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Fish and Wildlife Resources of the Great Lakes Coastal Wetlands within the United States

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VOLUME SIX: LAKE SUPERIOR

CLEAR Technical Report No. 170

Edited by

Charles E. Herdendorf
and
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Prepared for U.S. Fish and Wildlife Service, Division of Ecological Services-Region 3
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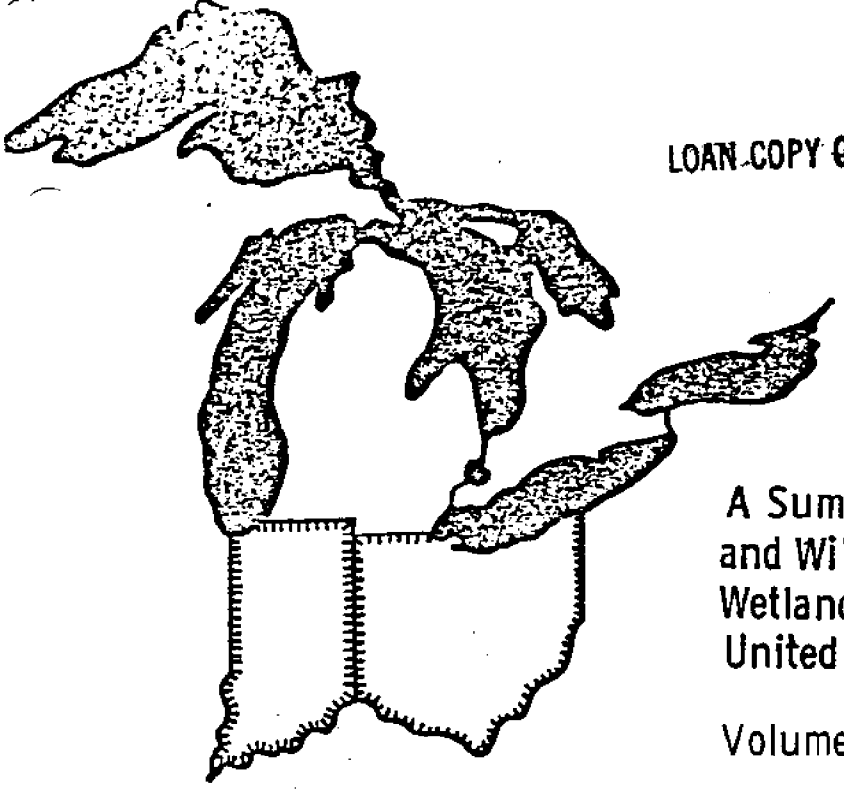
The Ohio State University, Center for Lake Erie Area Research,
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in cooperation with

Indiana University, Environmental Systems Application Center. Bloomington, Indiana

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A Summary of Knowledge of the Fish and Wildlife Resources of the Coastal Wetlands of the Great Lakes of the United States

Volume Six: Lake Superior

Prepared for

U.S. Fish and Wildlife Service
Division of Ecological Services - Region 3
Twin Cities, Minnesota

Compiled by

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CENTER FOR LAKE ERIE AREA RESEARCH
COLUMBUS, OHIO

and

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BLOOMINGTON, INDIANA

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PREFACE

OBJECTIVES

The purpose of the volumes of which this is the sixth is the compilation of information concerning fish and wildlife resources and environmental factors in the coastal wetlands of the Great Lakes within the United States. Specific objectives were as follows:

(a) to delineate and describe all wetland areas along the Great Lakes shorelines
(b) to inventory the fish and wildlife resources of these wetlands
(c) to describe the physiographic and cultural setting in which these wetlands are situated, and
(d) to determine the voids in knowledge pertaining to the fish and wildlife resources of the Great Lakes coastal wetlands.

The Great Lakes region has been divided into five areas of study, each consisting of a single lake and its connecting channel. These five areas are (1) Lake Ontario and the St. Lawrence River; (2) Lake Erie and the Niagara River; (3) Lake Huron and the St. Clair River, Lake St. Clair and the Detroit River; (4) Lake Michigan and the Mackinac Straits; and (5) Lake Superior and the St. Mary's River. Each such area comprises one volume in this study. An overview volume has been prepared which serves as an introduction to the five lake volumes.

The information summarizing the study areas is based on an extensive literature search undertaken by the Ohio State University Center for Lake Erie Area Research and the Indiana University Environmental Systems Application Center. Major sources of information used included referee journals and various technical and popular publications of the state departments of natural resources, libraries, universities, federal, state, and local agencies, multi-agency commissions having Great Lakes responsibilities, and private groups and individuals possessing knowledge of Lake Superior's coastal wetlands. In some cases unpublished open file data of various agencies and individuals was used. The sheer volume and the unfinished nature of unpublished data precluded its extensive use. Many agencies, institutions, and individuals were contacted by letter, telephone, or personal visit and provided valuable assistance in the acquisition and interpretation of published information. A complete listing of agencies, institutions, and individuals contacted appears in the Overview Volume (Volume #1).

ACKNOWLEDGEMENTS

This report represents the joint efforts of the Ohio State University Center for Lake Erie Area Research and the Indiana University Environmental Systems Application Center. The staff of the Center for Lake Erie Area Research was responsible for the preparation of all the components in this volume. Expertise and insight for the preparation of the Physiographic and Cultural Setting components was provided by the faculty of the Indiana University School of Public and Environmental Affairs.

Assistance from federal, state and local agencies, educational institutions and private individuals was splendid.

We would like to acknowledge all of the individuals contacted during this study who provided us with information concerning the coastal wetlands of Lake Superior. Special thanks are due to Charles C. King for his participation as coordinator of the Peer Review Group. We would like to thank all the members of the Peer Review Group for their valuable guidance. The seven members of the Peer Review Group are: Dr. William E. Cooper, Michigan State University; Dr. Henry L. Hunker, The Ohio State University; Dr. Orie Loucks, University of Wisconsin; Dr. Frederick Marland, Georgia Department of Natural Resources; Dr. William Niering, Connecticut College; Dr. Henry A. Regier, University of Toronto; Dr. Milton B. Trautman; The Ohio State University; and Dr. Charles C. King, Ohio Biological Survey.

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INTRODUCTION

WETLAND IDENTIFICATION AND DELINEATION

This volume concerns the coastal wetlands of Lake Superior and the St. Marys River. U.S. Geological Survey quadrangle maps (scale 1:24,000 or 1:62,500, depending on availability) were the primary basis for identifying and delineating all coastal wetlands. An arbitrary boundary line was drawn on these maps 1,000 feet landward of the normal high water mark at all points along the Lake Superior shore. All wetlands depicted on the maps which were contained entirely or partially between the 1,000 feet boundary and the shore, whether contiguous to the lake or not, were included in the review. Wetlands located wholly or partially within 1,000 feet of a coastal body of water such as a bay, harbor, or estuary, or small lakes and ponds with direct connections to Lake Superior, were similarly included. Figure 1 illustrates the above delineation rules.

An aerial reconnaissance of the Lake Superior shoreline was conducted to verify the existence of the wetlands shown on the quadrangle maps as well as to provide some first-hand familiarity with the wetlands and their setting. Based on the quadrangle maps and aerial reconnaissance, 348 wetlands were identified and delineated along the St. Marys River-Lake Superior shoreline. The 348 wetlands of Lake Superior are located along approximately 912 shoreline miles in Michigan, Wisconsin, and Minnesota.

USE OF THIS DOCUMENT

In order to facilitate the use of this report, the St. Marys River-Lake Superior shoreline has been divided into 11 lake sections (Table 1 and Figure 2). Each lake section corresponds to a separate chapter within this report. By looking at Figure 2, users of this document can determine which lake section contains the wetland(s) in which they are interested. Once this has been accomplished, the "Introduction" section of the appropriate lake section chapter should be consulted. A more detailed map of the shoreline is contained within the chapter Introduction. This map will permit users of the document to find the specific wetland(s) for which they are seeking information. The grouping of wetlands in a lake section does not necessarily imply physical or biological relationships among those wetlands. Rather, these sections are simply organizational devices and usually were drawn according to political boundaries or the density and distribution of wetlands along the coast.

Each wetland has been described in terms of its physiographic, biotic, and cultural characteristics. Table 2 identifies the sub-components considered within these three components. Where available, wetland-specific data are presented first within the individual wetland narratives, followed by historical or general information of relevance to the wetland. Reference may also be made to one of the appendices contained at the end of the report when more generalized but non-specific information is applicable to the wetland. A list of threatened and endangered species of Michigan, Wisconsin, and Minnesota

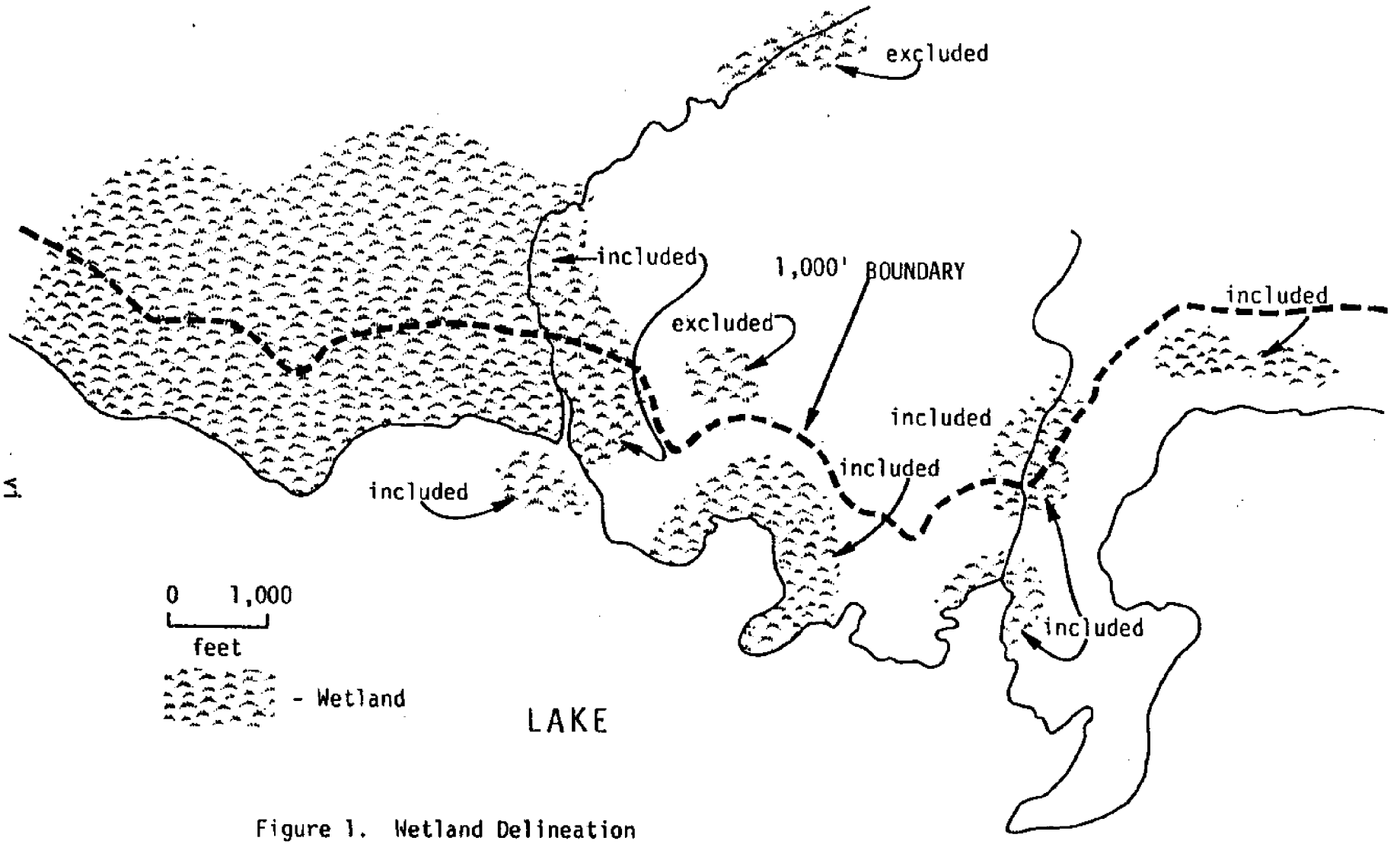


Figure 1. Wetland Delineation

Table 1. The Eleven Lake Sections of Lake Superior

Lake Section	Shoreline Area Included
LS 1	Lower St. Marys River to Sugar Island in Chippewa County, Michigan.
LS 2	Upper St. Marys River at Sugar Island to Point Iroquois in Chippewa County, Michigan.
LS 3	Point Iroquois to Crisp Point in Chippewa County, Michigan.
LS 4	Crisp Point to Point Abbaye within Luce, Marquette, and Baraga Counties, Michigan.
LS 5	Point Abbaye to Keweenaw Point within Baraga, Keweenaw, and Houghton Counties, Michigan.
LS 6	Manitou Island (off Keweenaw Point) to Michigan-Wisconsin border in Keweenaw, Michigan.
LS 7	Michigan-Wisconsin border to Van Tassells Point in Bayfield County, Wisconsin.
LS 8	Van Tassels Point to Brule Point in Bayfield County, Wisconsin.
LS 9	Brule Point to Two Harbors, Lake County, Minnesota.
LS 10	North shore from Two Harbors to the Minnesota-Canada border in Cook County, Minnesota.
LS 11	Isle Royale in Keweenaw County, Michigan.

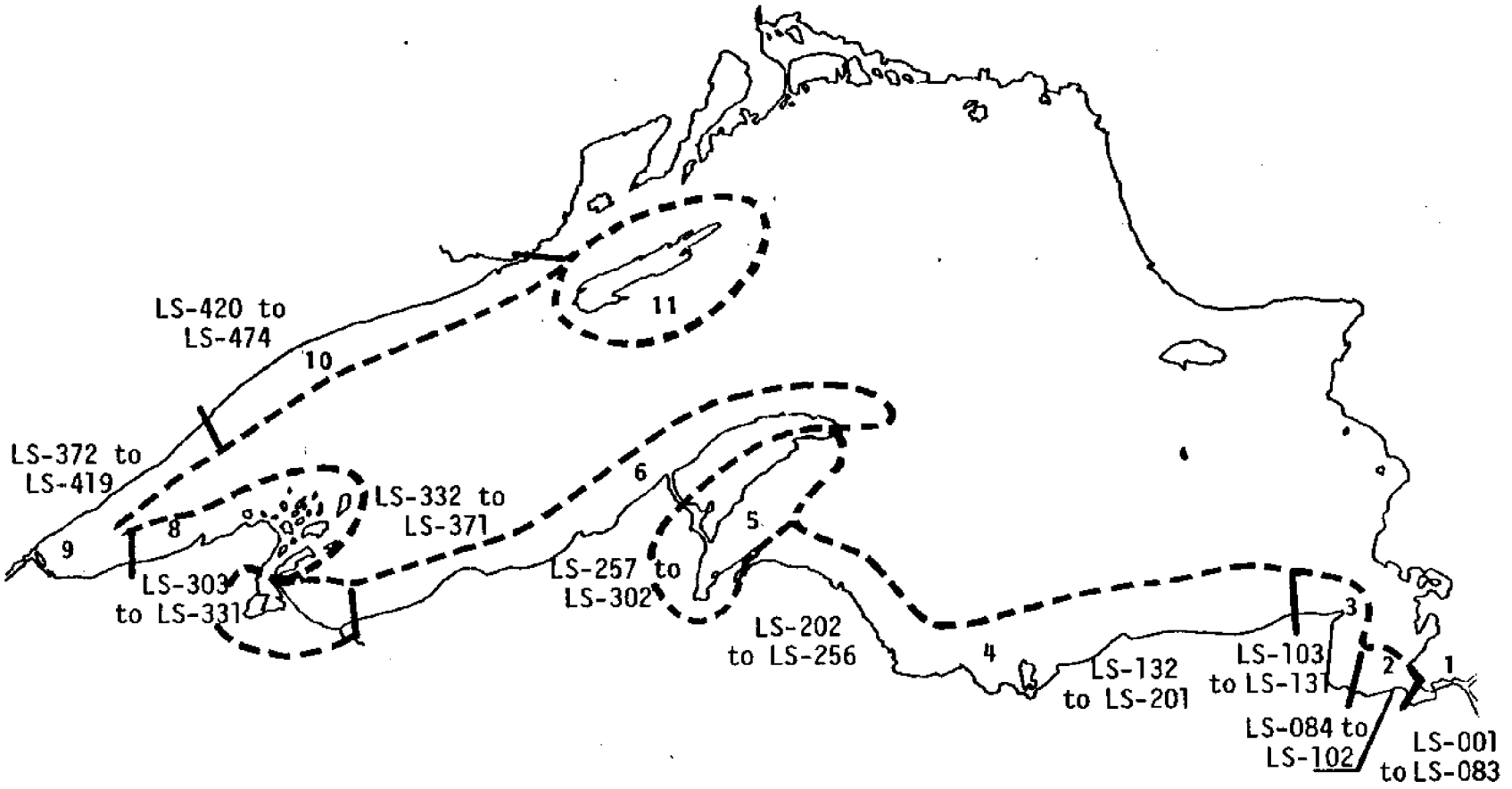


Figure 2. Lake Sections of Lake Superior and the St. Marys River

Table 2. Major Components Addressed in Individual Wetland Narratives

PHYSIOGRAPHIC SETTING
Setting
Topography
Surficial Geology
Soils
Hydrology
Climate
Special Features
BIOTIC SETTING
Vegetation
Fish
Invertebrates
Reptiles and Amphibians
Avifauna
Mammals
Endangered Species
CULTURAL SETTING
Population
Land Use and Ownership
Recreation
Mineral, Energy, and Forest Resources
Public Utilities and Facilities
Pollution Sources
Historical and Archaeological Features
RESEARCH PROJECTS

appears in Appendix D-1 of this volume. Scientific names associated with the common names used in this volume are presented in the Appendices of the Overview Volume.

A number of the wetlands along the Lake Superior shoreline are situated in close proximity to one another and have been grouped into "complexes" for convenience of discussion. The grouping of several wetlands in a complex does not necessarily imply any physical or biological continuity among those wetlands, although such continuity may exist in some cases. Several small wetlands in close proximity to one another or to a single larger wetland may have little or no site-specific information associated with them. It is simpler to group them under a single narrative rather than provide a completely negative narrative for each separately. A complete listing of these complexes as well as the individual wetlands along the Lake Superior shoreline is presented in Table 3. The table also indicates the page number on which a description of the wetland can be found.

This report is intended to provide a comprehensive summary of published information concerning the coastal wetlands of Lake Superior that can be readily used by public institutions and agencies as well as private groups and individuals. This report should enable interested persons to more easily use existing information as well as to identify areas where information concerning coastal wetlands is lacking. Doubtless, some sources of published information have been overlooked. It is hoped that such information, however minor, will be relayed to the authors.

Table 3. Wetlands in Lake Superior

Wetland Number	Wetland	Page Number
LAKE SECTION 1		
	False Detour Channel Wetland Complex	6
LS 001	False Detour Channel Wetland #1	
LS 002	False Detour Channel Wetland #2	
LS 003	Marble Head Wetland	11
LS 004	Sitgreaves Bay Wetland #1	15
LS 005	Sitgreaves Bay Wetland #2	19
	Glen Cove Wetland Complex	24
LS 006	Glen Cove Wetland #1	
LS 007	Glen Cove Wetland #2	
LS 008	Glen Cove Wetland #3	
LS 009	Glen Cove Wetland #4	
	Sand Bay Wetland Complex	29
LS 010	Sand Bay Wetland #1	
LS 011	Sand Bay Wetland #2	
	Northeast Drummond Island Wetland Complex	33
LS 012	Drummond Township Wetland #1	
LS 013	Drummond Township Wetland #2	
LS 014	Drummond Township Wetland #3	
LS 015	Drummond Township Wetland #4	
LS 016	Drummond Township Wetland #5	
LS 017	Drummond Township Wetland #6	
LS 018	Drummond Township Wetland #7	
LS 019	Raynolds Bay Wetland	38
LS 020	Raynolds Bay Area Wetland	42
LS 021	Dawson Lake Wetland	46
LS 022	Walkters Harbor Area Wetland	50
LS 023	Grand Marais Lake Wetland	54
	Northwest Drummond Island Wetland Complex	58
LS 024	Northwest Drummond Island Wetland #1	
LS 025	Chippewa Point Wetland	
LS 026	Hay Point Wetland	
LS 027	Bruce Point Wetland	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
(cont'd)	Northwest Drummond Island Wetland Complex	58
LS 028	Northwest Drummond Island Wetland #2	
LS 029	Northwest Drummond Island Wetland #3	
LS 030	Northwest Drummond Island Wetland #4	
LS 031	Northwest Drummond Island Wetland #5	
LS 032	Paw Point-North Scott Bay Wetland	63
LS 033	South Scott Bay Wetland	68
LS 034	South Scott Bay Area Wetland	73
LS 035	Potagannissing River Mouth Wetland	78
LS 036	Potagannissing River Mouth Area Wetland	83
LS 037	Stringham Lake Wetland	88
	Potagannissing Bay Islands Wetland Complex	93
LS 038	Harbor Island Wetland	
LS 039	Wilson Island Wetland	
LS 040	Burnt Island Wetland	
LS 041	Sweets Point Area Wetland	98
LS 042	Maud Bay Area Wetland	103
LS 043	Raber Bay Wetland	108
LS 044	Munuscong Lake Wetland #1	113
LS 045	Gogomain River Wetland	118
LS 046	Roach Point Wetland	123
	West Munuscong Lake Wetland Complex	128
LS 047	Munuscong Lake Wetland #2	
LS 048	Munuscong Lake Wetland #3	
LS 049	Munuscong-Little Munuscong River Delta Wetland	
LS 050	Munuscong Island Wetland	
LS 051	Munuscong Lake Wetland #4	
LS 052	Munuscong Lake Wetland #5	
LS 053	Munuscong Lake Wetland #6	
LS 054	Munuscong Lake Wetland #7	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
(cont'd)	West Munuscong Lake Wetland Complex	128
LS 055	Kemps Point Wetland	
LS 056	Sawmill Point Wetland	
LS 057	Moon Island Wetland	
	Neebish Island Wetland Complex	136
LS 058	Neebish Island Wetland	
LS 059	Southwest Neebish Island Wetland	
LS 060	Sand Island Wetland	
LS 061	Oak Ridge Wetland	
LS 062	Lake Nicolet West Shore Wetland	142
LAKE SECTION 2		
	Sugar Island Wetland Complex	152
LS 063	Sugar Island Wetland #1	
LS 064	Sugar Island Wetland #2	
LS 065	Lake Nicolet East Shore Wetland	
LS 066	Baie de Wasai Wetland	
LS 067	Sugar Island Wetland #3	
LS 068	Sugar Island Wetland #4	
LS 069	Lake George West Shore Wetland	
LS 070	Sugar Island Wetland #5	
	Izaak Walton Bay Wetland Complex	159
LS 071	Izaak Walton Bay Wetland #1	
LS 072	Izaak Walton Bay Wetland #2	
LS 073	Birch Point Area Wetland	164
LS 074	Back Bay Wetland	168
LS 075	South Pond Wetland	172
LS 076	North Pond Wetland	176
LAKE SECTION 3		
LS 077	Nodaway Point Wetland	184
	Pendills Creek Wetland Complex	188
LS 078	Pendills Lake Wetland	
LS 079	Pendills Creek Wetland #1	
LS 080	Pendills Creek Wetland #2	
LS 081	Pendills Creek Wetland #3	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LS 082	Naomikong Point Wetland	194
LS 083	South Tahquamenon Bay Wetland	198
LS 084	West Tahquamenon Bay Wetland	204
LS 085	Tahquamenon River Wetland	209
LS 086	Whitefish Bay Wetland	214
LS 087	Whitefish Point Wetland	219
	Whitefish Township Wetland Complex	224
LS 088	Whitefish Township Coastal Wetland #1	
LS 089	Whitefish Township Coastal Wetland #2	
LS 090	Whitefish Township Coastal Wetland #3	
LS 091	Weatherhogs Creek Wetland	229
LS 092	Whitefish Township Wetland	234
LS 093	Browns Creek Wetland	238
LAKE SECTION 4		
LS 094	Little Two Hearted River Wetland	252
LS 095	Two Hearted River Area Wetland	257
LS 096	Two Hearted River Wetland	261
LS 097	Muskallonge Lake Wetland	266
LS 098	Blind Sucker River Area Wetland	270
LS 099	Sucker River Wetland	274
LS 100	West Bay Wetland	279
LS 101	Au Sable Point Wetland	283
LS 102	Sullivan Creek Wetland	287
LS 103	Sullivan's Landing Wetland	291

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Table 3. (continued)

Wetland Number	Wetland	Page Number
	Pictured Rocks Area Wetland Complex	295
LS 104	Pictured Rocks Area Wetland #1	
LS 105	Pictured Rocks Area Wetland #2	
LS 106	Pictured Rocks Area Wetland #3	
LS 107	Pictured Rocks Area Wetland #4	
LS 108	Pictured Rocks Area Wetland #5	
LS 109	Pictured Rocks Area Wetland #6	
LS 110	Pictured Rocks Area Wetland #7	
LS 111	Pictured Rocks Area Wetland #8	
	Grand Island Wetland Complex	300
LS 112	Grand Island Harbor Area Wetland	
LS 113	Williams Landing Wetland	
LS 114	Echo Lake Wetland	
LS 115	Powell Point Wetland	305
LS 116	Fivemile Point Wetland	309
LS 117	Au Train Point Area Wetland	313
	Au Train Bay Wetland Complex	317
LS 118	Au Train Bay East Shore Wetland	
LS 119	Au Train River Wetland	
LS 120	Au Train Bay Southwest Shore Wetland	
	Laughing Fish Point Area Wetland Complex	323
LS 121	Laughing Fish Point Area Wetland #1	
LS 122	Laughing Fish Point Area Wetland #2	
LS 123	Laughing Fish Point Wetland	
LS 124	Laughing Whitefish River Wetland	
LS 125	Laughing Fish Point Area Wetland #3	
LS 126	Laughing Fish Point Area Wetland #4	
LS 127	Laughing Fish Point Area Wetland #5	
LS 128	Shot Point Wetland	329
LS 129	Marquette State Prison Area Wetland	333
LS 130	Middle Bay Wetland	339
LS 131	Little Garlic River Wetland	343
LS 132	Big Garlic River Wetland	348

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Table 3. (continued)

Wetland Number	Wetland	Page Number
	Yellow Dog Point Area Wetland Complex	354
LS 133	Yellow Dog Point Area Wetland #1	
LS 134	Yellow Dog Point Area Wetland #2	
LS 135	Yellow Dog Point Area Wetland #3	
LS 136	Yellow Dog Point Area Wetland #4	
LS 137	Iron River Wetland	358
	Big Bay Wetland Complex	363
LS 138	Big Bay Point Wetland	
LS 139	Squaw Beach Wetland	
LS 140	Big Bay West Shore Wetland	
LS 141	Salmon Trout River Wetland	367
	Huron Mountains Area Wetland Complex	372
LS 142	Conway Bay Wetland	
LS 143	Pine River Area Wetland	
LS 144	Pine River Wetland	
LS 145	Huron River Point Area Wetland	
LS 146	Little Huron River Wetland	
LS 147	Huron River Wetland	
LS 148	Lightfoot Bay Wetland	380
	Reeds Point Area Wetland Complex	385
LS 149	Reeds Point Wetland	
LS 150	Reeds Point Area Wetland	
LAKE SECTION 5		
	Keweenaw Bay Wetland Complex	395
LS 151	Pequaming Wetland	
LS 152	L'Anse Bay Wetland	
LS 153	Sand Point Wetland	
LS 154	Assinins Area Wetland	
LS 155	Arnheim Area Wetland	
	Portage River Wetland Complex	400
LS 156	Portage River Wetland #1	
LS 157	Portage River Wetland #2	
LS 158	Sturgeon River-Snake River Delta Wetland	404
LS 159	Pike River Wetland	410

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Table 3. (continued)

Wetland Number	Wetland	Page Number
LS 160	Denton Creek Wetland	415
LS 161	Pilgrim River Wetland	419
LS 162	Oskar Area Wetland	424
	Portage Lake Ship Canal Wetland Complex	428
LS 163	Portage Lake Ship Canal Wetland #1	
LS 164	Portage Lake Ship Canal Wetland #2	
LS 165	Portage Lake Ship Canal Wetland #3	
LS 166	Torch Bay Wetland	432
LS 167	Torch Lake Wetland	436
LS 168	Dollar Bay Wetland	441
LS 169	Rock River Wetland	446
LS 170	Silver Creek Wetland	451
	White City Area Wetland Complex	455
LS 171	White City Area Wetland #1	
LS 172	White City Area Wetland #2	
LS 173	LeChance Creek Wetland	459
LS 174	Mud Lake Creek Wetland	463
LS 175	Little Traverse Bay Wetland	468
LS 176	Grand Traverse Bay Wetland	472
	Oliver Bay Wetland Complex	477
LS 177	Oliver Bay Wetland #1	
LS 178	Oliver Bay Wetland #2	
LS 179	Point Isabelle Wetland	
	Lac LaBelle Wetland Complex	482
LS 180	Lac LaBelle Area Wetland	
LS 181	Lac LaBelle Wetland	
LS 182	Big Bay Wetland	487

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Table 3. (continued)

Wetland Number	Wetland	Page Number
LAKE SECTION 6		
LS 183	Manitou Island Wetland	497
LS 184	Lake Lily Wetland	501
	Agate Harbor Wetland Complex	505
LS 185	South Bay Area Wetland #1	
LS 186	South Bay Area Wetland #2	
LS 187	Silver River Area Wetland	
LS 188	Silver River Wetland	
	Cedar Swamp Area Wetland Complex	510
LS 189	Grand Marais Harbor Area Wetland	
LS 190	Lake Bailey Wetland	
LS 191	Cedar Swamp	
	The Marshes Area Wetland Complex	516
LS 192	The Marshes	
LS 193	Great Sand Bay Area Wetland #1	
LS 194	Great Sand Bay Area Wetland #2	
LS 195	Great Sand Bay Area Wetland #3	
LS 196	Jacobs Wetland	
	Eagle River Area Wetland Complex	521
LS 197	Dunes Drive Wetland	
LS 198	Eagle River Area Wetland	
LS 199	Silver Creek Area Wetland	
LS 200	Mud Lake Wetland	525
LS 201	Gratiot River Wetland	529
LS 202	Black Creek Wetland	534
	Brewery Creek Area Wetland Complex	539
LS 203	Brewery Creek Area Wetland #1	
LS 204	Brewery Creek Area Wetland #2	
LS 205	Brewery Creek Wetland	
	Muggun Creek Area Wetland Complex	543
LS 206	Muggun Creek Area Wetland #1	
LS 207	Muggun Creek Area Wetland #2	
LS 208	Muggun Creek Area Wetland #3	

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Table 3. (continued)

Wetland Number	Wetland	Page Number
	Sevenmile Creek Wetland Complex	547
LS 209	Sevenmile Creek Wetland #1	
LS 210	Sevenmile Creek Wetland #2	
LS 211	Bear Lake Wetland	551
LS 212	Salmon Trout River Wetland	556
LS 213	Little Elm River Wetland	560
LS 214	East Sleeping River Wetland	564
LS 215	Fourteenmile Point Wetland	569
	Flintsteel River Area Wetland Complex	573
LS 216	Firesteel River Wetland	
LS 217	Flintsteel River Wetland	
LS 218	Flintsteel River Area Wetland	
LS 219	Paddys Creek Wetland	
LS 220	Graveyard Creek Wetland	580
LAKE SECTION 7		
LS 221	Chequamegon Wetland	588
	Southeast Chequamegon Bay Area Wetland Complex	597
LS 222	Southeast Chequamegon Bay Area Wetland #1	
LS 223	Southeast Chequamegon Bay Area Wetland #2	
LS 224	Southeast Chequamegon Bay Area Wetland #3	
LS 225	Southeast Chequamegon Bay Area Wetland #4	
LS 226	Southeast Chequamegon Bay Area Wetland #5	
LS 227	Fish Creek Wetland	602
LS 228	Sioux River Wetland	610
LAKE SECTION 8		
	Madeline Island Wetland Complex	620
LS 229	La Pointe Wetland	
LS 230	Madeline Island Wetland #1	
LS 231	Madeline Island Wetland #2	
LS 232	Bog Lake Wetland	

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Table 3. (continued)

Wetland Number	Wetland	Page Number
(cont'd)	Madeline Island Wetland Complex	620
LS 233	Madeline Island Wetland #3	
LS 234	Big Bay Lagoon Wetland	
LS 235	Chebomnicon Bay Area Wetland	
	Stockton Island Wetland Complex	626
LS 236	Quarry Bay Wetland	
LS 237	Stockton Island Wetland	
LS 238	Presque Isle Point Wetland	
LS 239	Presque Isle Bay Wetland	
	Rocky Island Wetland Complex	632
LS 240	Rocky Island Wetland #1	
LS 241	Rocky Island Wetland #2	
	Outer Island Wetland Complex	637
LS 242	Sand Point Wetland	
LS 243	Outer Island Wetland #1	
LS 244	Outer Island Wetland #2	
	Cat Island Wetland Complex	643
LS 245	Cat Island Wetland #1	
LS 246	Cat Island Wetland #2	
LS 247	Cat Island Wetland #3	
	Michigan Island Wetland Complex	648
LS 248	Michigan Island Wetland #1	
LS 249	Michigan Island Wetland #2	
LS 250	Michigan Island Wetland #3	
LS 251	Michigan Island Wetland #4	
LS 252	Michigan Island Wetland #5	
LS 253	Michigan Island Wetland #6	
LS 254	York Island Wetland	653
	Raspberry Island Wetland Complex	657
LS 255	Raspberry Island Wetland #1	
LS 256	Raspberry Island Wetland #2	
LS 257	Raspberry Island Wetland #3	
LS 258	Frog Creek Wetland	662
LS 259	Raspberry Bay Wetland	666
LS 260	Little Sand Bay Wetland	671

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Table 3. (continued)

Wetland Number	Wetland	Page Number
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LAKE SECTION 1

INTRODUCTION

Lake Section 1 extends from the lower St. Marys River to Sugar Island in Chippewa County, Michigan. The region features irregular, hilly topography in the vicinity of the wetlands. The predominant shore type along this 77 mile stretch of shoreline is erodible low plain.

Figures 1-1 and 1-2 show the approximate location of the 62 wetlands in Lake Section 1. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 1-1. The wetlands of Lake Section 1 are located at elevations between 580 and 630 feet above sea level, zero to 50 feet above the mean low water datum of the St. Marys River. These wetlands are classified as Palustrine, Lacustrine and Riverine.

Available information related to physiographic and cultural features of these 62 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

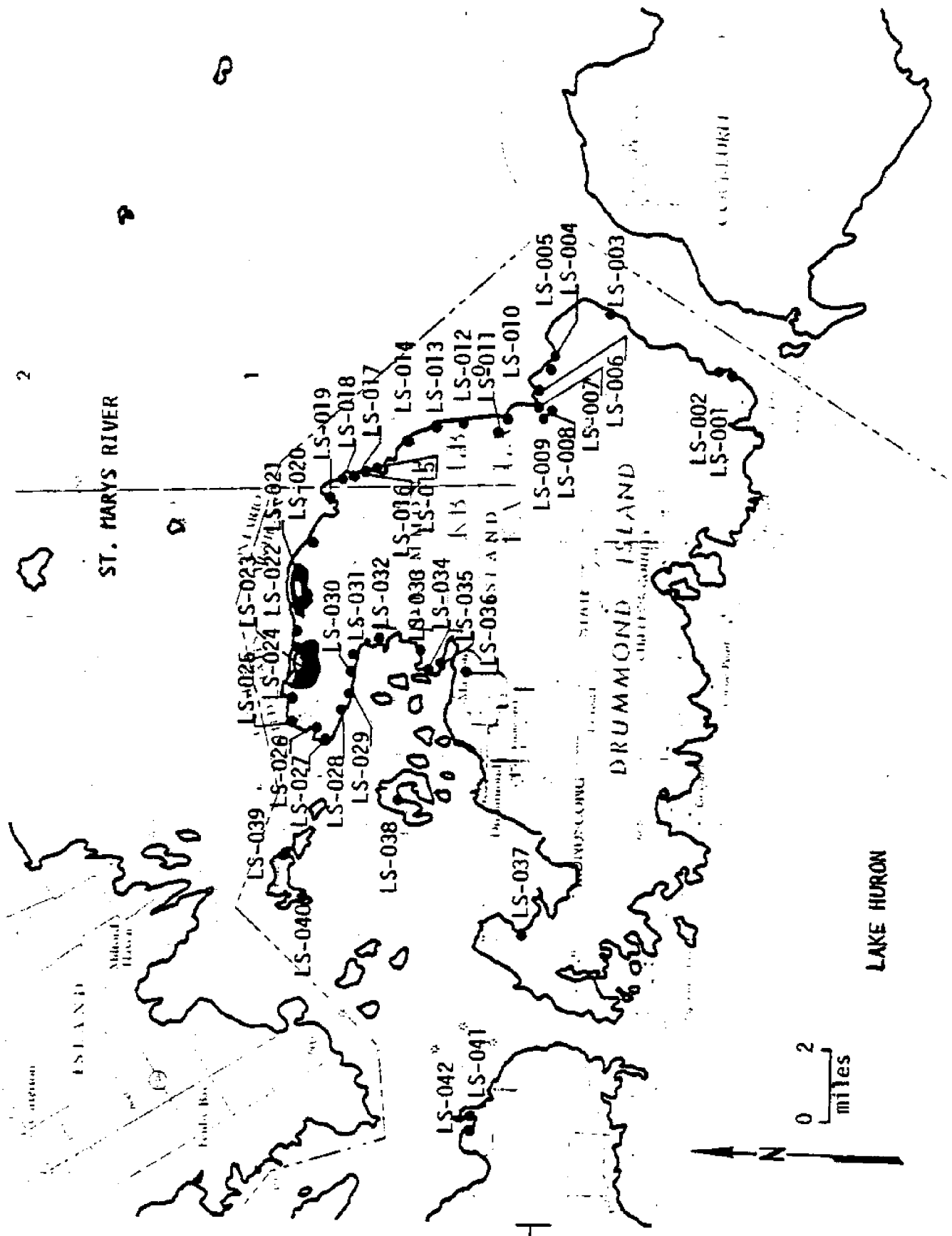


Figure 1-1. Lake Section 1 - Drummond Island Area

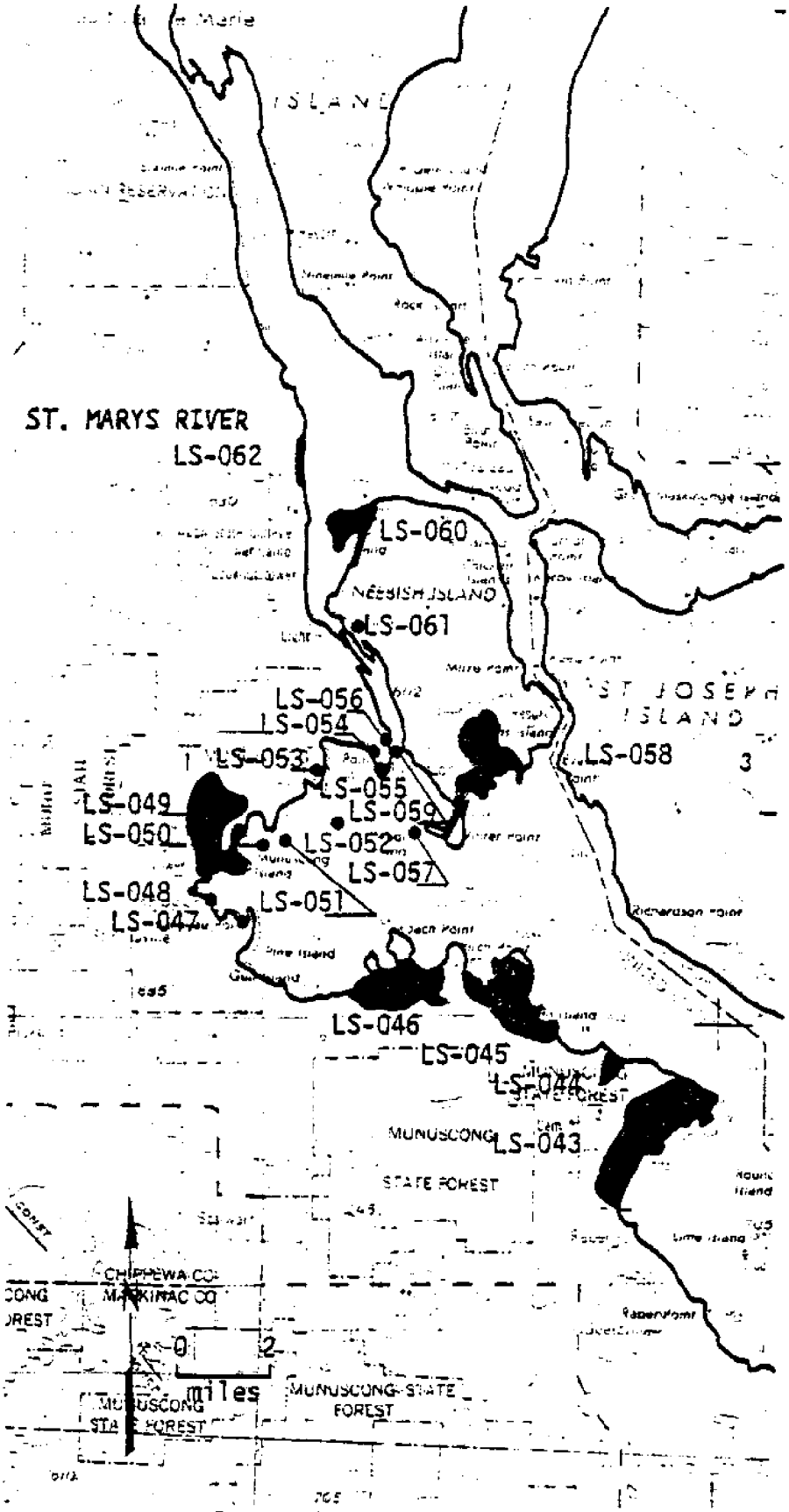


Figure 1-2. Lake Section 1 - Munuscong Lake Area

Table 1-1. Location, Acreage, and Classification of Wetlands in Lake Section 1

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	FALSE DETOUR CHANNEL WETLAND COMPLEX				
LS 001	False Detour Channel Wetland #1	45°55'42"	83°30'56"	7	P
LS 002	False Detour Channel Wetland #2	45°55'53"	83°30'44"	8	
LS 003	Marble Head Wetland	45°58'22"	82°58'58"	9	P
LS 004	Sitgreaves Bay Wetland #1	45°59'36"	83°30'02"	2	P
LS 005	Sitgreaves Bay Wetland #2	45°59'41"	83°30'53"	130	P
	GLEN COVE WETLAND COMPLEX				
LS 006	Glen Cove Wetland #1	46°00'02"	83°31'32"	83	P
LS 007	Glen Cove Wetland #2	46°00'21"	83°31'55"	5	P
LS 008	Glen Cove Wetland #3	46°00'15"	83°31'54"	3	P
LS 009	Glen Cove Wetland #4	46°00'08"	83°31'58"	10	P
	SAND BAY WETLAND COMPLEX				
LS 010	Sand Bay Wetland #1	46°00'55"	83°32'18"	8	P
LS 011	Sand Bay Wetland #2	46°01'00"	83°32'35"	3	P
	NORTHEAST DRUMMOND ISLAND WETLAND COMPLEX				
LS 012	Drummond Township Wetland #1	46°02'25"	83°32'46"	3	P
LS 013	Drummond Township Wetland #2	46°02'48"	83°32'54"	2	P
LS 014	Drummond Township Wetland #3	46°03'20"	83°33'28"	8	P
LS 015	Drummond Township Wetland #4	46°04'23"	83°34'26"	2	P
LS 016	Drummond Township Wetland #5	46°04'35"	83°34'37"	2	P
LS 017	Drummond Township Wetland #6	46°04'46"	83°34'37"	3	P
LS 018	Drummond Township Wetland #7	46°04'58"	83°34'42"	2	P
LS 019	Raynolds Bay Wetland	46°05'05"	83°35'46"	18	P
LS 020	Raynolds Bay Area Wetland	46°05'26"	83°36'44"	78	P
LS 021	Dawson Lake Wetland	46°05'41"	83°38'40"	367	P
LS 022	Waltkers Harbor Area Wetland	46°05'57"	83°39'42"	5	P
LS 023	Grand Marais Lake Wetland	46°05'48"	83°40'36"	170	P
	NORTHWEST DRUMMOND ISLAND WETLAND COMPLEX				
LS 024	Northwest Drummond Island Wetland #1	46°05'59"	83°42'04"	15	P
LS 025	Chippewa Point Wetland	46°05'59"	83°43'01"	15	P
LS 026	Hay Point Wetland	46°05'35"	83°43'10"	35	P
LS 027	Bruce Point Wetland	46°05'21"	83°43'38"	6	P
LS 028	Northwest Drummond Island Wetland #2	46°05'00"	83°43'09"	18	P
LS 029	Northwest Drummond Island Wetland #3	46°04'58"	83°42'41"	13	P
LS 030	Northwest Drummond Island Wetland #4	46°04'35"	83°41'58"	35	P
LS 031	Northwest Drummond Island Wetland #5	46°04'30"	83°41'58"	3	P
LS 032	Paw Point-North Scott Bay Wetland	46°04'01"	83°39'48"	450	P
LS 033	South Scott Bay Wetland	46°02'57"	83°40'42"	7	P
LS 034	South Scott Bay Area Wetland	46°04'51"	83°41'12"	10	P
LS 035	Potagannissing River Mouth Wetland	46°02'13"	83°40'24"	73	P
LS 036	Potagannissing River Mouth Area Wetland	46°47'52"	83°41'27"	20	P
LS 037	Stringham Lake Wetland	46°00'32"	83°50'22"	50	P
	POTAGANNISSING BAY ISLANDS WETLAND COMPLEX				
LS 038	Harbor Island Wetland	46°03'26"	83°45'36"	2.5	P
LS 039	Wilson Island Wetland	46°05'40"	83°46'52"	10	P
LS 040	Burnt Island Wetland	46°05'59"	83°49'02"	32	P
LS 041	Sweets Point Area Wetland	46°01'25"	83°56'29"	8	P
LS 042	Maud Bay Area Wetland	46°01'11"	83°57'16"	90	P
LS 043	Raber Bay Wetland	46°06'58"	84°03'24"	1595	P

-continued-

Table 1-1. (concluded)

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 044	Munuscong Lake Wetland #1	46°08'32"	84°06'20"	95	P
LS 045	Gogomain River Wetland	46°09'52"	84°07'22"	982	P
LS 046	Roach Point Wetland	46°09'59"	84°10'18"	946	P
	WEST MUNUSCONG LAKE WETLAND COMPLEX				
LS 047	Munuscong Lake Wetland #2	46°11'15"	84°15'10"	110	P
LS 048	Munuscong Lake Wetland #3	46°11'46"	84°16'12"	70	P
LS 049	Munuscong-Little Munuscong River Delta WL	46°13'25"	84°15'02"	1205	P-L-R
LS 050	Munuscong Island Wetland	46°12'49"	84°14'22"	15	P
LS 051	Munuscong Lake Wetland #4	46°12'49"	84°13'42"	23	P
LS 052	Munuscong Lake Wetland #5	46°13'09"	84°12'20"	36	P
LS 053	Munuscong Lake Wetland #6	46°14'14"	84°12'20"	265	P
LS 054	Munuscong Lake Wetland #7	46°14'39"	84°11'23"	5	P
LS 055	Kemps Point Wetland	46°14'15"	84°11'02"	70	P
LS 056	Sawmill Point Wetland	46°14'54"	84°11'03"	5	P
LS 057	Moon Island Wetland	46°12'51"	84°09'50"	45	P
	NEEBISH ISLAND WETLAND COMPLEX				
LS 058	Neebish Island Wetland	46°14'18"	84°07'55"	1320	P
LS 059	Southwest Neebish Island Wetland	46°14'22"	84°10'06"	10	P
LS 060	Sand Island Wetland	46°18'58"	84°10'09"	640	P-L
LS 061	Oak Ridge Wetland	46°17'27"	84°12'27"	40	P
LS 062	Lake Nicolet West Shore Wetland	46°20'36"	84°13'15"	252	L

P=palustrine

FALSE DETOUR WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 001-002

Setting

The False Detour Channel Wetland Complex is located on Drummond Island in the coastal zone of the St. Marys River, within Drummond Township of Chippewa County, Michigan. False Detour Channel Wetland #1 lies approximately 0.1 mile from the shoreline of False Detour Channel, and False Detour Channel Wetland #2 lies on the shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Topography

The False Detour Channel Wetland Complex has little relief, and lies at an elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area slopes steadily upward to about 670 feet above mean sea level (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the False Detour Channel Wetland Complex lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Manistique formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils present in False Detour Channel Wetland #1 are classified as Detour stony loam, and soils present in False Detour Channel Wetland #2 are classified as coastal beach (Veatch, 1927).

Hydrology

No streams flow through the False Detour Channel Wetland Complex (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the False Detour Channel Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in

July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are found in the vicinity of the False Detour Channel Wetland Complex (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

BIOTIC SETTING LS 001-002

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the False Detour Channel Wetland Complex.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the two wetlands of the False Detour Channel Wetland Complex. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the False Detour Channel Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the two wetlands comprising the False Detour Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the False Detour Channel Wetland Complex.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in the False Detour Channel Wetland Complex (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the False Detour Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 001-002

Population

The False Detour Channel Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-2 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-2. Population Data for the Vicinity of the False Detour Channel Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the False Detour Channel Wetland Complex and most of the surrounding area is rural open space. These wetlands are under mixed private and state ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Recreation

The False Detour Channel Wetland Complex is located within Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the False Detour Channel Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

False Detour Channel Wetland #2 is non-wooded, but False Detour Wetland #1 and the area surrounding the complex are wooded and represent potential forest resources. No significant energy resources are known to be present in the vicinity.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the False Detour Channel Wetland Complex (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the False Detour Channel Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of False Detour Channel Wetlands #1 and #2, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 001-002

The literature search identified no on-going or impending research projects pertaining to the False Detour Channel Wetland Complex.

MARBLE HEAD WETLAND

PHYSIOGRAPHIC SETTING

LS 003

Setting

Marble Head Wetland is located on Drummond Island, approximately 300 feet from the shoreline of the St. Marys River in Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Topography

Marble Head Wetland has ten feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular, with a steady rise inland to an elevation of about 730 feet above mean sea level (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Marble Head Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Manistique formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils present in Marble Head Wetland are classified as Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through Marble Head Wetland (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Marble Head Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are found in the vicinity of Marble Head Wetland (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

BIOTIC SETTING LS 003

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Marble Head Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Marble Head Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Marble Head Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Marble Head Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Marble Head Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Marble Head Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Marble Head Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 003

Population

Marble Head Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-3 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-3. Population Data for the Vicinity of Marble Head Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Marble Head Wetland and most of the surrounding area is rural open space. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Recreation

Marble Head Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Marble Head Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

Marble Head Wetland and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Marble Head Wetland (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Marble Head Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Marble Head Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 003

The literature search identified no on-going or impending research projects pertaining to Marble Head Wetland.

SITGREAVES BAY WETLAND #1

PHYSIOGRAPHIC SETTING

LS 004

Setting

Sitgreaves Bay Wetland #1 is located on Drummond Island, approximately 200 feet from the shoreline of Sitgreaves Bay, which is directly connected to False Detour Channel, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Topography

Sitgreaves Bay Wetland #1 has little relief and lies at an elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is hilly; the greatest local elevation is about 745 feet above mean sea level (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Sitgreaves Bay Wetland #1 lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Manistique formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils present in Sitgreaves Bay Wetland #1 are classified as Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through Sitgreaves Bay Wetland #1 (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sitgreaves Bay Wetland #1 is located in De Tour, Michigan. The average temperature was 43.4^{0}F in 1975. The mean daily low for January was 14.1^{0}F and the mean daily high for July was 79.3^{0}F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are found in the vicinity of Sitgreaves Bay Wetland #1 (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

BIOTIC SETTING LS 004

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sitgreaves Bay Wetland #1.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Sitgreaves Bay Wetland #1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sitgreaves Bay Wetland #1.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sitgreaves Bay Wetland #1.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sitgreaves Bay Wetland #1.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Sitgreaves Bay Wetland #1 (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sitgreaves Bay Wetland #1 by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 004

Population

Sitgreaves Bay Wetland #1 is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-4 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-4. Population Data for the Vicinity of Sitgreaves Bay Wetland #1

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sitgreaves Bay Wetland #1 and most of the surrounding area is rural open space. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Recreation

Sitgreaves Bay Wetland #1 is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Sitgreaves Bay Wetland #1 are limited to limestone (Great Lakes Basin Commission, 1974).

Sitgreaves Bay Wetland #1 and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sitgreaves Bay Wetland #1 (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Sitgreaves Bay Wetland #1 (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sitgreaves Bay Wetland #1, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 004

The literature search identified no on-going or impending research projects pertaining to Sitgreaves Bay Wetland #1.

SITGREAVES BAY WETLAND #2

PHYSIOGRAPHIC SETTING LS 005

Setting

Sitgreaves Bay Wetland #2 is located on Drummond Island, 0.2 mile from the shoreline of Sitgreaves Bay, which is directly connected to False Detour Channel, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

Topography

Sitgreaves Bay Wetland #2 has ten feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular and hilly with a fairly steep grade in the immediate area of the wetland. The greatest local elevation is about 745 feet above mean sea level (U.S.G.S. quadrangle maps, Marble Head, Michigan, 1964; Drummond Southeast, Michigan, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Sitgreaves Bay Wetland #2 lies is characterized by ground moraines (till plains). Rock occuring at or near the surface is of the Silurian period and the Burnt Bluff formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils present in Sitgreaves Bay Wetland #2 are classified as Detour stony loam (Veatch, 1927).

Hydrology

Two intermittent streams and an unnamed stream flow through Sitgreaves Bay Wetland #2 (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sitgreaves Bay Wetland #2 is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The

growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are found in the vicinity of Sitgreaves Bay Wetland #2 (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 005

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sitgreaves Bay Wetland #2.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Sitgreaves Bay Wetland #2. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sitgreaves Bay Wetland #2.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sitgreaves Bay Wetland #2.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sitgreaves Bay Wetland #2.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Sitgreaves Bay Wetland #2 (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sitgreaves Bay Wetland #2 by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 005

Population

Sitgreaves Bay Wetland #2 is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-5 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-5. Population Data for the Vicinity of Sitgreaves Bay Wetland #2

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sitgreaves Bay Wetland #2 and most of the surrounding area is rural open space. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Recreation

Sitgreaves Bay Wetland #2 is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Sitgreaves Bay Wetland #2 are limited to limestone (Great Lakes Basin Commission, 1974).

Sitgreaves Bay Wetland #2 and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sitgreaves Bay Wetland #2 (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Sitgreaves Bay Wetland #2 (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sitgreaves Bay Wetland #2, nor are there any known archaeological sites in the vicinity.

However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 005

The literature search identified no on-going or impending research projects pertaining to Sitgreaves Bay Wetland #2.

GLEN COVE WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 006-009

Setting

The Glen Cove Wetland Complex is located on Drummond Island in the coastal zone of Glen Cove, which is directly connected to North Channel, within Drummond Township of Chippewa County, Michigan. The various parts of the complex extend from the shoreline to approximately 0.7 mile inland. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

Topography

The Glen Cove Wetland Complex has 30 feet of relief and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular and hilly; the highest local elevation is about 750 feet above mean sea level (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the Glen Cove Wetland Complex lies is characterized by ground moraines (till plains). Rock occurring at or near the surface is of the Silurian period and the Burnt Bluff formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

The following soils are present in the Glen Cove Wetland Complex: Glen Cove Wetland #1 - Detour stony loam and Eastport sand, stony phase; Glen Cove Wetland #2 - Detour stony loam and coastal beach; Glen Cove Wetland #3 - Detour stony loam; and Glen Cove Wetland #4 - Detour stony loam and Johnswood stony loam (Veatch, 1927).

Hydrology

No streams flow through the Glen Cove Wetland Complex (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Glen Cove Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

Numerous rocks lie offshore, forming a submerged or partially submerged spit which possibly affords some protection to Glen Cove (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 006-009

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Glen Cove Wetland Complex.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the four wetlands of the Glen Cove Wetland Complex. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Glen Cove Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and

abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the four wetlands comprising the Glen Cove Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Glen Cove Wetland Complex.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in the Glen Cove Wetland Complex (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting these four wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Glen Cove Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 006-009

Population

The Glen Cove Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-6 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-6. Population Data for the Vicinity of the Glen Cove Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Glen Cove Wetland Complex and most of the surrounding area is rural open space. A jeep trail runs along the western boundaries of Glen Cove Wetlands #2, #3, and #4. Two buildings are adjacent to the western boundary of Glen Cove Wetland #2, but the wetlands are under state ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan-Ontario, 1964).

Recreation

The Glen Cove Wetland Complex is located in the Munuscong State Forest. Wetlands #2 and #4 have a jeep trail adjacent to them.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Glen Cove Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

The Glen Cove Wetland Complex and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Glen Cove Wetland Complex (U.S.G.S. quadrangle maps, Marble Head, Michigan-Ontario, 1964; Drummond Southeast, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Glen Cove Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Glen Cove Wetlands #1-#3 or Glen Point Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 006-009

The literature search identified no on-going or impending research projects pertaining to the Glen Cove Wetland Complex.

SAND BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 010-011

Setting

The Sand Bay Wetland Complex is located on Drummond Island approximately 0.5 mile from the shoreline of Sand Bay, which is directly connected to North Channel, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies predominantly wooded sites, but a portion of Sand Bay Wetland #1 is non-wooded (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Topography

The Sand Bay Wetland Complex has ten feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular and hilly; the greatest local elevation is about 750 feet above mean sea level (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the Sand Bay Wetland Complex lies is characterized by ground moraines (till plains). Rock occurring at or near the surface is of the Silurian period and the Mayville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in the Sand Bay Wetland Complex are classified as Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through the Sand Bay Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Sand Bay Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in

July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of the Sand Bay Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 010-011

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Sand Bay Wetland Complex.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the Sand Bay Wetland Complex. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Sand Bay Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Sand Bay Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

health, life histories, relationship to water levels, or major food sources of the birds utilizing the Sand Bay Wetland Complex.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in the Sand Bay Wetland Complex (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting these two wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Sand Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 010-011

Population

The Sand Bay Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-7 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-7. Population Data for the Vicinity of the Sand Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Sand Bay Wetland Complex and most of the surrounding area is rural open space. A jeep trail runs along the northeast boundary of Sand Bay Wetland #1. The wetlands are under private ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Recreation

The Sand Bay Wetland Complex is located in the Munuscong State Forest. Wetland #1 has a jeep trail near it.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Sand Bay Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

The Sand Bay Wetland Complex and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Sand Bay Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Sand Bay Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sand Bay Wetlands #1 and #2, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 010-011

The literature search identified no on-going or impending research projects pertaining to the Sand Bay Wetland Complex.

NORTHEAST DRUMMOND ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 012-018

Setting

The Northeast Drummond Island Wetland Complex is located on Drummond Island in the coastal zone of the St. Marys River, within Drummond Township of Chippewa County, Michigan. The various parts of the complex lie approximately 300 feet from the North Channel shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Topography

The Northeast Drummond Island Wetland Complex has 50 feet of relief and a maximum elevation of 630 feet above mean sea level (50 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular and hilly; the greatest local elevation is about 700 feet above mean sea level (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the Northeast Drummond Island Wetland Complex lies is characterized by ground moraines (till plain). Rock occurring at or near the surface is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in the Northeast Drummond Island Wetland Complex are classified as Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through the Northeast Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Northeast Drummond Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and

2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of the Northeast Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 012-018

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Northeast Drummond Island Wetland Complex.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the Northeast Drummond Island Wetland Complex. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these seven wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Northeast Drummond Island Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Northeast Drummond Island Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Northeast Drummond Island Wetland Complex.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in the Northeast Drummond Island Wetland Complex (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting these seven wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Northeast Drummond Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 012-018

Population

The Northeast Drummond Island Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-8 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-8. Population Data for the Vicinity of the Northeast Drummond Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Northeast Drummond Island Wetland Complex and most of the surrounding area is rural open space. One unimproved dirt road lies within one half mile of wetlands #3 and #4, and a trail runs along the southern boundary of wetland #1. The wetlands are under private ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Recreation

The Northeast Drummond Island Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Northeast Drummond Island Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

The wetlands in the complex and the surrounding areas are predominantly wooded and represent a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond Southeast, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Northeast Drummond Island Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Northeast Drummond Island Wetland Complex, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 012-018

The literature search identified no on-going or impending research projects pertaining to the Northeast Drummond Island Wetland Complex.

RAYNOLDS BAY WETLAND

PHYSIOGRAPHIC SETTING LS 019

Setting

Raynolds Bay Wetland is located on Drummond Island, on the shoreline of Raynolds Bay, which is directly connected to North Channel, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Topography

Raynolds Bay Wetland has little relief and lies at an elevation only slightly above that of the North Channel (580 feet above mean sea level). The surrounding area is irregular, with little relief (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Raynolds Bay Wetland lies is characterized by ground moraines and by rock at or near the surface. This rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in the Raynolds Bay Wetland are classified as coastal beach (Veatch, 1927).

Hydrology

No streams flow through Raynolds Bay Wetland (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Raynolds Bay Wetland is located in De Tour, Michigan. The average temperature was 43.4^{o}F in 1975. The mean daily low for January was 14.1^{o}F and the mean daily high for July was 79.3^{o}F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

Offshore rocks at the entrance of Raynolds Bay may afford some protection for the wetland from northerly seas (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 019

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Raynolds Bay Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Raynolds Bay Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Raynolds Bay Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Raynolds Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Raynolds Bay Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Raynolds Bay Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Raynolds Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 019

Population

Raynolds Bay Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-9 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-9. Population Data for the Vicinity of Raynolds Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Raynolds Bay Wetland and the surrounding area is rural open space. An unimproved road runs along the eastern boundary of the western section of the wetland. The wetland is under mixed private and state ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Recreation

Raynolds Bay Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Raynolds Bay Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland is non-wooded. The surrounding area is wooded and represents a potential forest resource, but no significant energy resources are known to be present in the vicinity.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Raynolds Bay Wetland (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Raynolds Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Raynolds Bay Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 019

The literature search identified no on-going or impending research projects pertaining to Raynolds Bay Wetland.

RAYNOLDS BAY AREA WETLAND

PHYSIOGRAPHIC SETTING LS 020

Setting

Raynolds Bay Area Wetland is located on Drummond Island, approximately 0.2 mile from the shoreline of the St. Mary's River, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Topography

Raynolds Bay Area Wetland has 15 feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular, with relatively little relief (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Raynolds Bay Area Wetland lies is characterized by ground moraines and by rock at or near the surface. The rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Reynolds Bay Area Wetland are classified as coastal beach (Veatch, 1927).

Hydrology

No streams flow through Raynolds Bay Area Wetland (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Raynolds Bay Area Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of Raynolds Bay Area Wetland (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

BIOTIC SETTING LS 020

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Raynolds Bay Area Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Raynolds Bay Area Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Raynolds Bay Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Raynolds Bay Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Raynolds Bay Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Raynolds Bay Area Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Raynolds Bay Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 020

Population

Raynolds Bay Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-10 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-10. Population Data for the Vicinity of Raynolds Bay Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Raynolds Bay Area Wetland and the surrounding area is rural open space. The wetland is under mixed state and private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Recreation

Raynolds Bay Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Raynolds Bay Area Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are predominantly wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Raynolds Bay Area Wetland (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Raynolds Bay Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Raynolds Bay Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 020

The literature search identified no on-going or impending research projects pertaining to Raynolds Bay Area Wetland.

DAWSON LAKE WETLAND

PHYSIOGRAPHIC SETTING LS 021

Setting

Dawson Lake Wetland is located on Drummond Island, approximately 0.1 mile from the shoreline of the St. Marys River within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Dawson Lake Wetland has little relief and lies at an elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron. The surrounding area is irregular, with little relief (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Dawson Lake Wetland lies is characterized by ground moraines and by rock at or near the surface. This rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Dawson Lake Wetland are classified as Tahquamenon peat, Carbondale muck, Detour stony loam, Granby sand, and Bruce silt loam (Veatch, 1927).

Hydrology

One intermittent stream flows through Dawson Lake Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Dawson Lake Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of Dawson Lake Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 021

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Dawson Lake Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Dawson Lake Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Dawson Lake Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Dawson Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Dawson Lake Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Dawson Lake Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Dawson Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 021

Population

Dawson Lake Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-11 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-11. Population Data for the Vicinity of Dawson Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Dawson Lake Wetland and the surrounding area is rural open space. A trail runs through the western section of the wetland, and two buildings are adjacent to the northwestern boundary. The wetland is under private ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond Southeast, Michigan-Ontario, 1964).

Recreation

Dawson Lake Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Dawson Lake Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are predominantly wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Dawson Lake Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Dawson Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Dawson Lake Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 021

The literature search identified no on-going or impending research projects pertaining to Dawson Lake Wetland.

WALKTERS HARBOR AREA WETLAND

PHYSIOGRAPHIC SETTING LS 022

Setting

Walkters Harbor Area Wetland is located on Drummond Island, approximately 300 feet from the St. Marys River shoreline, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Walkters Harbor Area Wetland has five feet of relief and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular, with little relief (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Walkters Harbor Area Wetland lies is characterized by ground moraines and by rock at or near the surface. This rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Walkters Harbor Area Wetland are classified as Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through Walkters Harbor Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Walkters Harbor Area Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with

the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of Walkters Harbor Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 022

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Walkters Harbor Area Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Walkters Harbor Area Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Walkters Harbor Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Walkters Harbor Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Walkters Harbor Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Walkters Harbor Area Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Walkters Harbor Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 022

Population

Walkters Harbor Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-12 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-12. Population Data for the Vicinity of Walkters Harbor Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Walkters Harbor Area Wetland and the surrounding area is rural open space. The wetland is under private ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

Walkters Harbor Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Walkters Harbor Area Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The small wetland and surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Walkters Harbor Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Walkters Harbor Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Walkters Harbor Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 022

The literature search identified no on-going or impending research projects pertaining to Walkters Harbor Area Wetland.

GRAND MARAIS LAKE WETLAND

PHYSIOGRAPHIC SETTING LS 023

Setting

Grand Marais Lake Wetland is located on Drummond Island, in the coastal zone of Grand Marais Lake, which is directly connected to the St. Marys River within Drummond Township of Chippewa County, Michigan. The component parts of the wetland extend from the shoreline to approximately 0.4 mile inland. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Grand Marais Lake Wetland has 40 feet of relief and a maximum elevation of 620 feet above mean sea level (40 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular, with little relief (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Grand Marais Lake Wetland lies is characterized by ground moraines and by rock at or near the surface. The rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Grand Marais Lake Wetland are classified as Alpena cobbly loam and coastal beach (Veatch, 1927).

Hydrology

One unnamed stream flows through Grand Marais Lake Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Grand Marais Lake Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

Grand Marais Lake has a relatively small entrance so that the wetland appears to be well protected even during times of strong northerly seas (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 023

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Grand Marais Lake Wetland.

Fish

A list of common fish species associated with the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Grand Marais Lake Wetland. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Grand Marais Lake Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Grand Marais Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Grand Marais Lake Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Grand Marais Lake Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Grand Marais Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 023

Population

Grand Marais Lake Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-13 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-13. Population Data for the Vicinity of Grand Marais Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Grand Marais Lake Wetland and the surrounding area is rural open space. The wetland is under mixed private and state ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

Grand Marais Lake Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Grand Marais Lake Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are predominantly wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Grand Marais Lake Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Grand Marais Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Grand Marais Lake Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 023

The literature search identified no on-going or impending research projects pertaining to Grand Marais Lake Wetland.

NORTHWEST DRUMMOND ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 024-031

Setting

The Northwest Drummond Island Wetland Complex is located on Drummond Island in the coastal zone of the St. Marys River, within Drummond Township of Chippewa County, Michigan. The components of the complex extend from the shoreline to approximately 0.3 miles inland. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

The Northwest Drummond Island Wetland Complex has ten feet of relief and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular with little relief (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the Northwest Drummond Island Wetland Complex lies is characterized by ground moraines and by rock at or near the surface. This rock is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

The following soils are present in the Northwest Drummond Island Wetland Complex: Northwest Drummond Island Wetland #1 and Chippewa Point Wetland - coastal beach and Detour stony loam; Hay Point Wetland - coastal beach, Bergland clay and Detour stony loam; Northwest Drummond Island Wetland #2 - Detour stony loam, Bergland clay, Tahquamenon peat, and coastal beach; Northwest Drummond Island Wetland #3 - Detour stony loam and Detour stony loam-shallow phase; Northwest Drummond Island Wetland #4 -coastal beach and Munuscong fine sandy loam; and Northwest Drummond Island Wetland #5 - coastal beach (Veatch, 1927).

Hydrology

No streams flow through the Northwest Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Northwest Drummond Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of the Northwest Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 024-031

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Northwest Drummond Island Wetland Complex.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of

wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, this group of wetlands, which includes Northwest Drummond Island Wetlands #2-#5, are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize the Northwest Drummond Island Wetland Complex. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Northwest Drummond Island Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the eight wetlands comprising the Northwest Drummond Island Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Northwest Drummond Island Wetland Complex.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in the Northwest Drummond Island Wetland Complex (Appendix D-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting these eight wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Northwest Drummond Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, Drummond Island Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

CULTURAL SETTING LS 024-031

Population

The Northwest Drummond Island Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-14 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-14. Population Data for the Vicinity of the Northwest Drummond Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Northwest Drummond Island Wetland Complex and the surrounding area is rural open space. A trail runs west of Northwest Drummond Island Wetland #1. An unimproved dirt road runs adjacent to several wetlands in the complex; the road is located south of Hay Point Wetland, north of the southern section of Bruce Point Wetland, and northwest of Northwest Drummond Island Wetland #2. There are several buildings in the vicinity of these wetlands; these are located west of the Bruce Point Wetland (two buildings), south of Hay Point Wetland, west of Northwest Drummond Island Wetland #2, and adjacent to the northern boundary of Northwest Drummond Island Wetland #4. The wetlands are under private ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

The Northwest Drummond Island Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Northwest Drummond Island Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

The wetlands of the complex are non-wooded. The area surrounding the wetlands is predominantly wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Northwest Drummond Island Wetland Complex (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Northwest Drummond Island Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Northwest Drummond Island Wetland Complex, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 024-031

The literature search identified no on-going or impending research projects pertaining to the Northwest Drummond Island Wetland Complex.

PAW POINT-NORTH SCOTT BAY WETLAND

PHYSIOGRAPHIC SETTING LS 032

Setting

Paw Point-North Scott Bay Wetland is located on Drummond Island, on the shorelines of Scott and Potagannissing Bays, which are directly connected to the St. Marys River, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Paw Point-North Scott Bay Wetland has ten feet of relief and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular, with little relief (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Paw Point-North Scott Bay Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Silurian period and the Mayville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soils in Paw Point-North Scott Bay Wetland are classified as coastal beach, Detour stony loam, Bergland silty clay loam, and Tahquamenon peat (Veatch, 1927).

Hydrology

One unnamed stream flows through Paw Point-North Scott Bay Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Paw Point-North Scott Bay Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first

killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

The wetland is relatively well protected by offshore islands and a large peninsula to the north (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 032

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Paw Point-North Scott Bay Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Paw Point-North Scott Bay Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Paw Point-North Scott Bay Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Paw Point-North Scott Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Paw Point-North Scott Bay Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Paw Point-North Scott Bay Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Paw Point-North Scott Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Paw Point-North Scott Bay Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

CULTURAL SETTING LS 032

Population

Paw Point-North Scott Bay Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-15 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-15. Population Data for the Vicinity of Paw Point-North Scott Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Paw Point-North Scott Bay Wetland and the surrounding area is rural open space. An unimproved dirt road runs through the northern section of the wetland, and also runs along the northern and southern boundaries of both sections. This same road is classified as an improved light-duty road south of the northern section of this wetland, and then runs east of the southern section. Two buildings are adjacent to the southern boundary of the northern section, and there are numerous buildings south of the southern section, but the wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

Paw Point-North Scott Bay Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Paw Point-North Scott Bay Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland is predominantly non-wooded. The area surrounding the wetland to the south and east is wooded and represents potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Paw Point-North Scott Bay Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Paw Point-North Scott Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Paw Point-North Scott Bay Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 032

The literature search identified no on-going or impending research projects pertaining to Paw Point-North Scott Bay Wetland.

SOUTH SCOTT BAY WETLAND

PHYSIOGRAPHIC SETTING LS 033

Setting

South Scott Bay Wetland is located on Drummond Island, on the southern shoreline of Scott Bay, which is directly connected to the St. Marys River within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a predominantly non-wooded, Palustrine System (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

South Scott Bay Wetland has five feet of relief and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The surrounding area is somewhat hilly, with low marshy areas (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which South Scott Bay Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Silurian period and the Mayville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in South Scott Bay Wetland are classified as Detour stony loam and coastal beach (Veatch, 1927).

Hydrology

No streams flow through South Scott Bay Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for South Scott Bay Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of South Scott Bay Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 033

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of South Scott Bay Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize South Scott Bay Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in South Scott Bay Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Scott Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing South Scott Bay Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in South Scott Bay Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in South Scott Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, South Scott Bay Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

Population

South Scott Bay Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-16 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-16. Population Data for the Vicinity of South Scott Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within South Scott Bay Wetland and most of the surrounding area is rural open space. However, the wetland lies midway between two small housing developments that are about a mile apart and connected by a light duty road. The wetland is under private ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

South Scott Bay Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of South Scott Bay Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland is predominantly non-wooded. The area surrounding the wetland is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Scott Bay Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to South Scott Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of South Scott Bay Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 033

The literature search identified no on-going or impending research projects pertaining to South Scott Bay Wetland.

SOUTH SCOTT BAY AREA WETLAND

PHYSIOGRAPHIC SETTING LS 034

Setting

South Scott Bay Area Wetland is located on Drummond Island on the shoreline of Scott Bay, which is directly connected to the St. Marys River, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

South Scott Bay Area Wetland has little relief and lies at an elevation of about 582 feet above mean sea level (two feet above the approximate mean elevation of Lake Huron). The surrounding area is somewhat hilly, with low marshy areas (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which South Scott Bay Area Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Silurian period and the Mayville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in South Scott Bay Area Wetland are classified as coastal beach, Bergland silty clay loam, and Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through South Scott Bay Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for South Scott Bay Area Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with

the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of South Scott Bay Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 034

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of South Scott Bay Area Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize South Scott Bay Area Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in South Scott Bay Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Scott Bay Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing South Scott Bay Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in South Scott Bay Area Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in South Scott Bay Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, South Scott Bay Area Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

Population

South Scott Bay Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-17 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-17. Population Data for the Vicinity of South Scott Bay Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within South Scott Bay Area Wetland and the surrounding area is rural open space. The wetland is under private ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

South Scott Bay Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of South Scott Bay Area Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland is non-wooded. The area surrounding the wetland is predominantly wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Scott Bay Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to South Scott Bay Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of South Scott Bay Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 034

The literature search identified no on-going or impending research projects pertaining to South Scott Bay Area Wetland.

POTAGANNISSING RIVER MOUTH WETLAND

PHYSIOGRAPHIC SETTING

LS 035

Setting

Potagannissing River Mouth Wetland lies on Drummond Island, on the shoreline of Potagannissing Bay, which is directly connected to the St. Marys River. The wetland is located in Drummond Township of Chippewa County, Michigan, at the mouth of the Potagannissing River. There are no major population centers in the area. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Potagannissing River Mouth Wetland has ten feet of relief and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is somewhat hilly, with some low marshy areas. The greatest local elevation is about 660 feet above mean sea level (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Potagannissing River Mouth Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Silurian period and the Burnt Bluff formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Potagannissing River Mouth Wetland are classified as Tahquamenon peat, Johnswood stony loam, Bergland silty clay loam, Ontonagon clay, and coastal beach (Veatch, 1927).

Hydrology

One intermittant stream flows into Potagannissing River Mouth Wetland and the Potagannissing River flows through the wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Potagannissing River Mouth Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches,

with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

Offshore islands afford some protection for this wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 035

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Potagannissing River Mouth Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Potagannissing River Mouth Wetland. However, a

search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Potagannissing River Mouth Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Potagannissing River Mouth Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Potagannissing River Mouth Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Potagannissing River Mouth Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Potagannissing River Mouth Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Potagannissing River Mouth Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

Population

Potagannissing River Mouth Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-18 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-18. Population Data for the Vicinity of Potagannissing River Mouth Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Potagannissing River Mouth Wetland and the surrounding area is rural open space. One light duty road has been built over the Potagannissing River upstream of the wetland and the river has been dammed upstream of the road, forming a small lake. One unimproved road enters the wetland. Two small housing developments are in the general vicinity. The wetland is under private ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

Potagannissing River Mouth Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Potagannissing River Mouth Wetland include limestone and gravel (Great Lakes Basin Commission, 1974).

The wetland is non-wooded. The area surrounding the wetland is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Potagannissing River Mouth Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Potagannissing River Mouth Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Potagannissing River Mouth Wetland. However, the Michigan Inventory of Coastal Sites indicates that two archaeological sites (# 20-CH-15 and 20-CH-44) are located in the vicinity; they are Indian mounds of unknown culture and date (Peebles and Black, 1976). Further information concerning field research and the exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 035

The literature search identified no on-going or impending research projects pertaining to Potagannissing River Mouth Wetland.

POTAGANNISSING RIVER MOUTH AREA WETLAND

PHYSIOGRAPHIC SETTING LS 036

Setting

Potagannissing River Mouth Area Wetland is located on Drummond Island, approximately 0.1 mile from the shoreline of Potagannissing Bay, which is directly connected to the St. Marys River, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Topography

Potagannissing River Mouth Area Wetland has five feet of relief and a maximum elevation of 620 feet above mean sea level (40 feet above the approximate mean elevation of Lake Huron). The surrounding area is irregular and hilly; the greatest local elevation is about 740 feet above mean sea level (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Potagannissing River Mouth Area Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Manistique formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Potagannissing River Mouth Area Wetland are classified as Detour stony loam and Johnswood stony loam (Veatch, 1927).

Hydrology

No streams flow through Potagannissing River Mouth Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Potagannissing River Mouth Area Wetland is located in De Tour, Michigan. The average temperature was 43.4^{o}F in 1975. The mean daily low for January was 14.1^{o}F and the mean daily high for July was 79.3^{o}F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 28

and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of Potagannissing River Mouth Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

BIOTIC SETTING LS 036

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Potagannissing River Mouth Area Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Potagannissing River Mouth Area Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Potagannissing River Mouth Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Potagannissing River Mouth Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Potagannissing River Mouth Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Potagannissing River Mouth Area Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Potagannissing River Mouth Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Potagannissing River Mouth Area Wetland is likely to be an important spawning, nursery, and feeding area for certain fishes.

CULTURAL SETTING LS 036

Population

Potagannissing River Mouth Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-19 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-19. Population Data for the Vicinity of Potagannissing River Mouth Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Potagannissing River Mouth Area Wetland and the surrounding area is rural open space. A secondary road from Drummond (the main road) lies near the wetland and an unimproved road to one building adjoins the wetland. Numerous houses are located along the beach about one quarter of a mile away. The wetland is under private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Recreation

Potagannissing River Mouth Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Potagannissing River Mouth Area Wetland include limestone and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding area is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Potagannissing River Mouth Area Wetland (U.S.G.S. quadrangle map, Drummond, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Potagannissing River Mouth Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Potagannissing River Mouth Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 036

The literature search identified no on-going or impending research projects pertaining to Potagannissing River Mouth Area Wetland.

STRINGHAM LAKE WETLAND

PHYSIOGRAPHIC SETTING LS 037

Setting

Stringham Lake Wetland lies on Drummond Island, approximately 0.1 mile from the shoreline of Sturgeon Bay, which is directly connected to the St. Marys River through Potagannissing Bay. The wetland is located in Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Topography

Stringham Lake Wetland has little relief and lies at an elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The surrounding area is somewhat hilly and irregular (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Stringham Lake Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Stringham Lake Wetland are classified as Bergland clay and Munuscong fine sandy loam (Veatch, 1927).

Hydrology

No streams flow through Stringham Lake Wetland (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Stringham Lake Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

BIOTIC SETTING LS 037

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Stringham Lake Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Stringham Lake Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal

locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Stringham Lake Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Stringham Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Stringham Lake Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Stringham Lake Wetland (Appendix C-1). However, the literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Stringham Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Stringham Lake Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

Population

Stringham Lake Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-20 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-20. Population Data for the Vicinity of Stringham Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Stringham Lake Wetland and the surrounding area is rural open space. A light-duty road crosses the wetland and a few scattered houses are along the beach. The wetland is under mixed private and state ownership, but its location suggests that it is subject to low development pressure (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Recreation

Stringham Lake Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Stringham Lake Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Stringham Lake Wetland (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Stringham Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Stringham Lake Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 037

The literature search identified no on-going or impending research projects pertaining to Stringham Lake Wetland.

POTAGANNISSING BAY ISLANDS WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 038-040

Setting

The Potagannissing Bay Islands Wetland Complex is located in the coastal zone of Potagannissing Bay, which is directly connected to the St. Marys River, within Drummond Township of Chippewa County, Michigan. Harbor Island Wetland and Wilson Island Wetland lie on the shoreline of Wilson Island, and Burnt Island Wetland lies on the shoreline of Burnt Island. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Topography

The Potagannissing Bay Islands Wetland Complex has 20 feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area on Harbor Island is hilly with a maximum elevation of about 670 feet above mean sea level. Wilson Island and Burnt Island are comparatively flat (U.S.G.S. quadrangle Burnt Island, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which the Potagannissing Bay Islands Wetland Complex lies is characterized by ground moraines. Rock occurring at or near the surface is of the Silurian period and the Engadine formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The following soil types are present in the Potagannissing Bay Islands Wetland Complex: Harbor Island Wetland - Granby sand and coastal beach; Wilson Island Wetland - coastal beach and stony Eastport sand; and Burnt Island Wetland - coastal beach, stony Eastport sand, and Detour stony loam (Veatch, 1927).

Hydrology

No streams flow through the Potagannissing Bay Islands Wetland Complex (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Potagannissing Bay Islands Wetland Complex is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

Harbor Island contains a large harbor which is extremely well protected by a small southerly entrance and sizeable hills. Wilson Island has a small, fairly well protected harbor. Burnt Island has a substantial harbor that would afford the wetlands some protection from any easterly swell (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

BIOTIC SETTING LS 038-040

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Potagannissing Bay Islands Wetland Complex.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus

spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mention above may also utilize the Potagannissing Bay Islands Wetland Complex. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in these three wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Potagannissing Bay Islands Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Potagannissing Bay Islands Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Potagannissing Bay Islands Wetland Complex.

Mammals

Studies of two other Potagannissing Bay Islands (Manville, 1960, 1951) provide information that may be applicable to the mammalian fauna of the three wetlands of the Potagannissing Bay Islands Wetland Complex. Eight species of mammals were found on Rogg Island and Little Rogg Island (Appendix C-2).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Potagannissing Bay Islands Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the Potagannissing Bay Islands Wetland Complex is likely to be an important spawning, nursery, and feeding area for certain fish species.

CULTURAL SETTING LS 038-040

Population

The Potagannissing Bay Islands Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-21 indicates that both Chippewa County and Drummond Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-21. Population Data for the Vicinity of the Potagannissing Bay Islands Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Potagannissing Bay Islands Wetland Complex and the surrounding area is rural open space. The wetlands are under private ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Recreation

The Potagannissing Bay Islands Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

The wetlands in the Potagannissing Bay Islands Wetland Complex are predominantly non-wooded. The surrounding areas are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Potagannissing Bay Islands Wetland Complex (U.S.G.S. quadrangle map, Burnt Island, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to any of the wetlands in the Potagannissing Bay Islands Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Potagannissing Bay Islands Wetland Complex, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 038-040

The literature search identified no on-going or impending research projects pertaining to the Potagannissing Bay Islands Wetland Complex.

SWEETS POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LS 041

Setting

Sweets Point Area Wetland is located on the shoreline of the St. Marys River within De Tour Township of Chippewa County, Michigan, approximately 2.3 miles from De Tour Village. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Topography

Sweets Point Area Wetland has five feet of relief and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of the St. Marys River). The surrounding area is irregular and hilly; the greatest local elevation is about 700 feet above mean sea level (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Sweets Point Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation. The wetland lies in an area formly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soils of Sweets Point Area Wetland are classified as coastal beach and Granby sand (Veatch, 1927).

Hydrology

Sweets Point Area Wetland lies adjacent to the St. Marys River but has no streams flowing through it (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sweets Point Area Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

BIOTIC SETTING LS 041

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sweets Point Area Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Sweets Point Area Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal

locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sweets Point Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sweets Point Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sweets Point Area Wetland.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasels (Mustela spp.) and mink (Mustela vison) may be found in Sweets Point Area Wetland (U.S. Army Corps of Engineers, 1975, 1977). Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sweets Point Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Sweets Point Area Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

Population

Sweets Point Area Wetland is located in De Tour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-22 indicates that both Chippewa County and De Tour Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-22. Population Data for the Vicinity of Sweets Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
De Tour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sweets Point Area Wetland and the surrounding area is rural open space. Unimproved dirt roads run along the northern and southern boundaries of the wetland, and several buildings are located along the northern border. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Recreation

Sweets Point Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Sweets Point Area Wetland include limestone, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland is non-wooded. The area surrounding the wetland is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sweets Point Area Wetland (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Sweets Point Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sweets Point Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 041

The literature search identified no on-going or impending research projects pertaining to Sweets Point Wetland.

MAUD BAY AREA WETLAND

PHYSIOGRAPHIC SETTING LS 042

Setting

Maud Bay Area Wetland is located in the coastal zone of Maud Bay, which is directly connected to the St. Marys River, within De Tour Township of Chippewa County, Michigan. The wetland lies approximately 0.2 mile from the Maud Bay shoreline and 2.3 miles from De Tour Village, Michigan. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Topography

Maud Bay Area Wetland has 25 feet of relief and a maximum elevation of 620 feet above mean sea level (40 feet above the approximate mean elevation of the St. Marys River). The surrounding area is irregular and hilly; the greatest local elevation is about 700 feet above mean sea level (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Maud Bay Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Maud Bay Area Wetland are classified as Alpena cobbly loam, Granby sand, Johnswood stony loam, and Carbondale muck (Veatch, 1927).

Hydrology

No streams flow through Maud Bay Area Wetland (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Maud Bay Area Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F.* The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

BIOTIC SETTING LS 042

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Maud Bay Area Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Maud Bay Area Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Maud Bay Area Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Maud Bay Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Maud Bay Area Wetland.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasels (Mustela spp.) and mink (Mustela vison) may be found in Maud Bay Area Wetland (U.S. Army Corps of Engineers, 1975, 1977). Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Maud Bay Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Maud Bay Area Wetland is likely to be an important spawning and nursery area for certain fish species.

Population

Maud Bay Area Wetland is located in De Tour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-23 indicates that both Chippewa County and De Tour Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-23. Population Data for the Vicinity of Maud Bay Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
De Tour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Maud Bay Area Wetland and the surrounding area is rural open space. Unimproved dirt roads run along the western and southern boundaries of the wetland, and scattered housing is a half mile away. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Recreation

Maud Bay Area Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Maud Bay Area Wetland include limestone, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are wooded and represent a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Maud Bay Area Wetland (U.S.G.S. quadrangle map, Lime Island, Michigan-Ontario, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Maud Bay Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Maud Bay Area Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 042

The literature search identified no on-going or impending research projects pertaining to Maud Bay Area Wetland.

RABER BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 043

Setting

Raber Bay Wetland is located on the shoreline of the St. Marys River, within Raber Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953).

Topography

Raber Bay Wetland has 30 feet of relief and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area consists of a hill with a fairly steep grade from 610 feet to 675 feet above mean sea level. The local maximum elevation is about 700 feet above mean sea level (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953).

Surficial Geology

The surficial geology of the area in which Raber Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Mayville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in the Raber Bay Wetland are classified as coastal beach, Carbondale muck, Granby sand, Bruce fine sandy loam, Emmet stony loamy sand, Eastport sand, and Munuscong fine sandy loam (Veatch, 1927).

Hydrology

Raber Bay Wetland is adjacent to the St. Marys River but has no streams flowing through it (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Raber Bay Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly

precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost ($28^{o}F$) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953).

BIOTIC SETTING LS 043

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Raber Bay Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Raber Bay Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal

locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Raber Bay Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Raber Bay Wetland.

Avifauna

Mallards (Anas platyrhynchos), blue-winged teal (A. discors), American wigeon (A. americana), wood ducks (Aix sponsa), common goldeneyes (Bucephala clangula), great blue herons (Ardea herodias), ring-billed gulls (Larus delawarensis), common terns (Sterna hirundo), black terns (Chlidonias niger) and red-winged blackbirds (Agelaius phoeniceus) were observed in Raber Bay Wetland during June, 1975 by Michigan Department of Natural Resources personnel (Michigan Department of Natural Resources, 1975).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing this wetland.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasels (Mustela spp.) and mink (Mustela vison) may be found in Raber Bay Wetland (U.S. Army Corps of Engineers, 1975, 1977). Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

Common terns, a species endangered in Michigan, were recorded in Raber Bay Wetland in 1975 (Michigan Department of Natural Resources, 1975). No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered

and Threatened Species Program, 1976) were documented in Raber Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Raber Bay Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

CULTURAL SETTING LS 043

Population

Raber Bay Wetland is located in Raber Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-24 indicates that both Chippewa County and Raber Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-24. Population Data for the Vicinity of Raber Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Raber Township	513	14.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Raber Bay Wetland and the surrounding area is rural open space. State Route 48 runs along the southern and southwestern boundaries of the wetland. A light-duty road runs through the central part of the wetland (in an east-west direction), and an unimproved road borders and cuts through several sections of the eastern part. Several buildings lie to the east, and a lighting system is located on Pointe aux Frenes. The wetland is under mixed private and state ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953).

Recreation

Raber Bay Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Raber Bay Wetland include limestone, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Raber Bay Wetland (U.S.G.S. quadrangle maps, Goetzville, Michigan-Ontario, 1964; Munuscong Northeast, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to Raber Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Raber Bay Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 043

The literature search identified no on-going or impending research projects pertaining to Raber Bay Wetland.

MUNUSCONG LAKE WETLAND #1

PHYSIOGRAPHIC SETTING LS 044

Setting

Munuscong Lake Wetland #1 lies on the shoreline of Munuscong Lake in Raber Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953).

Topography

Munuscong Lake Wetland #1 has 20 feet of relief and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area consists of a hill with an irregular contour and with a maximum elevation of about 700 feet above mean sea level (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953).

Surficial Geology

The surficial geology of the area in which Munuscong Lake Wetland #1 lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soils in Munuscong Lake Wetland #1 are classified as Shelldrake sand, Munuscong fine sandy loam, Carbondale muck, Eastport sand, Emmet stony loamy sand, and coastal beach (Veatch, 1927).

Hydrology

Munuscong Lake Wetland #1 is adjacent to the St. Marys River but has no streams running through it (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Munuscong Lake Wetland #1 is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last

killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953).

BIOTIC SETTING LS 044

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Munuscong Lake Wetland #1.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Munuscong Lake Wetland #1. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Munuscong Lake Wetland #1.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Munuscong Lake Wetland #1.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Munuscong Lake Wetland #1.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasels (Mustela spp.) and mink (Mustela vison) may be found in Munuscong Lake Wetland #1 (U.S. Army Corps of Engineers, 1975, 1977). Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The literature search provided no site-specific data pertaining to seasonal distribution ad abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Munuscong Lake Wetland #1 by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Munuscong Lake Wetland #1 is likely to be an important spawning, nursery, and feeding area for certain fish species.

Population

Munuscong Lake Wetland #1 is located in Raber Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-25 indicates that both Chippewa County and Raber Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-25. Population Data for the Vicinity of Munuscong Lake Wetland #1

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Raber Township	513	14.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Munuscong Lake Wetland #1 and the surrounding area is rural open space. An unimproved road lies to the southeast. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953).

Recreation

Munuscong Lake Wetland #1 is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Munuscong Lake Wetland #1 include limestone, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are predominantly wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Munuscong Lake Wetland #1 (U.S.G.S. quadrangle map, Munuscong Northeast, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to Munuscong Lake Wetland #1 (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Munuscong Lake Wetland #1, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 044

The literature search identified no on-going or impending research projects pertaining to Munuscong Lake Wetland #1.

GOGOMAIN RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 045

Setting

Gogomain River Wetland lies on the shoreline of Munuscong Lake in Raber Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Topography

Gogomain River Wetland has five feet of relief and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is hilly (maximum elevation 660 feet above mean sea level) with extensive plain areas as well (U.S.G.S. quadrangle maps, Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Surficial Geology

The surficial geology of the area in which Gogomain River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Gogomain River Wetland are classified as coastal beach, Spaulding peat, Bergland silty clay loam, Munuscong fine sandy loam, Emmet stony loamy sand, Eastport sand, and Tahquamenon peat (Veatch, 1927).

Hydrology

Gogomain River Wetland is adjacent to the St. Marys River and has the Gogomain River and two unnamed streams flowing through it (U.S.G.S. quadrangle maps, Munuscong Norhteast, Michigan, 1953; Munuscong, Michigan, 1953). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Gogomain River Wetland is located in De Tour, Michigan. The average temperature was 43.4°F in 1975. The mean daily low for January was 14.1°F and the mean daily high for July was 79.3°F. The average annual precipitation is 29.03 inches, with a mean

monthly precipitation of 2.04 inches in January and 2.55 inches in July. The growing season is approximately six and one half months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

* Long-term averages not yet established

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

BIOTIC SETTING LS 045

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Gogomain River Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Gogomain River Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal

locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Gogomain River Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Gogomain River Wetland.

Avifauna

Mallards (Anas platyrhynchos), blue-winged teal (A. discors), American wigeon (A. americana), wood ducks (Aix sponsa), belted kingfishers (Megaceryle alcyon), ring-billed gulls (Larus delawarensis), black terns (Chlidonias niger), common terns (Sterna hirundo), and red-winged blackbirds (Agelaius phoeniceus) were observed in this wetland in the vicinity of the Gogomain River in June, 1975 (Michigan Department of Natural Resources, 1975).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Gogomain River Wetland.

Mammals

A variety of mammals inhabit Gogomain River Wetland and the other wetlands associated with Munuscong Bay (Weise, 1975; U.S. Army Corps of Engineers, 1975, 1977). Some species included in the mammalian fauna of this wetland are the snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasel (Mustela spp.), white-tailed deer (Odocoileus virginianus), and moose (Alces alces), but the moose is not common. Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The wetlands associated with Munuscong Bay provide exceptional habitat for muskrat (Weise, 1975; Jaworski and Raphael, 1978), and muskrat trapping is an important activity on these wetlands. Other mammalian species which may be commonly hunted on this wetland include the showshoe hare and white-tailed deer.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, food sources, or relationship to water levels of the mammals inhabiting Gogomain River Wetland.

Endangered Species

Common terns, a species endangered in Michigan, were recorded in Gogomain River Wetland in 1975 (Michigan Department of Natural Resources, 1975). No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in this wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Gogomain River Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

CULTURAL SETTING LS 045

Population

Gogomain River Wetland is located in Raber Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-26 indicates that both Chippewa County and Raber Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-26. Population Data for the Vicinity of Gogomain River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Raber Township	513	14.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Gogomain River Wetland and the surrounding area is rural open space. A light-duty highway runs through the north-west sector of the wetland and a building and an unimproved dirt road are located to the southeast. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Recreation

Gogomain River Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Gogomain River Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The wetland and surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Gogomain River Wetland (U.S.G.S. quadrangle maps, Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to Gogomain River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Gogomain River Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 045

The literature search identified no on-going or impending research projects pertaining to Gogomain River Wetland.

ROACH POINT WETLAND

PHYSIOGRAPHIC SETTING

LS 046

Setting

Roach Point Wetland lies on the shoreline of Munuscong Lake within Raber Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953).

Topography

Roach Point Wetland has five feet of relief and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area contains some fairly steep hills with extensive low plains beyond (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953).

Surficial Geology

The surficial geology of the area in which Roach Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soil types present in Roach Point Wetland include coastal beach, Bergland silty clay loam, Munuscong fine sandy loam, Ontonagon silt loam, Eastport sand, Emmet stony loamy sand, Carbondale muck and Kalkaska sandy loam-gravelly phase (Veatch, 1927).

Hydrology

No streams flow through Roach Point Wetland (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Roach Point Wetland is located in Dunbar Forest Experiment Station. The average annual temperature is 41.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.6°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 32.03 inches, with a mean monthly precipitation of 2.70 inches in January and 3.37 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in

1975 occurring on April 28 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953).

BIOTIC SETTING LS 046

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Roach Point Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Roach Point Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Roach Point Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Roach Point Wetland.

Avifauna

Gadwalls (Anas strepera), common goldeneyes (Bucephala clangula), herring gulls (Larus argentatus), ring-billed gulls (Larus delawarensis), common terns (Sterna hirundo), black terns (Chlidonias niger), and red-winged blackbirds (Agelaius phoeniceus) were observed in this wetland in June, 1975 (Michigan Department of Natural Resources, 1975).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Roach Point Wetland.

Mammals

A variety of mammals inhabit Roach Point Wetland and the other wetlands associated with Munuscong Bay (Weise, 1975; U.S. Army Corps of Engineers, 1975, 1977). Some species included in the mammalian fauna of this wetland are the snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasel (Mustela spp.), white-tailed deer (Odocoileus virginianus), and moose (Alces alces), but the moose is not common. Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The wetlands associated with Munuscong Bay provide exceptional habitat for muskrat (Weise, 1975; Jaworski and Raphael, 1978), and muskrat trapping is an important activity on these wetlands. Other mammalian species which may be commonly hunted on this wetland include the showshoe hare and white-tailed deer.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, food sources, or relationship to water levels of the mammals inhabiting Roach Point Wetland.

Endangered Species

Common terns, a species endangered in Michigan, were recorded in Roach Point Wetland in 1975 (Michigan Department of Natural Resources, 1975). No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Roach Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Roach Point Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

CULTURAL SETTING LS 046

Population

Roach Point Wetland is located in Raber Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-27 indicates that both Chippewa County and Raber Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-27. Population Data for the Vicinity of Roach Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Raber Township	513	14.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Roach Point Wetland and the surrounding area is rural open space. The wetland is under mixed private and state ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953).

Recreation

Roach Point Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Roach Point Wetland include limestone, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland is 50% wooded and the surrounding area is wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Roach Point Wetland (U.S.G.S. quadrangle map, Munuscong, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to Roach Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Roach Point Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 046

The literature search identified no on-going or impending research projects pertaining to Roach Point Wetland.

WEST MUNUSCONG LAKE WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 047-057

Setting

The West Munuscong Lake Wetland Complex is located in the coastal zone of Munuscong Lake within Pickford, Bruce, and Soo Townships of Chippewa County, Michigan. The various parts of the complex extend from the shoreline of Lake Munuscong to approximately 1.7 miles inland. Munuscong Island Wetland is located on Munuscong Island, and Moon Island Wetland lies on Moon Island. Munuscong Lake Wetlands #3 and #4 are on unnamed islands in the lake. There are no major population centers in the area. This wetland complex is a Palustrine-Lacustrine-Riverine Systems and occupies both wooded and non-wooded sites (U.S. G.S. quadrangle maps, Munuscong, Michigan, 1953; Pickford, Michigan, 1975).

Topography

The West Munuscong Lake Wetland Complex has 30 feet of relief and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shorelines as erodible low plains and non-erodible low bluffs. The surrounding area is variable. In the vicinity of the southern wetlands the surrounding area is low plain but around the northern wetlands the terrain is somewhat more hilly (U.S.G.S. quadrangle maps, Munuscong, Michigan, 1953; Pickford, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the West Munuscong Lake Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Trenton formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The following soil types are present in the West Munuscong Lake Wetland Complex: Munuscong Lake Wetland #2 - Bruce fine sandy loam, Munscong fine sandy loam, and coastal beach; Munuscong Lake Wetland #3 - coastal beach; Munuscong-Little Munuscong River Delta Wetland - coastal beach, Bergland silty clay loam, Munuscong fine sandy loam, Bruce fine sandy loam, Spaulding peat, Greenwood peat, Brimley very fine sandy loam, and Carbondale muck; Munuscong Lake Wetland #6 - coastal beach, Bruce silt loam, Eastport sand, and Munuscong fine sandy loam; Munuscong Lake Wetland #7 - coastal beach and Bergland silty clay loam; Kemps Point Wetland - coastal beach, Bruce silt loam, and Bruce fine sandy loam; Sawmill Point Wetland - Munuscong fine sandy loam and coastal beach; and Moon Island Wetland - Eastport sand. No soil information is available for Munuscong Island Wetland or Munuscong Lake Wetlands #4 and #5 (Veatch, 1927).

Hydrology

Several streams and rivers flow through parts of the West Munuscong Lake Wetland Complex. Two unnamed streams flow through Munuscong Lake Wetland #3; Little Munuscong River, Munuscong River, and two unnamed streams flow through Munuscong-Little Munuscong River Delta Wetland; and one unnamed stream flows through Munuscong Lake Wetland #6 (U.S.G.S. quadrangle maps, Munuscong, Michigan, 1953; Pickford, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the West Munuscong Lake Wetland Complex is located in Dunbar Forest Experiment Station. The average annual temperature is 41.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.6°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 32.03 inches, with a mean monthly precipitation of 2.70 inches in January and 3.37 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Munuscong, Michigan, 1953; Pickford, Michigan, 1975).

BIOTIC SETTING LS 047-057

Vegetation

A general characterization of the vegetation of Moon Island Wetland (LS 057) which is part of the West Munuscong Lake Wetland Complex, has been provided by the U.S. Fish and Wildlife Service (1977). The processes of natural succession, natural disturbances and spoil disposal have produced a diverse flora on Moon Island. Aspen (*Populus* sp.), elm (*Ulmus americana*), and ash (*Fraxinus pennsylvanica*) comprise the major tree species. Willows (*Salix* sp.), however, occupy lower sites or those next to the water. Dogwood (*Cornus* spp.) and elderberry (*Sambucus* sp.) are common shrub species. In one wetland area of the island, reed grass (*Phramites communis*) is the dominant species. In addition to forbes and grasses common to spoil islands, nettle (*Urtica* sp.) and dock (*Rumex* sp.) are quite common.

The literature search yielded no other site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of the 11 wetlands of the West Munuscong Lake Wetland Complex.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize the West Munuscong Lake Wetland Complex. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the West Munuscong Lake Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the West Munuscong Lake Wetland Complex.

Avifauna

A preliminary list of birds recorded in the Munuscong Bay Area appears in Table 1-28. The osprey (Pandion haliaetus), a species threatened in Michigan, has recently nested in the area (Weise and Schemenauer, 1976). A total of 1200 birds were observed in the Munuscong Bay Area during the 1977 waterfowl spring migration survey conducted by the Michigan Department of Natural Resources (1977). The percent composition of the species observed during the survey is presented in Table 1-29. Gadwalls (Anas strepera), blue-winged teal (A. discors), American wigeon (A. americana), common mergansers (Mergus merganser), herring gulls (Larus argentatus), ring-billed gulls (L. delawarensis), common terns (Sterna hirundo), black terns (Chlidonias niger), and red-winged blackbirds (Agelaius phoeniceus) were observed in Moon Island Wetland on June 19, 1975. A spotted sandpiper (Actitis macularia) nest was also found (Michigan Department of Natural Resources, 1975).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the 11 wetlands comprising the West Munuscong Lake Wetland Complex.

Mammals

A variety of mammals inhabit the West Munuscong Lake Wetland Complex and the other wetlands associated with Munuscong Bay (Weise, 1975; U.S. Army Corps of Engineers, 1975, 1977). Some species included in the mammalian fauna of this wetland are the snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasel (Mustela spp.), white-tailed deer (Odocoileus virginianus), and moose (Alces alces), but the moose is not common. Coyotes (Canis latrans) may utilize this wetland as a hunting area (Strebler, 1951).

The wetlands associated with Munuscong Bay provide exceptional habitat for muskrat (Weise, 1975; Jaworski and Raphael, 1978), and muskrat trapping is an important activity on these wetlands. Other mammalian species which may be commonly hunted here include the snowshoe hare and white-tailed deer.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, food sources, or relationship to water levels of the mammals inhabiting the 11 wetlands in the West Munuscong Lake Wetland Complex.

Endangered Species

The osprey, a species threatened in Michigan, recently nested in the vicinity of Munuscong Bay. Common terns, endangered in Michigan, have also been observed there, as well as marsh hawks (Circus cyaneus), a threatened species, and American bitterns (Botaurus lentiginosus) and sharp-shinned hawks (Accipiter striatus), both rare (Weise and Schemanauer, 1976).

Table 1-28. A preliminary List of Birds from Munuscong Bay Area[a]

Common name	Occurrence[c]	Common name	Occurrence[c]
common loon	M	American golden plover	M
red-necked grebe	M	black-bellied plover	M
pied-billed grebe	L,C	semipalmated plover	M,L
whistling swan	M	killdeer	L,C
Canada goose	M,C	spotted sandpiper	L
blue goose	M,C	greater yellowlegs	M
snow goose	M,C	lesser yellowlegs	M
mallard[b]	M,L,C	ruddy turnstone	M,L
black duck[b]	M,L,C	American woodcock[b]	L,M,C
pintail	M	common snipe	L,M
gadwall	M	herring gull	L,C
American wigeon[b]	M,L	ring-billed gull	L,C
northern shoveler	M,O	common tern	L
blue-winged teal[b]	L,C	black tern[b]	L,C
green-winged teal	M	mourning dove	L,M
wood duck	M,L	common flicker	L,C
redhead[b]	M,L	pileated woodpecker	L
canvasback	M	yellow-bellied sapsucker	L
ring-necked duck[b]	L,M,C	hairy woodpecker	L
greater scaup	M	downy woodpecker	L
lesser scaup	M,C	great crested flycatcher	L
common goldeneye[b]	M,L	least flycatcher	L
bufflehead	M,C	horned lark	M
oldsquaw	M,O	tree swallow	L
white-winged scoter	M	blue jay	L
ruddy duck	M,O	gray jay	M
common merganser[b]	L,M	common raven	L,C
red-breasted merganser[b]	L,M	common crow	L,M
hooded merganser[b]	L,M	black-capped chickadee	L,C
sharp-shinned hawk	M	American robin	L,C
marsh hawk	L,M	starling	L
rough-legged hawk	M	yellow warbler	M,L
red-tailed hawk	L,M	American redstart	L
broad-winged hawk	L,M	bobolink	L,C
osprey	L,M	red-winged blackbird[b]	L,C
American kestrel	L,M	common grackle	L
ruffed grouse[b]	L,C	brown-headed cowbird	L
great blue heron	L,C	purple finch	L
American bittern	L	chipping sparrow	L
least bittern	L	white-throated sparrow	L,C
sandhill crane	M,L	song sparrow	L,C
sora	L	savannah sparrow	L
common gallinule	O	snow bunting	L,C
American coot	L,M,C		

[a]Taken from Weise and Schemenauer, 1976
[b]known nesting species
[c]M=migratory, L=local, C=common, O=occasional

Table 1-29. Percent Composition of the Species Observed During the 1977 Waterfowl Spring Migration Survey

Common name	Percent composition
ring-necked duck	50%
bufflehead spp.	15%
Canada geese	10%
black duck	5%
mallard	5%
scaup	1%
American coot	3%
common goldeneye	2%
pintail	1%
northern shoveler	8%
green-winged teal	8%
blue-winged teal	8%
American wigeon	8%
gadwall	8%
wood duck	8%
hooded merganser	8%

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the West Munuscong Lake Wetland Complex by the literature search.

Health

The environmental quality of the West Munuscong lake Wetland Complex is good for fish, avifauna, and mammals.

CULTURAL SETTING

LS 047-057

Population

The West Munuscong Lake Wetland Complex is located in Pickford, Bruce, and Soo Townships of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-30 indicates that Chippewa County and Soo and Bruce Townships experienced a rapid rate of population growth between 1970 and 1975, although population increase in Pickford Township was only moderate. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-30. Population Data for the Vicinity of the West Munuscong Lake Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Pickford Township	1,238	3.3	--
Soo Township	2,244	26.4	--
Bruce Township	1,330	30.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the West Munuscong Lake Wetland Complex and the surrounding area is rural open space. A series of dikes connects Munuscong Lake Wetland #2 with other areas across the western tip of Munuscong Lake, and dikes also run through both Munuscong Lake Wetland #3 and Munuscong-Little Munuscong River Delta Wetland. A few buildings are located west of Munuscong Lake Wetlands #6 and #7; a building is also east of Kemps Point Wetland. Unimproved dirt roads run along the western boundaries of each of these three wetlands. A light is

located at the northern tip of Moon Island Wetland. The wetlands are under mixed private and state ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle maps, Pickford, Michigan, 1975; Munuscong, Michigan, 1953).

Recreation

The West Munuscong Lake Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the West Munuscong Lake Wetland Complex include limestone, sand, and gravel (Great Lakes Basin Commission, 1974). Munuscong Island Wetland, Munuscong Lake Wetland #4, Munuscong Lake Wetland #5, and Moon Island Wetland are all located on small islands with no significant resources.

The wetlands are non-wooded except for the northern portion of Munuscong-Little Muscong River Delta Wetland. The areas surrounding the complex are wooded and represent a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the West Munuscong Lake Wetland Complex (U.S.G.S. quadrangle maps, Pickford, Michigan, 1975; Munuscong, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to the West Munuscong Lake Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of any of the 11 wetlands of the West Munuscong Lake Wetland Complex, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 047-057

The literature search identified no on-going or impending research projects pertaining to the West Munuscong Lake Wetland Complex.

NEEBISH ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 058-061

Setting

The Neebish Island Wetland Complex is located on Neebish Island, in the coastal zones of Munuscong Lake and the St. Marys River, within Soo Township of Chippewa County, Michigan. Neebish Island Wetland and Southwest Neebish Island Wetland lie on the Munuscong Lake shoreline. Sand Island Wetland lies on the shoreline of Sand Island in the St. Marys River. Oak Ridge Wetland lies on the shoreline of the St. Marys River at Oak Ridge. There are no major population centers in the area. This wetland complex is a Palustrine-Lacustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Munuscong, Michigan, 1953; Munuscong Northeast, Michigan, 1953).

Topography

The Neebish Island Wetland Complex has 25 feet of relief and a maximum elevation of 605 feet above mean sea level (25 feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shorelines as non-erodible and erodible low bluffs. The surrounding area is somewhat hilly; the greatest local elevation is about 700 feet above mean sea level (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Munuscong, Michigan, 1953; Munuscong Northeast, Michigan, 1953).

Surficial Geology

The surficial geology of the area in which the Neebish Island Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Ordovician period and the Hermansville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The following soil types are present in the Neebish Island Wetland Complex: Neebish Island Wetland - coastal beach, Eastport sand, Bruce fine sandy loam, Bergland silty clay loam, Munuscong fine sandy loam, Carbondale muck, Bruce fine sandy loam, Munising stony sandy loam, Bergland silt loam, and Tahquamenon peat; Southwest Neebish Island Wetland - stony Eastport sand and coastal beach; Sand Island Wetland - coastal beach, Tahquamenon peat, Newton sand, and Shelldrake sand; and Oak Ridge Wetland - coastal beach and Tahquamenon peat (Veatch, 1927).

Hydrology

Oak Ridge Wetland, Sand Island Wetland, and Southwest Neebish Island Wetland are all adjacent to the West Neebish Channel. Oak Ridge Wetland has an unnamed stream flowing through it, as does the remaining wetland of the complex, Neebish Island Wetland (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951;

Munuscong, Michigan, 1953; Munuscong Northeast, Michigan, 1953). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for the Neebish Island Wetland Complex is located in Dunbar Forest Experiment Station. The average annual temperature is 41.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.6°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 32.03 inches, with a mean monthly precipitation of 2.70 inches in January and 3.37 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Munuscong, Michigan, 1953; Munuscong Northeast, Michigan, 1953).

BIOTIC SETTING LS 058-061

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Neebish Island Wetland Complex.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus

spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize the four wetlands of the Neebish Island Wetland Complex. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Neebish Island Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Neebish Island Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Neebish Island Wetland Complex.

Mammals

A variety of mammals inhabit Neebish Island Wetland, southwest Neebish Island Wetland, and the other wetlands associated with Munuscong Bay (Weise, 1975; U.S. Army Corps of Engineers, 1975, 1977). Some species included in the mammalian fauna of these two wetlands are the snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasel (Mustela spp.), mink (Mustela vison), white-tailed deer (Odocoileus virginianus), and moose (Alces alces), but the moose is not common. Muskrat, beaver, raccoon, weasels, and mink may also be found on Sand Island Wetland and Oak Ridge Wetland (U.S. Army Corps of Engineers, 1975, 1977).

The wetlands associated with Munuscong Bay provide exceptional habitat for muskrat (Weise, 1975; Jaworski and Raphael, 1978), and muskrat trapping is an important activity on these wetlands. Other mammalian species which may be commonly hunted here include the snowshoe hare and white-tailed deer.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, food sources, or relationship to water levels of the mammals inhabiting the Neebish Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Neebish Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the Neebish Island Wetland Complex is likely to be an important spawning, nursery, and feeding area for certain fish species.

CULTURAL SETTING LS 058-061

Population

The Neebish Island Wetland Complex is located in Soo Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-31 indicates that both Chippewa County and Soo Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-31. Population Data for the Vicinity of the Neebish Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Soo Township	2,244	26.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Neebish Island Wetland Complex and the surrounding area is rural open space. A light-duty road passes through the northern part of Neebish Island Wetland. Two buildings are located in the southeastern section, and two lights are located in the southern part of this same wetland. A light-duty road passes through Oak Ridge Wetland, also running along its southeastern boundary, and several buildings are adjacent to the western boundary of this same wetland. The wetlands are under mixed private and state ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Recreation

The Neebish Island Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Neebish Island Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

The Neebish Island Wetland Complex and the surrounding areas are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Neebish Island Wetland Complex (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Munuscong Northeast, Michigan, 1953; Munuscong, Michigan, 1953).

Pollution Sources

There are no NPDES permit holders adjacent to the Neebish Island Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of any of the four wetlands of the Neebish Island Wetland Complex, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to the Neebish Island Wetland Complex.

LAKE NICOLET WEST SHORE WETLAND

PHYSIOGRAPHIC SETTING LS 062

Setting

Lake Nicolet West Shore Wetland extends approximately 0.1 mile lakeward from the shoreline of Lake Nicolet, within Bruce Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Lacustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951).

Topography

Lake Nicolet West Shore Wetland has two feet of relief and a maximum elevation of 582 feet above mean sea level (two feet above the approximate mean elevation of the St. Marys River). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is relatively flat (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Lake Nicolet West Shore Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Ordovician period and the Hermansville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils of the Lake Nicolet West Shore Wetland are classified as coastal beach (Veatch, 1927).

Hydrology

Lake Nicolet West Shore Wetland is adjacent to the West Neebish Channel and the St. Marys River. An intermittant stream and the Charlotte River flow through the wetland (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Lake Nicolet West Shore Wetland is located in Dunbar Forest Experiment Station. The average annual temperature is 41.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.6°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 32.03 inches, with a mean monthly precipitation of 2.70 inches in January and 3.37 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in

1975 occurring on April 28 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951).

BIOTIC SETTING LS 062

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Lake Nicolet West Shore Wetland.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize Lake Nicolet West Shore Wetland. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Lake Nicolet West Shore Wetland.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lake Nicolet West Shore Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Lake Nicolet West Shore Wetland.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), weasels (Mustela spp.), and mink (Mustela vison) may be found in Lake Nicolet West Shore Wetland (U.S. Army Corps of Engineers, 1975, 1977).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Lake Nicolet West Shore Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Lake Nicolet West Shore Wetland is likely to be an important spawning, nursery, and feeding area for certain fish species.

Population

Lake Nicolet West Shore Wetland is located in Bruce Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 1-32 indicates that both Chippewa County and Bruce Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 1-32. Population Data for the Vicinity of Lake Nicolet West Shore Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bruce Township	1,330	30.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Lake Nicolet West Shore Wetland is rural open space. The surrounding area is residential around the southern half and rural open space around the northern part. An unimproved dirt road and light-duty road lie to the west of the wetland's northern and central sections, respectively, and a light-duty road and several buildings are adjacent to the western border of the southern section. The wetland is under mixed private and state ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951).

Recreation

Lake Nicolet West Shore Wetland is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Lake Nicolet West Shore Wetland are limited to limestone (Great Lakes Basin Commission, 1974).

The area surrounding the wetland is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Lake Nicolet West Shore Wetland (U.S.G.S. quadrangle map, Oak Ridge, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Lake Nicolet West Shore Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Lake Nicolet West Shore Wetland, nor are there any known archaeological sites in the vicinity. However, the area has not yet been systematically surveyed by a professional archaeologist (Peebles and Black, 1976).

RESEARCH PROJECTS LS 062

The literature search identified no on-going or impending research projects pertaining to Lake Nicolet West Shore Wetland.

Table 1-33. Data Gaps-Lake Section 1

Data Gap*		Wetland Number	001–002	003	004	005	006–009	010–011	012–018	019	020	021	022	023	024–031	032	033	034	035	036	037	038–040	041
Physiographic Setting		Setting																					
		Topography																					
		Surficial Geology																					
		Soils																					
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
		Climate																					
		Special Features																					
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Major Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species	*	*	*	*	*	*	*	*	*	*	*										
		Species Composition	*	*	*	*	*	*	*	*	*	*	*										
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*										
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*										
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species																					
		Health	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cultural Setting		Population																					
		Land Use and Ownership																					
		Recreation																					
		Mineral, Energy, Forest Resource																					
		Public Utilities/Facilities																					
		Point Pollution Sources																					
		Non-Point Pollution Sources																					
		Historic Features																					
		Archaeologic Features																					

Table 1-33. Data Gaps-Lake Section 1

Data Gap*		Wetland Number	042	043	044	045	046	047-057	058-061	062
Physiographic Setting		Setting								
		Topography								
		Surficial Geology								
		Soils								
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*
		Climate								
		Special Features								
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*		*	*
		Major Species Composition	*	*	*	*	*		*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Fish	Major species			*					
		Species Composition								
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas								
		Commercial/Recreational Use								
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*		*				*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Mammals	Major Species								
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
		Endangered Species								
		Health	*	*	*	*	*	*	*	*
Cultural Setting		Population								
		Land Use and Ownership								
		Recreation								
		Mineral, Energy, Forest Resource								
		Public Utilities/Facilities								
		Point Pollution Sources								
		Non-Point Pollution Sources								
		Historic Features								
		Archaeologic Features								

LAKE SECTION 2

INTRODUCTION

Lake Section 2 extends from the upper St. Mary's River at Sugar Island to Point Iroquois in Chippewa County, Michigan. The topography of the region features a series of low bluffs in the vicinity of the wetlands. The predominant shore types along this 39 mile stretch of shoreline are erodible low bluff and plain.

Figure 2-1 shows the approximate location of the 14 wetlands in Lake Section 2. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 2-1. The wetlands of Lake Section 2 are located at elevations between 610 and 640 feet above sea level, 8 to 38 feet above the mean elevation of Lake Superior. The section 2 wetlands are classified as Palustrine-Lacustrine.

Available information related to physiographic and cultural features of these 14 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

Figure 2-1. Lake Section 2

Table 2-1. Location, Acreage, and Classification of Wetlands in Lake Section 2

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	SUGAR ISLAND WETLAND COMPLEX				
LS 063	Sugar Island Wetland #1	46°18'17"	84°07'42"	15	P
LS 064	Sugar Island Wetland #2	46°20'11"	84°09'43"	805	P-L
LS 065	Lake Nicolet East Shore Wetland	46°22'42"	84°11'58"	515	P-L
LS 066	Baie de Wasai Wetland	46°28'04"	84°16'03"	815	P-L
LS 067	Sugar Island Wetland #3	46°28'59"	84°16'52"	60	P
LS 068	Sugar Island Wetland #4	46°22'15"	84°09'09"	30	P
LS 069	Lake George West Shore Wetland	46°27'32"	84°10'38"	1005	P-L
LS 070	Sugar Island Wetland #5	46°31'43"	84°07'57"	12	P
	IZAAK WALTON BAY WETLAND COMPLEX				
LS 071	Izaak Walton Bay Wetland #1	46°27'26"	84°25'10"	185	P
LS 072	Izaak Walton Bay Wetland #2	46°26'03"	84°28'00"	10	P
LS 073	Birch Point Area Wetland	46°25'38"	84°31'08"	65	P
LS 074	Back Bay Wetland	46°26'34"	84°35'56"	85	P
LS 075	South Pond Wetland	46°26'53"	84°35'54"	120	P
LS 076	North Pond Wetland	46°27'47"	84°36'46"	57	P

P=palustrine

SUGAR ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 063-070

Setting

The Sugar Island Wetland Complex is located on Sugar Island in the coastal zones of the St. Marys River and Lake George, in Sugar Island Township of Chippewa County, Michigan. Sugar Island Wetlands #1, #2, #3, and #5, and Lake Nicolet East Shore Wetland lie on the shoreline of the St. Marys River. Sugar Island Wetland #4 and Lake George West Shore Wetland lie on the shoreline of Lake George. Baie de Wasai Wetland lies on the shoreline of Baie de Wasai, which is directly connected to the St. Marys River. There are no major population centers in the area. This wetland complex is a Palustrine-Lacustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Payment, Michigan, 1951; Sault Ste Marie South, Michigan-Ontario, 1975; Baie de Wasai, Michigan, 1951; Oak Ridge, Michigan, 1951).

Topography

The Sugar Island Wetland Complex has an overall relief of 30 feet and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of the St. Marys River). Sugar Island rises steeply from the St. Marys River and is composed of fairly hilly terrain. The greatest elevation on the island (891 feet above mean sea level) is in the northern part and is 311 feet above the mean elevation of the St. Marys River. The southern part of the island has a maximum elevation of 683 feet above sea level. A low plain separates the northern and southern areas (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Baie de Wasai, Michigan, 1951; Payment, Michigan, 1951; Sault Ste Marie South, Michigan-Ontario, 1975).

Surficial Geology

The surficial geology of the area in which the Sugar Island Wetland Complex lies is characterized by lake bed sand and lake bed clay. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soil types present in the Sugar Island Wetland Complex include, in Sugar Island Wetland #1 - coastal beach; in Sugar Island Wetland #2 -coastal beach, stony Shelldrake sand, Tahquamenon peat, stony Newton sand, Rifle peat, and Waiska cobbly sandy loam; in Lake Nicolet East Shore Wetland -coastal beach, Newton sand, Waiska cobbly sandy loam, and Bergland silty clay loam; in Baie de Wasai Wetland - coastal beach, Munuscong fine sandy loam, Tahquamenon peat, Shelldrake sand, Greenwood peat, Newton sand, and Bergland silty clay loam; in Sugar Island Wetland #3 - stony Shelldrake sand, Greenwood peat, and Newton sand; in Sugar Island Wetland #4 - Stony Newton sand, Stony Shelldrake sand,

Tahquamenon peat, and coastal beach; in Lake George West Shore Wetland - coastal beach, Newton sand, Munuscong fine sandy loam, Bergland silty clay loam, Shelldrake sand, Greenwood peat, and Bruce fine sandy loam; and in Sugar Island Wetland #5 - coastal beach, Munuscong fine sandy loam, and Shelldrake sand (Veatch, 1927).

Hydrology

The majority of the wetlands in the Sugar Island Wetland Complex are adjacent to the St. Marys River, but Sugar Island Wetland #4 and Lake George West Shore Wetland are adjacent to Lake George. In addition to two unnamed streams, Wilmar Creek and Rock Bottom Creek flow through Lake George West Shore Wetland; two unnamed streams and Beaver Dam Creek flow through Baie de Wasai Wetland; and no streams flow through the other six wetlands in the complex (U.S.G.S. quadrangle maps, Baie de Wasai, Michigan, 1951; Oak Ridge, Michigan, 1951; Sault Ste Marie South, Michigan-Ontario, 1975; Payment, Michigan, 1951).

The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland complex.

Climate

The closest weather station providing climatic data for the Sugar Island Wetland Complex is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2^{o}F and the mean monthly high for July is 63.8^{o}F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28^{o}F) in 1975 occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Baie de Wasai, Michigan, 1951; Oak Ridge, Michigan, 1951; Sault Ste Marie South, Michigan-Ontario, 1975; Payment, Michigan, 1951).

BIOTIC SETTING LS 063-070

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Sugar Island Wetland Complex.

Fish

Potagannissing Bay, a part of the St. Marys River, has been an important commercial fishing area since the late 1800's; the harvest has consisted primarily of suckers (Catostomidae), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), and muskellunge (Esox masquinongy). Since the closure of Lake Huron waters to commercial fishing for northern pike (Esox lucius) in 1966 and walleye in 1970, the waters of the St. Marys River and Potagannissing Bay have become of primary importance to recreational fishing. Suckers remain an important commercial resource of this area, although most are taken in tributary streams during spawning runs. Carp are becoming abundant in the Potagannissing River area, but no permanent commercial carp fishery exists (Jaworski and Raphael, 1978; Westerman and Van Oosten, 1937). Recreational fishing for yellow perch, walleye, and northern pike in Potagannissing Bay is considered excellent (Wright and Schorfhaar, 1976). In the St. Marys River in general, major game fish species include rock bass (Ambloplites rupestris), smallmouth bass (Micropterus dolomieui), northern pike, yellow perch, muskellunge, rainbow smelt (Osmerus mordax), lake whitefish (Coregonus clupeaformis), walleye, steelhead trout (Salmo gairdneri), salmon (Oncorhynchus spp.) and various species of small forage fish (U.S. Army Corps of Engineers, 1977). Although no site-specific information concerning the fish fauna of wetlands along the St. Marys River, Potagannissing Bay, Lake George and Munuscong Lake is available, these wetlands are clearly important spawning, nursery and feeding areas for all the species mentioned above, excluding perhaps the trout, salmon, and smelt.

A list of common species of fishes associated with coastal wetlands of Michigan appears in Appendix A-1. Some of these species in addition to those mentioned above may also utilize the eight wetlands of the Sugar Island Wetland Complex. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Sugar Island Wetland Complex.

Reptiles and Amphibians

A list of the herpetofauna of Chippewa County, as recorded by Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Sugar Island Wetland Complex.

Avifauna

Baie de Wasai Wetland and its vicinity is an important nesting and feeding area for bald eagles (Haliaeetus leucocephalus); four bald eagle nests were also located in the southern end of Sugar Island in the vicinity of Sugar Island Wetland #2 (Michigan Department of Natural Resources, 1975 and 1976).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Sugar Island Wetland Complex.

Mammals

Beaver (Castor canadensis) activity and the presence of lodges has been noted on Lake Nicolet East Shore Wetland and Baie de Wasai Wetland (U.S. Fish and Wildlife Service, 1977).

A survey of the mammalian species of the Chase S. Osborn Preserve (Pruitt, 1951), located at the southern end of Sugar Island, provides information concerning the mammalian species which may utilize the eight wetlands of the Sugar Island Wetland Complex (Table 2-2). However, the literature search provided no other site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Table 2-2. Mammalian Species of the Chase S. Osborn Preserve Which Also May Utilize the Eight Wetlands of Sugar Island Wetland Complex[a]

Common name	Common name
masked shrew	meadow jumping mouse
short-tailed shrew	coyote
snowshore hare	red fox
red squirrel	black bear
beaver	ermine
Gapper's red-backed mouse	long-tailed weasel
deer mouse	striped skunk
meadow vole	white-tailed deer
muskrat	moose[b]

[a] Pruitt, 1951
[b] probably not common

Endangered Species

Bald eagles, which are on the federal and state lists of threatened species, are known to nest within the Sugar Island Wetland Complex (Michigan Department of Natural Resources, 1975 and 1976).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in these wetlands by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the Sugar Island Wetland Complex is an important spawning, nursery, and feeding area for certain game fish. The Sugar Valley Travel Resort discharges into the St. Marys River. The effect and extent of this discharge on the Sugar Island Wetland Complex is not known.

CULTURAL SETTING LS 063-070

Population

The Sugar Island Wetland Complex is located in Sugar Island Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-3 indicates that Chippewa County and Sugar Island Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-3. Population Data for the Vicinity of the Sugar Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Sugar Island Township	403	70.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Sugar Island Wetland Complex is rural open space, but numerous special features characterize these wetlands. Several buildings and a light-duty road lie east of Sugar Island Wetland #1, and a light-duty road crosses the northeastern section of Sugar Island Wetland #2. A telephone line also extends across the latter wetland, leading to one building, which is situated in the southwest corner. Light-duty roads and unimproved dirt roads run adjacent to several parts of the eastern boundary of the lower section of the Lake Nicolet East Shore Wetland; several buildings are also located in these areas. A light-duty road and several buildings lie adjacent to the eastern boundary of Baie de Wasai Wetland; in addition, four buildings are located along its northern boundary. Sugar Island Wetland #3 includes two light-duty highways running east to west, and a campground is adjacent to its northeast boundary. Special features in the Lake George West Shore Wetland include a trail in the southern section, an unimproved dirt road bisecting the southern section, several light-duty roads adjacent to the southern, middle, and northern sections, as well as buildings adjacent to the western boundary. A light-duty road and several buildings surround Sugar Island Wetland #5, bordering on the northern, western, and southern edges of this wetland. The Sugar Island Wetland Complex is under a variety of ownerships and land use development pressures, according to the following tabulation:

Wetland	Land Use	Land Use: Surrounding Area	Ownership	Development Pressure
Sugar Island Wetland #1	rural/ open space	rural/ open space	private	moderate
Sugar Island Wetland #2	rural/ open space	rural/ institutional	private	moderate
Lake Nicolet East Shore Wetland	rural/ open space	rural/ open space	private/state/ local	moderate
Baie de Wasai Wetland	rural/ open space	rural/ open space	private/state	moderate
Sugar Island Wetland #3	rural/ open space	rural/ open space	private	high
Sugar Island Wetland #4	rural/ open space	rural/ open space	state	minimal
Lake George West Shore Wetland	rural/ open space	rural/ open space	private/state	moderate
Sugar Island Wetland #5	rural/ open space	residential	private	high

Recreation

Sugar Island Wetland #3 is adjacent to a campground. Snowmobile trails are nearby. Lake George West Shore Wetland is partially located in a Michigan State Park, in which recreational facilities are unknown. Lake Nicolet East Shore

Wetland, Baie de Wasai Wetland, Sugar Island Wetland #4, Lake George West Shore Wetland, and Sugar Island Wetland #5 are adjacent to snowmobile trails (Duwe, 1976).

Mineral, Energy, and Forest Resources

Potential mineral resources located in the vicinity of the Sugar Island Wetland Complex are limited to limestone, which is present within Sugar Island Wetlands #1 and #2 (Great Lakes Basin Commission, 1974).

The areas surrounding the Sugar Island Wetland Complex and within Baie de Wasai Wetland, Lake George Shore Wetland, and Sugar Island Wetlands #2 and #3 is wooded and represent potential forest resources, but no significant energy resources are known to be present in the vicinity.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Sugar Island Wetland Complex except for a telephone line crossing Sugar Island Wetland #2 (U.S.G.S. quadrangle maps, Oak Ridge, Michigan, 1951; Baie de Wasai, Michigan, 1951; Sault Ste Marie South, Michigan-Ontario, 1975; Payment, Michigan, 1951).

Pollution Sources

The Sugar Valley Travel Resort, located north of Sugar Island Wetland #3, discharges into the St. Marys River. The extent and effect of this discharge on Sugar Island Wetland #3 is not known. There are no other NPDES permit holders adjacent to the wetlands in the Sugar Island Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the eight wetlands of the Sugar Island Wetland Complex, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 063-070

The literature search identified no on-going or impending research projects pertaining to the Sugar Island Wetland Complex.

IZAAK WALTON BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 071-072

Setting

The Izaak Walton Bay Wetland Complex is located in the coastal zone of Izaak Walton Bay, which is directly connected to the St. Marys River in Soo Township of Chippewa County, Michigan. Izaak Walton Bay Wetland #1 lies on the shoreline of the bay, and Izaak Walton Bay Wetland #2 lies approximately 0.1 mile from the shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Shallows, Michigan, 1951).

Topography

The Izaak Walton Bay Wetland Complex has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area contains an initial bluff at the river followed by a plain and an interior bluff. The northern area near wetland #1 slopes more gradually (U.S.G.S. quadrangle map, Shallows, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which the Izaac Walton Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soil types present in the Izaak Walton Bay Wetland Complex include, in Izaac Walton Bay Wetland #1 - coastal beach, Rifle peat, and Carbondale muck, and in Izaac Walton Bay Wetland #2 - Munuscong fine sandy loam, Newton sand, and Rifle peat.

Hydrology

Izaak Walton Bay Wetland #1 is adjacent to the St. Marys River, and Izaak Walton Bay Wetland #2 has one intermittent stream flowing through it (U.S.G.S. quadrangle map, Shallows, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Izaak Walton Bay Wetland Complex is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Shallows, Michigan, 1951).

BIOTIC SETTING LS 071-072

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Izaak Walton Bay Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Izaak Walton Bay Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Izaak Walton Bay Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Izaak Walton Bay Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Izaak Walton Bay Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the two wetlands comprising the Izaak Walton Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Izaak Walton Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 071-072

Population

The Izaak Walton Bay Wetland Complex is located in Soo Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-4 indicates that both Chippewa County and Soo Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-4. Population Data for the Vicinity of the Izaak Walton Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Soo Township	2,244	26.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Izaac Walton Bay Wetland Complex and the surrounding area is rural open space. A trail intersects the northern section of Izaak Walton Bay Wetland #1, while a light-duty road runs along the eastern and southern boundaries of Izaak Walton Bay Wetland #2. The wetlands are under mixed private, state, and local ownership, but their location suggests that they are subject to low development pressure (U.S.G.S. quadrangle map, Shallows, Michigan, 1951).

Recreation

A large portion of the Izaak Walton Bay Wetland Complex is located in the Munuscong State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Izaak Walton Bay Wetland Complex are limited to sand and gravel (Great Lakes Basin Commission, 1974).

The Izaak Walton Bay Wetland Complex and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Izaak Walton Wetland Complex (U.S.G.S. quadrangle map, Shallows, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to the Izaak Walton Bay Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Izaak Walton Bay Wetland Complex, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 071-072

The literature search identified no on-going or impending research projects pertaining to the Izaak Walton Bay Wetland Complex.

BIRCH POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LS 073

Setting

Birch Point Area Wetland is located 0.3 mile from the shoreline of the St. Marys River in Bay Mills Township of Chippewa County, Michigan, approximately 2.6 miles from Brimley. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Topography

Birch Point Area Wetland has 14 feet of relief and a maximum elevation of 625 feet above mean sea level (23 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is a gradual slope upward from the beach for a half mile toward an interior bluff of 40 feet (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Surficial Geology

The surficial geology of the area in which Birch Point Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in the Birch Point Area Wetland are classified as Rifle peat, Saugatuck sand, and Newton sand (Veatch, 1927).

Hydrology

No streams flow through Birch Point Area Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Birch Point Area Wetland is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately

five and one-fourth months long, with the last killing frost (28^{0}F) in 1975 occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

BIOTIC SETTING LS 073

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Birch Point Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Birch Point Area Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Birch Point Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Birch Point Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Birch Point Area Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Birch Point Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Birch Point Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 073

Population

Birch Point Area Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-5 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-5. Population Data for the Vicinity of Birch Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Birch Point Area Wetland is rural open space, but the surrounding area is residential and rural. A light-duty road lies adjacent to the northwestern and northeastern boundaries of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Recreation

Birch Point Area Wetland is located near the Hiawatha National Forest. Facilities in the forest include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites and snowmobiling (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Birch Point Area Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Birch Point Area Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Birch Point Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Birch Point Area Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 073

The literature search identified no on-going or impending research projects pertaining to Birch Point Area Wetland.

BACK BAY WETLAND

PHYSIOGRAPHIC SETTING LS 074

Setting

Back Bay Wetland lies on the shoreline of Back Bay, which is directly connected to the St. Marys River, in Bay Mills Township of Chippewa County, Michigan, approximately 2.2 miles from Brimley. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Topography

Back Bay Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (8 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is a gradual slope upward from the beach to an interior bluff (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Surficial Geology

The surficial geology of the area in which Back Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Back Bay Wetland are classified as Shelldrake sand, Rifle peat, and coastal beach (Veatch, 1927).

Hydrology

Two unnamed streams flow through Back Bay Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Back Bay Wetland is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring

on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

BIOTIC SETTING LS 074

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Back Bay Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Back Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Back Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Back Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Back Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Back Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Back Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 074

Population

Back Bay Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-6 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-6. Population Data for the Vicinity of Back Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Back Bay Wetland and most of the surrounding area is rural open space. A light-duty road runs along the northern boundary of the wetland, and several buildings lie adjacent to its northeastern boundary. The wetland is

under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Recreation

Back Bay Wetland is located near the Hiawatha National Forest. Facilities in the forest include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites and snowmobiling (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Back Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Back Bay Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Back Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Back Bay Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 074

The literature search identified no on-going or impending research projects pertaining to Back Bay Wetland.

SOUTH POND WETLAND

PHYSIOGRAPHIC SETTING LS 075

Setting

South Pond Wetland is located at South Pond, 0.1 mile from the St. Marys River shoreline in Bay Mills Township of Chippewa County, Michigan, approximately 2.6 miles from Brimley. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Topography

South Pond Wetland has ten feet of relief and a maximum elevation of 625 feet above mean sea level (23 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is a gradual slope upward from the beach to an interior bluff (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Surficial Geology

The surficial geology of the area in which South Pond Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soil type in South Pond Wetland is Rifle peat (Veatch, 1927).

Hydrology

No streams flow through South Pond Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for South Pond Wetland is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

BIOTIC SETTING LS 075

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of South Pond Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in South Pond Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in South Pond Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Pond Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing South Pond Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting South Pond Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in South Pond Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the Bay Mills Indian Community Fish Processing Plant discharges into the groundwater. The nature, effects, and extent of this discharge on South Pond Wetland are not known.

CULTURAL SETTING LS 075

Population

South Pond Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-7 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-7. Population Data for the Vicinity of South Pond Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within South Pond Wetland and the surrounding area is rural open space. A light-duty road lies adjacent to both the northern and southern boundaries of the wetland, while an unimproved dirt road lies to the east. There are also several buildings nearby. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Recreation

South Pond Wetland is located near the Hiawatha National Forest. Facilities in the forest include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites and snowmobiling (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of South Pond Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Pond Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Pollution Sources

The Bay Mills Indian Community Fish Processing Plant located north of South Pond Wetland discharges into the groundwater. Neither the effect nor the extent of this discharge on the wetland are known. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are exist within 500 feet of South Pond Wetland, but the Michigan Coastal Zone Inventory indicates that three archaeological sites are present in the vicinity. Sites 20-CH-14 and 20-CH-22 are habitations of an unknown culture and time period, and site 20-CH-23 is a historical Indian mission (Peebles and Black, 1976). Further information regarding the field research and exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 075

The literature search identified no on-going or impending research projects pertaining to South Pond Wetland.

NORTH POND WETLAND

PHYSIOGRAPHIC SETTING LS 076

Setting

North Pond Wetland is located on the St. Marys River shoreline in Bay Mills Township of Chippewa County, Michigan, approximately 3.3 miles from Brimley, at North Pond. This wetland is a Palustrine System and occupies predominantly wooded sites (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Topography

North Pond Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area consists of a series of low bluffs (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Surficial Geology

The surficial geology of the area in which North Pond Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in North Pond Wetland are classified as Shelldrake sand and Greenwood peat (Veatch, 1927).

Hydrology

North Pond Wetland is adjacent to the St. Marys River and has no streams flowing through it (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for North Pond Wetland is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

BIOTIC SETTING LS 076

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of North Pond Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in North Pond Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in North Pond Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North Pond Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing North Pond Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting North Pond Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in North Pond Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 076

Population

North Pond Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 2-8 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 2-8. Population Data for the Vicinity of North Pond Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within North Pond Wetland and the surrounding area is rural open space. A light-duty road and several buildings are located west of the wetland. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Recreation

North Pond Wetland is partially within the Hiawatha National Forest, in which recreational facilities include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites, and snowmobiling trails (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of North Pond Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of North Pond Wetland (U.S.G.S. quadrangle map, Brimley, Michigan-Ontario, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to North Pond Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of North Pond Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 076

The literature search identified no on-going or impending research projects pertaining to North Pond Wetland.

Table 2-9. Data Gaps-Lake Section 2

Data Gap*		Wetland Number	063-070	071-072	073	074	075	076
Physiographic Setting		Setting						
		Topography						
		Surficial Geology						
		Soils						
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*
		Depth	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*
		Climate						
		Special Features						
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*
		Major Species Composition	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*
	Fish	Major species		*	*	*	*	*
		Species Composition		*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*
		Spawning and Hatching Areas		*	*	*	*	*
		Commercial/Recreational Use		*	*	*	*	*
		Life Histories	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*
	Mammals	Major Species		*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*
		Endangered Species						
		Health	*	*	*	*	*	*
Cultural Setting		Population						
		Land Use and Ownership						
		Recreation						
		Mineral, Energy, Forest Resource						
		Public Utilities/Facilities						
		Point Pollution Sources						
		Non-Point Pollution Sources						
		Historic Features						
		Archaeologic Features						

LAKE SECTION 3

INTRODUCTION

Lake Section 3 extends from Point Iroquois to Crisp Point in Chippewa County, Michigan. The topography of the region features low plain and irregular steep bluffs in the vicinity of the wetlands. The predominant shore types along this 62 mile stretch of shoreline are erodible low bluff and plain.

Figure 3-1 shows the approximate location of the 17 coastal wetlands in Lake Section 3. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 3-1. The wetlands of Lake Section 3 are located at elevations between 604 and 650 feet above sea level, 2 to 48 feet above the mean elevation of Lake Superior. The Section 3 wetlands are classified as Palusterine and Riverine.

Available information related to physiographic and cultural features of these 17 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

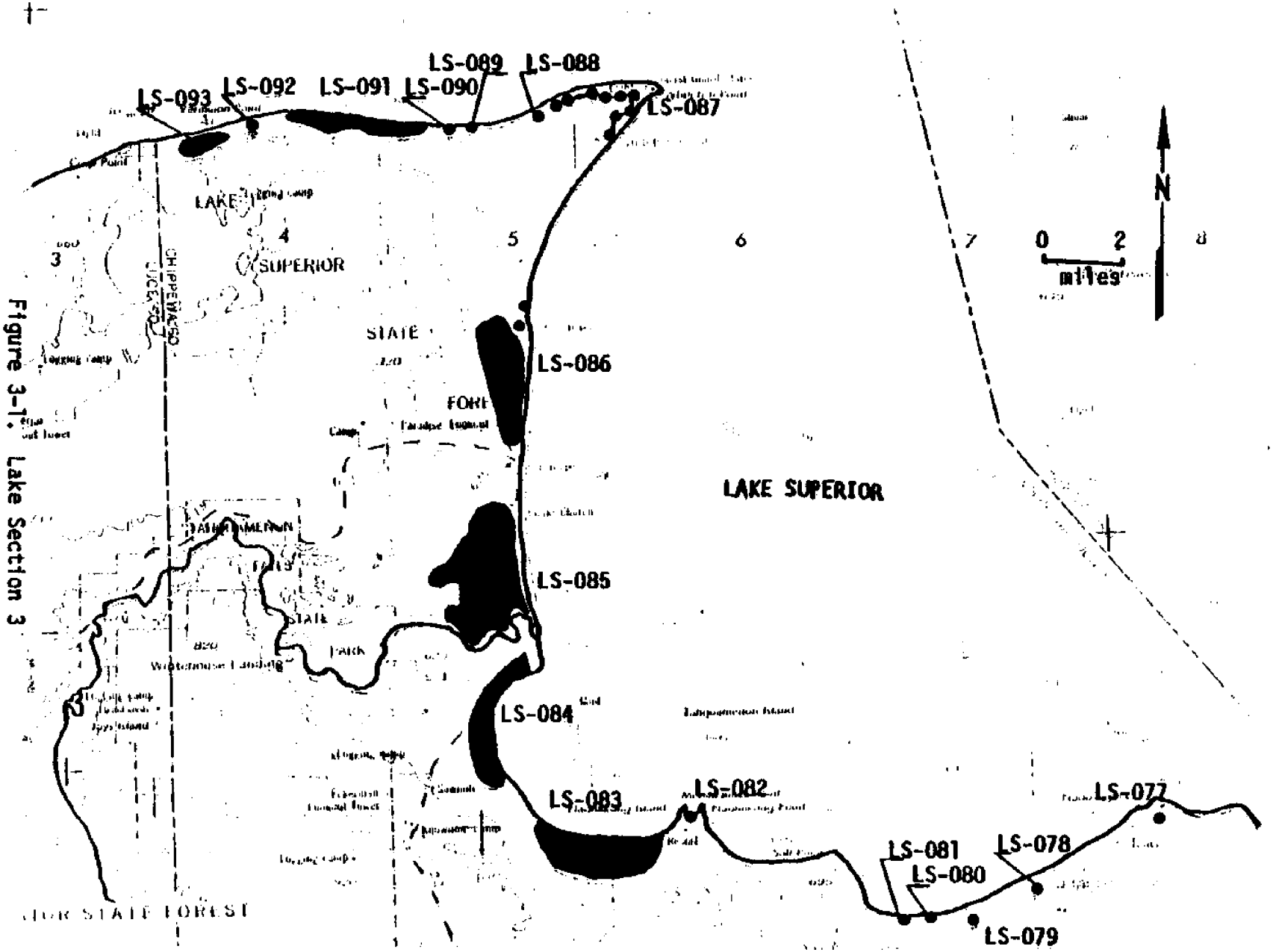


Figure 3-1. Lake Section 3

Table 3-1. Location, Acreage, and Classification of Wetlands in Lake Section 3

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 077	Nodaway Point Wetland	46°28'56"	84°40'31"	175	P
	PENDILLS CREEK WETLAND COMPLEX				
LS 078	Pendills Lake Wetland	46°27'08"	84°44'58"	77	P
LS 079	Pendills Creek Wetland #1	46°26'39"	84°48'40"	25	P
LS 080	Pendills Creek Wetland #2	46°26'32"	84°48'09"	43	P
LS 081	Pendills Creek Wetland #3	46°26'28"	84°49'34"	15	P
LS 082	Naomikong Point Wetland	46°29'10"	84°56'30"	83	P
LS 083	South Tahquamenon Bay Wetland	46°28'12"	84°59'51"	1200	P
LS 084	West Tahquamenon Bay Wetland	46°31'42"	85°03'35"	1110	P
LS 085	Tahquamenon River Wetland	46°35'09"	85°03'22"	2545	P-R
LS 086	Whitefish Bay Wetland	46°39'38"	85°02'37"	1442	P
LS 087	Whitefish Point Wetland	46°45'59"	84°59'20"	230	P
	WHITEFISH TOWNSHIP WETLAND COMPLEX				
LS 088	Whitefish Township Coastal Wetland #1	46°45'46"	85°01'12"	25	P
LS 089	Whitefish Township Coastal Wetland #2	46°45'19"	85°03'48"	8	P
LS 090	Whitefish Township Coastal Wetland #3	46°45'17"	85°04'21"	23	P
LS 091	Weatherhogs Creek Wetland	46°45'28"	85°07'26"	715	P
LS 092	Whitefish Township Wetland	46°45'35"	85°11'02"	75	P
LS 093	Brown Creek Wetland	46°45'11"	85°12'30"	235	P

[a]P=palustrine

NODAWAY POINT WETLAND

PHYSIOGRAPHIC SETTING LS 077

Setting

Nodaway Point Wetland is located 0.1 mile from the shoreline of Whitefish Bay, which is directly connected to Lake Superior, in Bay Mills Township of Chippewa County, Michigan, at Westons Iroquois Beach. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951).

Topography

Nodaway Point Wetland has 13 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is a low plain with a steep 250 foot bluff inland near the wetland (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Nodaway Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in Nodaway Point Wetland are classified as Rifle peat and Waiska cobbly sandy loam (Veatch, 1927).

Hydrology

No streams flow through Nodaway Point Wetland (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Nodaway Point Wetland is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951).

BIOTIC SETTING LS 077

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Nodaway Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Nodaway Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Nodaway Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Nodaway Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Nodaway Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Nodaway Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Nodaway Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 077

Population

Nodaway Point Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-2 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-2. Population Data for the Vicinity of Nodaway Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Nodaway Point Wetland and the surrounding area is rural open space. Iroquois Road (a four to six lane highway) is located adjacent to the northern boundary of Nodaway Point Wetland; numerous buildings and several

streets are also located along this boundary, at Westons Iroquois Beach. An unimproved dirt road runs along the southeastern boundary, and a sawmill is located nearby. The wetland is under mixed federal and private ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951).

Recreation

Nodaway Point Wetland is within the Hiawatha National Forest, where recreational facilities include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites, and snowmobile trails.

Mineral, Energy, and Forest Resources

No significant mineral resources are located in the vicinity of Nodaway Point Wetland.

The wetland and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Nodaway Point Wetland (U.S.G.S. quadrangle map, Dollar Settlement, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Nodaway Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Nodaway Point Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 077

The literature search identified no on-going or impending research projects pertaining to Nodaway Point Wetland.

PENDILLS CREEK WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 078-081

Setting

The Pendills Creek Wetland Complex is located in the coastal zone of Pendills Bay, which is connected to Lake Superior through Whitefish Bay, within Bay Mills Township of Chippewa County, Michigan. The components of the complex extend from approximately 100 feet to 0.6 mile from the Pendills Bay shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies predominantly wooded sites (U.S.G.S. quadrangle maps, Pendills Lake, Michigan, 1951; Dollar Settlement, Michigan, 1951).

Topography

The Pendills Creek Wetland Complex has 48 feet of relief and a maximum elevation of 650 feet above mean sea level (48 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and non-erodible low bluff. The surrounding area is irregular with steep inland bluffs and irregular hills (U.S.G.S. quadrangle maps, Pendills Lake, Michigan, 1951; Dollar Settlement, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which the Pendills Creek Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Richmond formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soil types present in the Pendills Creek Wetland Complex include, in Pendills Lake Wetland - Rifle peat, Shelldrake sand, and Greenwood peat; in Pendills Creek Wetland #1 - coastal beach; in Pendills Creek Wetland #2 - Shelldrake sand and Rifle peat; and in Pendills Creek Wetland #3 - Shelldrake sand (Veatch, 1927).

Hydrology

Three intermittent streams flow through Pendills Lake Wetland, and one intermittent stream flows through Pendills Creek Wetland #3. No streams flow through the remaining two wetlands of the Pendills Creek Wetland Complex (U.S.G.S. quadrangle maps, Dollar Settlement, Michigan, 1951; Pendills Lake, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Pendills Creek Wetland Complex is located in Sault Ste Marie, Michigan. The average annual temperature is 40.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 31.70 inches, with a mean monthly precipitation of 1.92 inches in January and 2.60 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Dollar Settlement, Michigan, 1951; Pendills Lake, Michigan, 1951).

BIOTIC SETTING

LS 078-081

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Pendills Creek Wetland Complex.

Fish

Fish species found in Pendill Creek are listed in Table 3-3. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed in Table 3-3, may also utilize the Pendills Creek Wetland Complex. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Pendills Creek Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food

Table 3-3. Fish Species Found in Pendills Creek, Chippewa County, Michigan [a]

Family and Species	Family and Species
Petromyzontidae	Cyprinodontidae
silver lamprey	banded killifish*
northern brook lamprey	
sea lamprey	Gadidae
American brook lamprey	burbot
Salmonidae	Gasterosteidae
brown trout	brook stickleback
rainbow trout	ninespine stickleback
lake trout	
	Percopsidae
Osmeridae	trout-perch
rainbow smelt	
	Centrarchidae
Esocidae	rock bass
northern pike*	
	Percidae
Cyprinidae	yellow perch*
longnose dace	logperch*
northern redbelly dace	Iowa darter*
common shiner	
brassy minnow	Cottidae
fathead minnow*	mottled sculpin*
Catostomidae	
white sucker*	
longnose sucker	
Ictaluridae	
brown bullhead*	

[a]Moore and Braem (1965)
*Species which are associated with wetland habitats, according to Trautman (1957) and Raphael and Jaworski (1978)

sources, or relationship to water levels of the reptiles and amphibians in the Pendills Creek Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Pendills Creek Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the four wetlands comprising the Pendills Creek Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Pendills Creek Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, numerous fish species are found in Pendills Creek.

CULTURAL SETTING LS 078-081

Population

The Pendills Creek Wetland Complex is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-4 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-4. Population Data for the Vicinity of the Pendills Creek Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Pendills Creek Wetland Complex and the surrounding area is rural open space. Lake Shore Drive (a light-duty road) passes north of Pendills Lake Wetland, Pendills Creek Wetland #2, and Pendills Creek Wetland #3, and south of Pendills Creek Wetland #1. An unimproved dirt road intersects Pendills Creek Wetland #2, and also runs west of Pendills Lake Wetland. Several buildings are located northeast of Pendills Lake Wetland. The Pendills Creek Wetland Complex is under mixed federal and private ownership, but its location suggests that it is subject to mixed minimal to moderate development pressure (U.S.G.S. quadrangle maps, Pendills Lake, Michigan, 1951; Dollar Settlement, Michigan, 1951).

Recreation

The Pendills Creek Wetland Complex lies within the Hiawatha National Forest. The Bayview privte campground and the big Pines Picnic Area are located near the wetland complex. Recreational facilities in the National Forest include campsites, picnic areas, fishing, swimming, launching ramps, scenic sites, and snowmobile trails.

Mineral, Energy, and Forest Resources

Potential mineral resources located in the vicinity of the Pendills Creek Wetland Complex are limited to limestone (Great Lakes Basin Commission, 1974).

Pendills Creek Wetland Complex and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Pendills Creek Wetland Complex (U.S.G.S. quadrangle maps, Dollar Settlement, Michigan, 1951; Pendills Lake, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to the Pendills Lake Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of the Pendills Creek Wetland Complex (Peebles and Black, 1976). However, the Michigan Coastal Zone Inventory indicates that three archaeological sites are present in the vicinity of the wetlands. Sites 20-CH-32, 20-CH-31, and 20-CH-30 are possible habitations of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 078-081

The literature search identified no on-going or impending research projects pertaining to the Pendills Creek Wetland Complex.

NAOMIKONG POINT WETLAND

PHYSIOGRAPHIC SETTING LS 082

Setting

Naomikong Point Wetland lies on the shoreline of Whitefish Bay, which is directly connected to Lake Superior, within Bay Mills Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975).

Topopgraphy

Naomikong Point Wetland has only two feet of relief and lies at an elevation of 604 feet above mean sea level (two feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat with an interior bluff (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Naomikong Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in the Naomikong Point Wetland are classified as coastal beach and Shelldrake sand (Veatch, 1927).

Hydrology

No streams flow through Naomikong Point Wetland (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Naomikong Point Wetland is located in Tahquamenon Falls Park, Michigan. The average annual temperature is 41.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.8°F and the mean monthly high for July is 66.5°F. The average annual precipitation is 36.64 inches, with a mean monthly precipitation of 4.44 inches in January and 1.89 inches in July. The growing season is approximately four and one-half months long, with the last killing

frost ($28^{o}F$) in 1975 occurring on May 13 and the first killing frost on September 24 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975).

BIOTIC SETTING LS 082

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Naomikong Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Naomikong Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Naomikong Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Naomikong Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Naomikong Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Naomikong Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Naomikong Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 082

Population

Naomikong Point Wetland is located in Bay Mills Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-5 indicates that Chippewa County and Bay Mills Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-5. Population Data for the Vicinity of Naomikong Point Wetland

	Estimated population 1975[a]	Estimated % change 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Naomikong Point Wetland and the surrounding area is rural open space. A building and an unimproved dirt road lie adjacent to the southeastern boundary. The wetland is under state ownership, and its location

suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975).

Recreation

Naomikong Point Wetland lies within the Hiawatha National Forest, where recreational facilities include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites, and snowmobile trails (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Naomikong Point Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Naomikong Point Wetland (U.S.G.S. quadrangle map, McNearney Lake, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Naomikong Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Naomikong Point is an archaeological site (20-Ch-2) that has been placed on the National Register. Naomikong Point was excavated by the University of Michigan in 1965, 1966, and 1967. Materials uncovered during the excavation suggest that the site was used as a seasonal fishing village by both historic and prehistoric cultures. The prehistoric occupation of the site is believed to be an example of the Laurel Tradition of the Middle Woodland culture. Naomikong Point was also inhabited by the Chippewa as late as 1850 (Peebles and Black, 1976). Further information on field findings and research can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 082

The literature search identified no on-going or impending research projects pertaining to Naomikong Point Wetland.

SOUTH TAHQUAMENON BAY WETLAND

PHYSIOGRAPHIC SETTING LS 083

Setting

South Tahquamenon Bay Wetland lies approximately 100 feet from the shoreline of Tahquamenon Bay, which is connected to Lake Superior through Whitefish Bay, within Bay Mills and Whitefish Townships of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine system and occupies a wooded site (U.S.G.S. quadrangle maps, Piatt Lake, Michigan, 1975; McNearney Lake, Michigan, 1975).

Topography

South Tahquamenon Bay Wetland has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area consists of an interior bluff, with hills beyond (U.S.G.S. quadrangle maps, McNearney Lake Michgan, 1975; Piatt Lake, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which South Tahquamenon Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Ordovician period and the Hermansville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils of South Tahquamenon Bay Wetland are classified as coastal beach, Shelldrake sand, Greenwood peat, Rifle peat, and Saugatuck sand (Veatch, 1927).

Hydrology

Naomikong Creek, Ankodosh Creek, and an unnamed stream flow through South Tahquamenon Bay Wetland (U.S.G.S. quadrangle maps, McNearney Lake, Michigan, 1975; Piatt Lake, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for South Tahquamenon Bay Wetland is located in Tahquamenon Falls Park, Michigan. The average annual temperature is 41.5^{0}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.8^{0}F and the mean monthly high for July is 66.5^{0}F. The average annual precipitation is 36.64 inches, with a mean monthly

precipitation of 4.44 inches in January and 1.89 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on September 24 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, McNearney Lake, Michigan, 1975; Piatt Lake, Michigan, 1975).

BIOTIC SETTING LS 083

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of South Tahquamenon Bay Wetland.

Fish

Fish species found in Naomikong Creek, Ankodosh Creek, and Roxbury Creek, which flow through South Tahquamenon Bay Wetland are listed in Table 3-6. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed in Table 3-6, may also utilize this wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in South Tahquamenon Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in South Tahquamenon Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Tahquamenon Bay Wetland.

Table 3-6. Fish Species Found in Naomikong Creek, Ankodosh Creek, and Roxbury Creek, which Flow Through Ankodosh Creek Wetland, Chippewa County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
northern brook lamprey	
	Percidae
Salmonidae	johnny darter*
rainbow trout	
brook trout	Cottidae
	mottled sculpin*
Cyprinidae	
creek chub	
longnose dace	
blacknose shiner	
bluntnose minnow	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing South Tahquamenon Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting South Tahquamenon Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in South Tahquamenon Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the creeks flowing through South Tahquamenon Bay Wetland are utilized by a number of fish species.

CULTURAL SETTING LS 083

Population

South Tahquamenon Bay Wetland is located in Whitefish and Bay Mills Townships of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-7 indicates that Chippewa County and both townships experienced rapid rates of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-7. Population Data for the Vicinity of South Tahquamenon Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--
Bay Mills Township	602	44.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within South Tahquamenon Bay Wetland and the surrounding area is rural open space. Two light-duty roads are located near South Tahquamenon Bay Wetland; one passes through the northern section of this wetland, and the other runs adjacent to the southern boundary. One building is adjacent to the southern border, and several buildings lie to the north of the wetland. The wetland is under mixed federal and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, McNearney Lake, Michigan, 1975; Piatt Lake, Michigan, 1975).

Recreation

South Tahquamenon Bay Wetland is within the Hiawatha National Forest. The Roxbury private campground is located nearby. Recreational facilities in the national forest include campsites, picnic areas, swimming, fishing, launching ramps, scenic sites, and snowmobile trails (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of South Tahquamenon Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Tahquamenon Bay Wetland (U.S.G.S. quadrangle maps, McNearney Lake, Michigan, 1975; Piatt Lake, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to South Tahquamenon Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of South Tequamenon Bay Wetland, but the Michigan Coastal Zone Inventory indicates that one archaeological site (20-CH-9) is present in the vicinity of the wetland. The site is a habitation of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and exact location of this site can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 083

The literature search identified no on-going or impending research projects pertaining to South Tahquamenon Bay Wetland.

WEST TAHQUAMENON BAY WETLAND

PHYSIOGRAPHIC SETTING LS 084

Setting

West Tahquamenon Bay Wetland lies on the shoreline of Tahquamenon Bay, which is connected to Lake Superior through Whitefish Bay, within Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Topography

West Tahquamenon Bay Wetland has 28 feet of relief and a maximum elevation of 630 feet above mean sea level (28 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat, with a gradual rising slope further inland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which West Tahquamenon Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils in West Tahquamenon Bay Wetland are classified as Rifle peat, coastal beach, Bruce fine sandy loam, Newton sand, Houghton muck, and Shelldrake sand (Veatch, 1927).

Hydrology

Galloway Creek and seven unnamed streams flow through West Tahquamenon Bay Wetland, and Silver Creek flows into the wetland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for West Tahquamenon Bay Wetland is located in Tahquamenon Falls Park, Michigan. The average annual temperature is 41.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.8°F and the mean monthly high for July is 66.5°F. The average annual precipitation is 36.64 inches, with a mean monthly precipitation of 4.44 inches in January and 1.89 inches in July. The growing season is approximately four and one-half months long, with the last killing

frost (28°F) in 1975 occurring on May 13 and the first killing frost on September 24 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

BIOTIC SETTING LS 084

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of West Tahquamenon Bay Wetland.

Fish

Fish species found in Big Silver Creek and Galloway Creek, which flow through West Tahquamenon Bay Wetland, include sea lamprey (Petromyzon marinus), American brook lamprey (Lampetra lamottei), brook trout (Salvelinus fontinalis), rainbow smelt (Osmerus mordax), central mudminnow (Umbra limi), finescale dace (Phoxinus neogaeus), and Iowa darter (Etheostoma exile) (Moore and Braem, 1965). Fish species known to utilize coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may also utilize West Tahquamenon Bay Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in West Tahquamenon Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in West Tahquamenon Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing West Tahquamenon Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting West Tahquamenon Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in West Tahquamenon Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, several fish species are found in the creeks flowing through West Tahquamenon Bay Wetland.

CULTURAL SETTING LS 084

Population

West Tahquamenon Bay Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-8 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-8. Population Data for the Vicinity of West Tahquamenon Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within West Tahquamenon Bay Wetland and the surrounding area is rural open space. State Route 123 and a light-duty road cross the northwestern section of West Tahquamenon Bay Wetland; two trails also run through the southern section. The wetland is under mixed federal and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Recreation

West Tahquamenon Bay Wetland is within the Hiawatha National Forest and partially within the Tahquamenon Falls State Park. Recreational facilities in the national forest include camping, picnic areas, swimming, fishing, launching ramps, scenic sites, and snowmobile trails. In the state park, facilities include camping and snowmobile trails (Dune, 1976).

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of West Tahquamenon Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of West Tahquamenon Bay Wetland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to West Tahquamenon Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of West Tahquamenon Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 084

The literature search identified no on-going or impending research projects pertaining to West Tahquamenon Bay Wetland.

TAHQUAMENON RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 085

Setting

Tahquamenon River Wetland is located approximately 0.1 mile from the shoreline of Whitefish Bay, which is directly connected to Lake Superior, within Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Topography

Tahquamenon River Wetland has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat, with some irregular variations in elevation to the northwest (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Tahquamenon River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils of the Tahquamenon River Wetland are classified as Rubicon sand, Saugatuck sand, Rifle peat, Spaulding peat, Greenwood peat, and Newton sand (Veatch, 1927).

Hydrology

Tahquamenon River Wetland is adjacent to the Tahquamenon River and has four unnamed streams, Black Creek, and O'Briens Creek flowing through it (U.S.G.S. quadrangle map, Emerson, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Tahquamenon River Wetland is located in Tahquamenon Falls Park, Michigan. The average annual temperature is 41.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.8°F and the mean monthly high for July is 66.5°F. The average annual precipitation is 36.64 inches, with a mean monthly

precipitation of 4.44 inches in January and 1.89 inches in July. The growing season is approximately four and one-half months long, with the last killing frost ($28^{o}F$) in 1975 occurring on May 13 and the first killing frost on September 24 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

BIOTIC SETTING LS 085

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Tahquamenon River Wetland.

Fish

Fish species found in the Tahquamenon River are listed in Table 3-9. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species may also utilize Tahquamenon River Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Tahquamenon River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Tahquamenon River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Tahquamenon River Wetland.

Table 3-9 . Fish Species Found in Tahquamenon River, Chippewa County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
northern brook lamprey	white sucker*
sea lamprey	longnose sucker
ammocetes (silver or northern brook lamprey)	Ictaluridae
American brook lamprey	black bullhead*
	brown bullhead*
Salmonidae	Gasterosteidae
rainbow trout	brook stickleback*
brook trout	
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	smallmouth bass*
	rock bass
Esocidae	Percidae
northern pike*	yellow perch*
	blackside darter
Cyprinidae	johnny darter*
creek chub	Iowa darter*
pearl dace	
longnose dace	
finescale dace	Cottidae
northern redbelly dace	mottled sculpin*
goldenshiner*	
emerald shiner	
rosyface shiner	
common shiner	
spottail shiner	
sand shiner	
blacknose shiner*	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Rapahel (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Tahquamenon River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Tahquamenon River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, a variety of fish species is found in the Tahquamenon River.

CULTURAL SETTING LS 085

Population

Tahquamenon River Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-10 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-10. Population Data for the Vicinity of Tahquamenon River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Tahquamenon River Wetland and the surrounding area is rural open space. State Route 123 passes through the southeastern section and

adjacent to the eastern boundary of Tahquamenon River Wetland. Many buildings are located along this highway, including two churches, Whitefish School and athletic field, and the Town Hall. A trail and an unimproved dirt road also pass through the wetland. The wetland is under mixed state and private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Recreation

Tahquamenon River Wetland is located partially within Tahquamenon Falls State Park and partially within Lake Superior State Forest. Recreational facilities in Tahquamenon Falls State Park include campsites. Campgrounds are adjacent to the wetland at the mouth of the Tahquamenon River. The Whitefish School Athletic field is adjacent to the wetland. Recreational facilities in the state forest also include campsites.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Tahquamenon River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Tahquamenon River Wetland (U.S.G.S. quadrangle map, Emerson, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Tahquamenon River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Tequamenon River Wetland, but the Michigan Coastal Zone Inventory indicates that six archaeological sites are present in the vicinity (20-CH-40, 20-CH-39, 20-CH-38, 20-CH-33, 20-CH-8, and 20-CH-37), which represent habitations of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 085

The literature search identified no on-going or impending research projects pertaining to Tahquamenon River Wetland.

WHITEFISH BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 086

Setting

Whitefish Bay Wetland is located 0.1 mile from the shoreline of Whitefish Bay, which is directly connected to Lake Superior, within Whitefish Township of Chippewa County, Michigan, approximately 0.6 mile from the community of Paradise. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S quadrangle map, Shelldrake, Michigan, 1975).

Topography

Whitefish Bay Wetland has 27 feet of relief and a maximum elevation of 630 feet above mean sea level (28 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area consists of an inland bluff, with irregular terrain of minimal relief farther inland (U.S.G.S. quadrangle map, Shelldrake, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Whitefish Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils of the Whitefish Bay Wetland are classified as Rifle peat, Shelldrake sand, Saugatuck sand, Newton sand, Greenwood peat, and coastal beach (Veatch, 1927).

Hydrology

Whitefish Bay Wetland is adjacent to the Betsy River and has three unnamed streams flowing through it (U.S.G.S. quadrangle map, Shelldrake, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Whitefish Bay Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Shelldrake, Michigan, 1975).

BIOTIC SETTING LS 086

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Whitefish Bay Wetland.

Fish

Fish species found in the Betsy River are listed in Table 3-11. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species may also utilize Whitefish Bay Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Whitefish Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Chippewa County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitefish Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Whitefish Bay Wetland.

Table 3-11. Fish Species Found in the Betsy River, Chippewa County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	longnose sucker
ammocetes of silver or northern brook lamprey	Ictaluridae
sea lamprey	brown bullhead*
northern brook lamprey	
American brook lamprey	Gadidae
	burbot
Salmonidae	
rainbow trout	Gasterosteidae
brook trout	brook stickleback*
	ninespine stickleback
Umbridae	
central mudminnow*	Percopsidae
	trout-perch
Esocidae	
northern pike*	Centrarchidae
	pumpkinseed*
Cyprinidae	rock bass
creek chub	
pearl dace	Percidae
blacknose dace	yellow perch*
longnose dace	blackside darter
finescale dace	logperch*
northern redbelly dace	johnny darter*
goldenshiner*	
emerald shiner	Cottidae
common shiner'	mottled sculpin*
spottail shiner	slimy sculpin
blackchin shiner*	
sand shiner	
mimic shiner	
blacknose shiner*	
fathead minnow*	
bluntnose minnow*	

[a]Moore and Braem, 1965
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Whitefish Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Whitefish Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the Betsy River, adjacent to Whitefish Bay Wetland, contains a number of fish species.

CULTURAL SETTING LS 086

Population

Whitefish Bay Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-12 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-12. Population Data for the Vicinity of Whitefish Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Whitefish Bay Wetland and the surrounding area is rural open space. Whitefish Road (a light-duty road) is adjacent to the eastern boundary of Whitefish Bay Wetland, and several buildings are located along this highway. The wetland is under mixed state and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Shelldrake, Michigan, 1975).

Recreation

Whitefish Bay Wetland is located within Lake Superior State Forest, where recreational facilities include campsites. Other facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Whitefish Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Whitefish Bay Wetland (U.S.G.S. quadrangle map, Shelldrake, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Whitefish Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Whitefish Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 086

The literature search identified no on-going or impending research projects pertaining to Whitefish Bay Wetland.

WHITEFISH POINT WETLAND

PHYSIOGRAPHIC SETTING

LS 087

Setting

Whitefish Point Wetland is located approximately 0.1 mile from the southern shoreline of Lake Superior in Whitefish Township of Chippewa County, Michigan, at Whitefish Point. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951).

Topography

Whitefish Point Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and erodible low bluff. The surrounding area consists of low beach ridges with occassional knolls (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Whitefish Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soils of the Whitefish Point Wetland are classified as Newton sand, Shelldrake sand, and Waiska cobbly sandy loam (Veatch, 1927).

Hydrology

No streams flow through Whitefish Point Wetland (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Whitefish Point Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April

27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951).

BIOTIC SETTING LS 087

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Whitefish Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Whitefish Point Wetland.

Invertebrates

Information on the distribution of the butterflies and moths (Lepidoptera) of Whitefish Point was reported by McAlpine (1918). The typical northern fauna at that time included species from more southern and western ranges. This northern extension of more temperate species was presumed to be the result of the moderating effect of Lake Superior on the coastal zone of the point. Brenthis myrina, B. bellona, Phycoides tharos, Argynnis atlantis, Colias interior, and Chrysophanus epixanthe were commonly seen in graminoid marshes, while Argynnis atlantis, Colias interior, Chrysophanus epixanthe, and the moths, Diastictis brunneata and D. sulphurea, were observed in cranberry marshes. McAlpin's list of lepidoptera appears in Table 3-13. A list of dipterans for the area can be found in Andrews (1918). These species may or may not occur in Whitefish Point Wetland today. The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in this wetland.

Table 3-13. Lepidoptera of Whitefish Point[a]

Rhopalocera
- Nymphalidae
  - Argynnis atlantis
  - A. myrina
  - Phyciodes tharos
  - Phrameis atalanta
  - P. cardui
- Lycaenidae
  - Chrysophanus epixanthe
- Papilionidae
  - Pieris napi var. oleracea-hiemalis
  - Colias interior
- Noctuidae
  - Orthodes cynica
  - Autographa epigoea
  - Eustrotia albidula
  - Lithacodia bellicula
  - Drasteria erechtea
  - Hormisa bivittata
  - Chrytolita petrealis

Geometridae
- Epelis faxonii
- Eufidonia notataria
- Deilimia variolaria
- Diastictis sulphuria
- D. brunneata
- D. inceptaria

Sesiidae
- Nomophila noctuella
- Nymphula icciusalis
- Crambus hortellus

Tortricidae
- Olethreutes hartmanniana
- Alceris minuta
- Archips persicana

[a] McAlpine, 1918

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1915). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitefish Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

health, life histories, relationship to water levels, or major food sources of the birds utilizing Whitefish Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Whitefish Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Whitefish Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 087

Population

Whitefish Point Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-14 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-14. Population Data for the Vicinity of Whitefish Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Whitefish Point Wetland and the surrounding area is rural open space. Whitefish Road (a light-duty road) is adjacent to the eastern boundary of Whitefish Point Wetland, and there are unimproved dirt roads also. A telephone line crosses parts of the wetland, and a radio station and a fog warning station lie to the northeast. The wetland is under mixed state and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951).

Recreation

Whitefish Point Wetland is located within Lake Superior State Forest, where recreational facilities include campsites. Other facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Whitefish Point Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A telephone line crosses three sections of Whitefish Point Wetland (U.S.G.S. quadrangle map, Whitefish Point, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Whitefish Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Whitefish Point Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 087

The literature search identified no on-going or impending research projects pertaining to Whitefish Point Wetland.

WHITEFISH TOWNSHIP WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 088-090

Setting

The Whitefish Township Wetland Complex extends from approximately 300 feet to 0.3 mile inland from the southern shoreline of Lake Superior, within Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Vermilion Southeast, Michigan, 1951).

Topography

The Whitefish Township Wetland Complex has an overall relief of 17 feet and a maximum elevation of 630 feet above mean sea level (28 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is irregular, with low beach ridges and knolls (U.S.G.S. quadrangle map, Vermilion Southeast, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which the Whitefish Township Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soil types present in the Whitefish Township Wetland Complex include, in Whitefish Township Coastal Wetland #1, Shelldrake sand, Newton sand, and Rubicon sand; in Whitefish Township Coastal Wetland #2, Shelldrake sand, Saugatuck sand, and Newton sand (Veatch, 1927).

Hydrology

No streams flow through the Whitefish Township Wetland Complex (U.S.G.S. quadrangle map, Vermilion Southeast, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Whitefish Township Wetland Complex is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly

precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Vermilion Southeast, Michigan, 1951).

BIOTIC SETTING LS 088-090

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Whitefish Township Wetland Complex.

Fish

Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Whitefish Township Coastal Wetlands #1-#3.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Whitefish Township Wetland Complex.

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1915). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or

commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Whitefish Township Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Whitefish Township Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands comprising the Whitefish Township Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Whitefish Township Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 088-090

Population

The Whitefish Township Wetland Complex is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-15 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-15. Population Data for the Vicinity of the Whitefish Township Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Whitefish Township Wetland Complex and most of the surrounding area is rural open space. An unimproved dirt road and a telephone line are located north of the wetland complex, and another unimproved dirt road is adjacent to the western boundary of Whitefish Township Coastal Wetland #3. The wetlands are under mixed local, private, and state ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Vermilion Southeast, Michigan, 1951).

Recreation

The Whitefish Township Wetland Complex is located within Lake Superior State Forest, where recreational facilities include campsites. Other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of the Whitefish Township Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A telephone line is located north of the Whitefish Township Wetland Complex (U.S.G.S. quadrangle maps, Vermilion Southeast, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to the Whitefish Township Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of the Whitefish Township Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 088-090

The literature search identified no on-going or impending research projects pertaining to the Whitefish Township Wetland Complex.

WEATHERHOGS CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 091

Setting

Weatherhogs Creek Wetland lies approximately 500 feet from the southern shoreline of Lake Superior, within Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Vermilion Southeast, Michigan, 1951).

Topography

Weatherhogs Creek Wetland has 48 feet of relief and a maximum elevation of 650 feet above mean sea level (48 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area features an interior bluff (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Vermilion Southeast, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Weatherhogs Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Weatherhogs Creek Wetland are classified as Houghton muck, Shelldrake sand, Greenwood peat, Rifle peat, and Rubicon sand (Veatch, 1927).

Hydrology

Four unnamed streams and Weatherhogs Creek flow through Weatherhogs Creek Wetland (U.S.G.S. quadrangle maps, Vermilion Southeast, Michigan, 1951; Vermilion, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Weatherhogs Creek Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Vermilion Southeast, Michigan, 1951; Vermilion, Michigan, 1951).

LS 091

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Weatherhogs Creek Wetland.

Fish

The American brook lamprey is the only fish species reported from Weatherhogs Creek (Moore and Braem, 1965). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Weatherhogs Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Weatherhogs Creek Wetland.

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1915). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or

commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Weatherhogs Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Weatherhogs Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Weatherhogs Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Weatherhogs Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 091

Population

Weatherhogs Creek Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-16 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-16. Population Data for the Vicinity of Weatherhogs Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Weatherhogs Creek Wetland and the surrounding area is rural open space. Unimproved dirt roads are adjacent to the eastern, northern and southern boundaries of Weatherhogs Creek Wetland, and one of them passes through the central section. A telephone line and several buildings lie just north of the wetland. The wetland is under mixed state and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Vermilion Southeast, Michigan, 1951; Vermilion, Michigan, 1951).

Recreation

Weatherhogs Creek Wetland is located within Lake Superior State Forest, where recreational facilities include campsites. Other facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Weatherhogs Creek Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A telephone line crosses three sections of Weatherhogs Creek Wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Vermilion Southeast, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Weatherhogs Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Weatherhogs Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 091

The literature search identified no on-going or impending research projects pertaining to Weatherhogs Creek Wetland.

WHITEFISH TOWNSHIP WETLAND

PHYSIOGRAPHIC SETTING LS 092

Setting

Whitefish Township Wetland is located approximately 300 feet from the southern shoreline of Lake Superior in Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951).

Topography

Whitefish Township Wetland has seven feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is composed of a flat narrow plain bordered by two interior bluffs (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Whitefish Township Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Whitefish Township Wetland are classified as Shelldrake sand, Rifle peat, and Newton sand (Veatch, 1927).

Hydrology

No streams flow through Whitefish Township Wetland (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Whitefish Township Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8^{o}F and the mean monthly high for July is 63.3^{o}F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately six months long, with the last killing frost (28^{o}F) in 1975 occurring on April

7 and the first killing frost on October 30 (National Oceanic and Atmospheric dministration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951).

LS 092

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Whitefish Township Wetland.

Fish

Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Whitefish Township Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Whitefish Township Wetland.

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1915). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitefish Township Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Whitefish Township Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Whitefish Township Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Whitefish Township Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 092

Population

Whitefish Township Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-17 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-17. Population Data for the Vicinity of Whitefish Township Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Whitefish Township Wetland and the surrounding area is rural open space. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951).

Recreation

Whitefish Township Wetland is located within Lake Superior State Forest, where recreational facilities include campsites. Other facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Whitefish Township Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A telephone line crosses three sections of Whitefish Township Wetland (U.S.G.S. quadrangle map, Vermilion, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Whitefish Township Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Whitefish Township Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 092

The literature search identified no on-going or impending research projects pertaining to Whitefish Township Wetland.

BROWNS CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 093

Setting

Browns Creek Wetland is located approximately 0.2 mile from the southern shoreline of Lake Superior, in Whitefish Township of Chippewa County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

Topography

Browns Creek Wetland has a relief of only three feet and lies at an elevation of 650 feet above mean sea level (48 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The wetland lies on a flat plateau at a greater elevation than the beach; there is a second bluff which is inland and adjacent to the wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

Surficial Geology

The surficial geology of the area in which Browns Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Browns Creek Wetland are classified as Greenwood peat, Rifle peat, Saugatuck sand, and Strongs loamy sand (Veatch, 1927).

Hydrology

Browns Creek and one unnamed stream flow through Browns Creek Wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Browns Creek Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

LS 093

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Browns Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Browns Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Brown Creek Wetland.

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1915). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major

six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

BIOTIC SETTING LS 093

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Browns Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Browns Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Brown Creek Wetland.

Reptiles and Amphibians

The herpetofauna of the Whitefish Point region, including the coastal wetlands from Whitefish Point to the Luce County line, was studied by Thompson and Thompson (1913) and Hankinson (1916). Species found there included red-backed salamander (Plethodon cinereus cinereus), four-toed salamander (Hemidactylium scutatum), American toad (Bufo americanus americanus), northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), bullfrog (Rana catesbeiana), mink frog (Rana septentrionales), red-bellied snake (Storeria occipitomaculata occipitomaculata), northern water snake (Natrix sipedon sipedon), eastern garter snake (Thamnophis sirtalis sirtalis), eastern smooth green snake (Opheodrys vernalis vernalis), and western painted turtle (Chrysemys picta belli). A later record of the herpetofauna of Chippewa County was provided by Ruthven et al. (1928), and this list appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major

species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Browns Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Browns Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Browns Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Browns Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 093

Population

Browns Creek Wetland is located in Whitefish Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 20 persons per square mile. Table 3-18 indicates that Chippewa County and Whitefish Township experienced a rapid rate of population growth between 1970 and 1975. However, projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 3-18. Population Data for the Vicinity of Browns Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,064
Whitefish Township	494	39.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Browns Creek Wetland and the surrounding area is rural open space. An unimproved dirt road bisects Brown Creek Wetland, and a trail is adjacent to the southern border. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

Recreation

Browns Creek Wetland is located within Lake Superior State Forest, where recreational facilities include campsites. Other facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Browns Creek Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A telephone line crosses three sections of Browns Creek Wetland (U.S.G.S. quadrangle maps, Vermilion, Michigan, 1951; Sheephead Lake, Michigan, 1951).

Pollution Sources

There are no NPDES permit holders adjacent to Browns Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Browns Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to Browns Creek Wetland.

Table 3-19. Data Gaps-Lake Section 3

Data Gap*		Wetland Number	077	078–081	082	083	084	085	086	087	088–090	091	092	093
Physiographic Setting		Setting												
		Topography												
		Surficial Geology												
		Soils												
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*
		Climate												
		Special Features												
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Major Species Composition	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species	*	*	*					*	*	*	*	*
		Species Composition	*	*	*					*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*		*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*		*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species												
		Health	*	*	*	*	*	*	*	*	*	*	*	*
Cultural Setting		Population												
		Land Use and Ownership												
		Recreation												
		Mineral, Energy, Forest Resource												
		Public Utilities/Facilities												
		Point Pollution Sources												
		Non-Point Pollution Sources												
		Historic Features												
		Archaeologic Features												

LAKE SECTION 4

INTRODUCTION

Lake Section 4 extends from Crisp Point to Point Abbaye and includes shoreline portions of Alger, Luce, Marquette, and Baraga Counties, Michigan. The topography of the region features irregular plains and bluffs in the vicinity of the wetlands. The predominant shore types along this 242 mile stretch of shoreline are non-erodible high bluff and low bluff.

Figures 4-1, 4-2, 4-3, and 4-4 show the approximate location of the 57 coastal wetlands of Lake Section 4. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 4-1. The wetlands of Lake Section 4 are located at elevations between 610 and 840 feet above sea level, 8 to 238 feet above mean low water datum of Lake Superior. The Section 4 wetlands are classified as Palustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 57 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

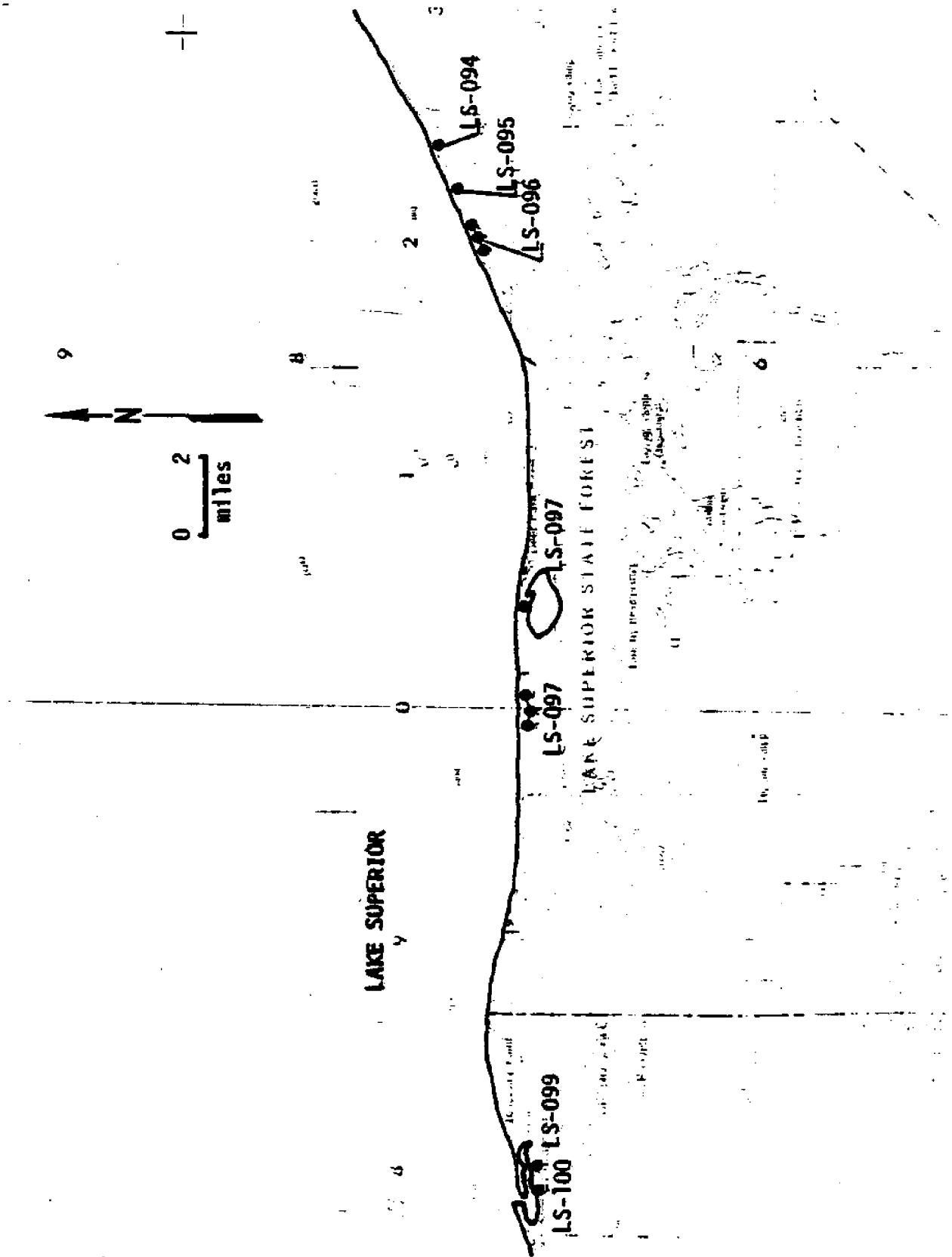


Figure 4-1. Lake Section 4 - Lake Superior State Forest Area

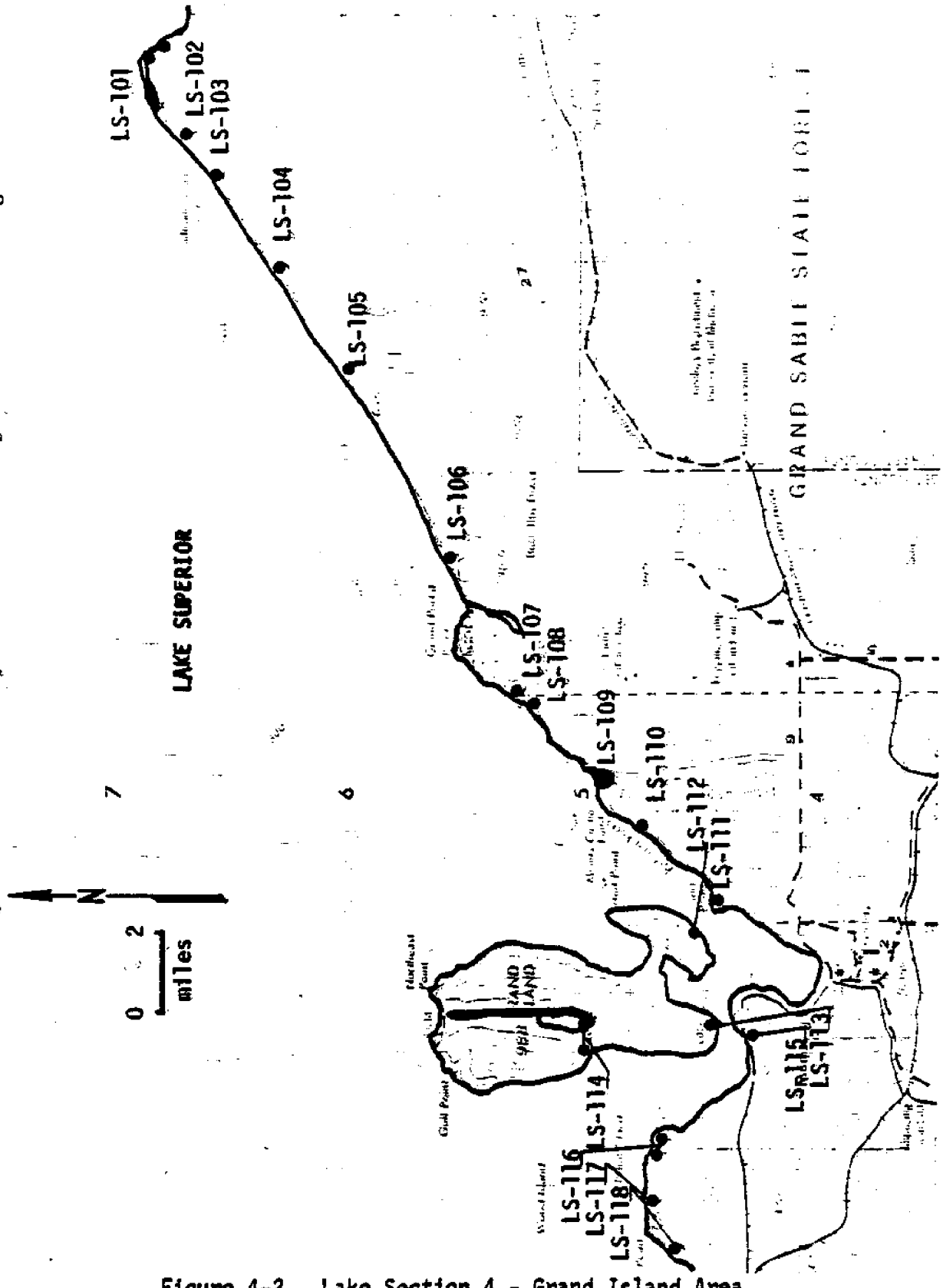


Figure 4-2. Lake Section 4 - Grand Island Area

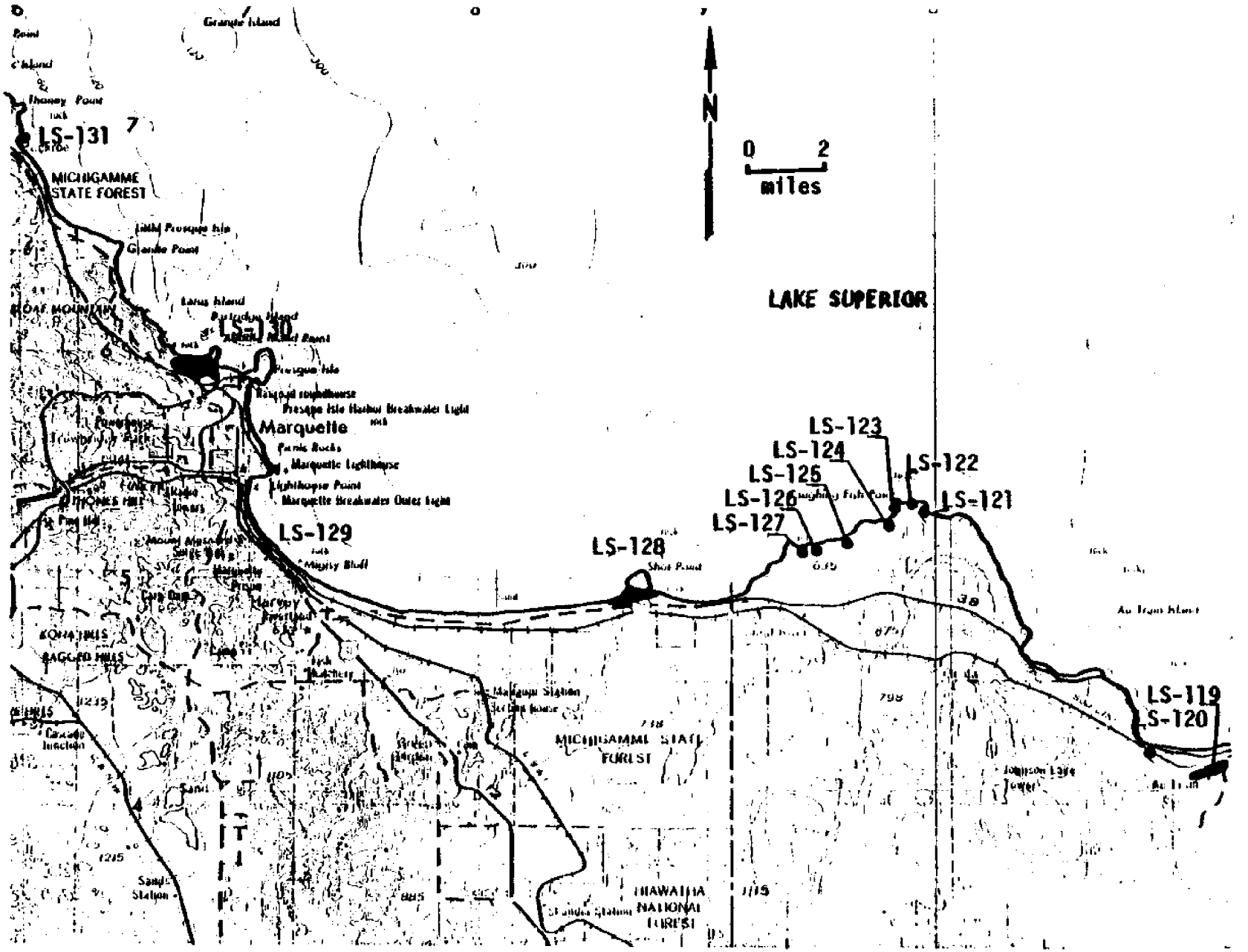


Figure 4-3. Lake Section 4 - Marquette Area

Figure 4-4. Lake Section 4 - Huron Mountains Area

Table 4-1. Location, Acreage, and Classification of Wetlands in Lake Section 4

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 094	Little Two Hearted River Wetland	46°42'33"	85°22'30"	10	P
LS 095	Two Hearted River Area Wetland	46°42'16"	85°23'40"	5	P
LS 096	Two Hearted River Wetland	46°41'46"	85°25'28"	19.5	P
LS 097	Muskallonge Lake Wetland	46°40'33"	85°38'22"	10	P
LS 098	Blind Sucker River Area Wetland	46°40'41"	85°40'20"	19.5	P
LS 099	Sucker River Wetland	46°40'05"	85°55'48"	266	P
LS 100	West Bay Wetland	46°40'12"	85°57'56"	23	P
LS 101	Au Sable Point Wetland	46°37'32"	86°08'44"	85	P
LS 102	Sullivan Creek Wetland	46°39'11"	86°11'05"	2	P
LS 103	Sullivan's Landing Wetland	46°38'38"	86°11'58"	48	P
	PICTURED ROCKS AREA WETLAND COMPLEX				
LS 104	Pictured Rocks Area Wetland #1	46°37'18"	86°14'56"	5	P
LS 105	Pictured Rocks Area Wetland #2	46°35'35"	86°18'24"	25	P
LS 106	Pictured Rocks Area Wetland #3	46°33'17"	86°25'10"	12	P
LS 107	Pictured Rocks Area Wetland #4	46°31'30"	86°29'02"	10	P
LS 108	Pictured Rocks Area Wetland #5	46°31'22"	86°29'50"	2	P
LS 109	Pictured Rocks Area Wetland #6	46°30'08"	86°30'48"	720	P
LS 110	Pictured Rocks Area Wetland #7	46°28'30"	86°34'10"	22	P
LS 111	Pictured Rocks Area Wetland #8	46°27'04"	86°36'09"	90	P
	GRAND ISLAND WETLAND COMPLEX				
LS 112	Grand Island Harbor Area Wetland	46°27'28"	86°37'24"	25	P
LS 113	Williams Landing Wetland	46°42'12"	86°40'29"	30	P
LS 114	Echo Lake Wetland	46°31'37"	86°49'56"	650	P
LS 115	Powell Point Wetland	46°26'08"	86°40'45"	535	P
LS 116	Fivemile Point Wetland	46°28'36"	86°44'47"	75	P
LS 117	Au Train Point Area Wetland	46°28'26"	86°46'20"	55	P
	AU TRAIN BAY WETLAND COMPLEX				
LS 118	Au Train Bay East Shore Wetland	46°27'20"	86°48'10"	280	P
LS 119	Au Train River Wetland	46°25'22"	86°49'59"	205	P-R
LS 120	Au Train Bay Southwest Shore Wetland	46°26'12"	86°52'42"	90	P
	LAUGHING FISH POINT AREA WETLAND COMPLEX				
LS 121	Laughing Fish Point Area Wetland #1	46°31'44"	87°00'05"	12	P
LS 122	Laughing Fish Point Area Wetland #2	46°32'04"	87°00'39"	5	P
LS 123	Laughing Fish Point Wetland	46°32'04"	87°01'10"	20	P
LS 124	Laughing Whitefish River Wetland	46°31'27"	87°01'28"	65	P
LS 125	Laughing Fish Point Area Wetland #3	46°31'11"	87°02'44"	10	P
LS 126	Laughing Fish Point Area Wetland #4	46°31'02"	87°03'53"	50	P
LS 127	Laughing Fish Point Area Wetland #5	46°31'00"	87°04'32"	5	P
LS 128	Shot Point Wetland	46°29'44"	87°10'01"	360	P
LS 129	Marquette State Prison Area Wetland	46°30'56"	87°23'03"	17	P
LS 130	Middle Bay Wetland	46°35'13"	87°25'09"	225	P
LS 131	Little Garlic River Wetland	46°40'28"	87°31'30"	22	P
LS 132	Big Garlic River Wetland	46°42'04"	87°33'59"	450	P
	YELLOW DOG POINT AREA WETLAND COMPLEX				
LS 133	Yellow Dog Point Area Wetland #1	46°47'04"	87°36'01"	40	P
LS 134	Yellow Dog Point Area Wetland #2	46°47'20"	87°36'38"	35	P
LS 135	Yellow Dog Point Area Wetland #3	46°47'36"	87°37'10"	35	P
LS 136	Yellow Dog Point Area Wetland #4	46°48'32"	87°37'58"	45	P
LS 137	Iron River Wetland	46°49'00"	87°39'50"	95	P

-continued-

Table 4-1. (concluded)

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	BIG BAY WETLAND COMPLEX				
LS 138	Big Bay Point Wetland	46°50'02"	87°40'48"	60	P
LS 139	Squaw Beach Wetland	46°49'28"	87°42'34"	245	P
LS 140	Big Bay West Shore Wetland	46°50'30"	87°44'34"	100	P
LS 141	Salmon Trout River Wetland	46°51'15"	87°47'09"	1480	P
	HURON MOUNTAINS AREA WETLAND COMPLEX				
LS 142	Conway Bay Wetland	46°52'46"	87°48'00"	20	P
LS 143	Pine River Area Wetland	46°53'02"	87°50'35"	15	P
LS 144	Pine River Wetland	46°53'04"	87°51'28"	35	P
LS 145	Huron River Point Area Wetland	46°54'03"	87°53'10"	5	P
LS 146	Little Huron River Wetland	46°54'14"	88°00'08"	10	P
LS 147	Huron River Wetland	46°54'30"	88°02'30"	100	P→R
LS 148	Lightfoot Bay Wetland	46°54'00"	88°11'19"	385	P
	REEDS POINT AREA WETLAND COMPLEX				
LS 149	Reeds Point Wetland	46°54'38"	88°12'17"	75	P
LS 150	Reeds Point Area Wetland	46°55'16"	88°11'25"	10	P

[a]P=palustrine

LITTLE TWO HEARTED RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 094

Setting

Little Two Hearted River Wetland is located approximately 400 feet from the southern shoreline of Lake Superior, in McMillan Township of Luce County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Topography

Little Two Hearted River Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises from the beach very quickly for a change in elevation of about 40 feet and then forms an irregular plain (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Little Two Hearted River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in the Little Two Hearted River Wetland are classified as Rubicon sand and Griffin loamy fine sand (Veatch, 1929).

Hydrology

The Little Two Hearted River flows through Little Two Hearted River Wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Little Two Hearted River Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8^{o}F and the mean monthly high for July is 63.3^{o}F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing

season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

BIOTIC SETTING LS 094

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Little Two Hearted River Wetland.

Fish

Fish species found in the Little Two Hearted River are listed in Table 4-2, and a list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Little Two Hearted River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Little Two Hearted River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Luce County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Little Two Hearted River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Little Two Hearted River Wetland.

Table 4-2. Fish Species Found in Little Two Hearted River, Luce County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
American brook lamprey	longnose sucker
Salmonidae	Ictaluridae
rainbow trout	brown bullhead*
brook trout	
round whitefish	Gadidae
	burbot
Osmeridae	
rainbow smelt	Percopsidae
	trout-perch
Umbridae	
central mudminnow*	Centrarchidae
	largemouth bass*
Esocidae	rock bass
northern pike*	
	Percidae
Cyprinidae	yellow perch*
creek chub	logperch*
pearl dace	johnny darter*
blacknose dace	
longnose dace	Cottidae
finescale dace	mottled sculpin*
northern redbelly dace	slimy sculpin
goldenshiner*	
common shiner	
sand shiner	
blacknose shiner*	
brassy minnow	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Little Two Hearted River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Little Two Hearted River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the wetland is likely to be utilized by a number of fish species present in the Little Two Hearted River.

CULTURAL SETTING LS 094

Population

Little Two Hearted River Wetland is located in McMillan Township of Luce County, Michigan. The county is sparsely populated, having a density of 7 persons per square mile. Table 4-3 indicates that Luce County experienced a moderate rate of population growth between 1970 and 1975, but growth in McMillan Township was more rapid. Projections for 1990 indicate that Luce County is expected to undergo a rapid rate of population growth in the future.

Table 4-3. Population Data for the Vicinity of Little Two Hearted River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Luce County	7,115	4.8	9,225
McMillan Township	4,035	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Little Two Hearted River Wetland and the surrounding area is rural open space. An unimproved dirt road is adjacent to the northern boundary of Little Two Hearted River Wetland and another lies to the south. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Recreation

Little Two Hearted River Wetland is located within Lake Superior State Forest, where campsites are available. Other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Little Two Hearted River Wetland, but the area surrounding the wetland is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Little Two Hearted River Wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Little Two Hearted River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Little Two Hearted River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 094

The literature search identified no on-going or impending research projects pertaining to Little Two Hearted River Wetland.

TWO HEARTED RIVER AREA WETLAND

PHYSIOGRAPHIC SETTING LS 095

Setting

Two Hearted River Area Wetland is located approximately 0.1 mile from the southern shoreline of Lake Superior in McMillan Township of Luce County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Topography

Two Hearted River Area Wetland has little relief and lies at an elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The wetland is a sunken area in an irregular plateau separated from the beach by a low irregular bluff (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Two Hearted River Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soil in Two Hearted River Area Wetland is classified as Rubicon sand (Veatch, 1929).

Hydrology

No streams flow through Two Hearted River Area Wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Two Hearted River Area Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in

1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

BIOTIC SETTING LS 095

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Two Hearted River Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Two Hearted River Area Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Two Hearted River Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Luce County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Two Hearted River Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Two Hearted River Area Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Two Hearted River Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Two Hearted River Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 095

Population

Two Hearted River Area Wetland is located in McMillan Township of Luce County, Michigan. The county is sparsely populated, having a density of 7 persons per square mile. Table 4-4 indicates that Luce County experienced a moderate rate of population growth between 1970 and 1975, but growth in McMillan Township was more rapid. Projections for 1990 indicate that Luce County is expected to undergo a rapid rate of population growth in the future.

Table 4-4. Population Data for the Vicinity of Two Hearted River Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Luce County	7,115	4.8	9,225
McMillan Township	4,035	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Two Hearted River Area Wetland and the surrounding area is rural open space. An unimproved dirt road is located south of the wetland. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Recreation

Two Hearted River Area Wetland is located within Lake Superior State Forest, where campsites are available. Other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Two Hearted River Area Wetland, but the area surrounding the wetland is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Two Hearted River Area Wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Two Hearted River Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Two Hearted River Area Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 095

The literature search identified no on-going or impending research projects pertaining to Two Hearted River Area Wetland.

TWO HEARTED RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 096

Setting

Two Hearted River Wetland is located approximately 0.2 mile from the southern shoreline of Lake Superior in McMillan Township of Luce County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Topography

Two Hearted River Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The wetland is in a low valley formed by the changing path of the Two Hearted River. On either side of the valley is a steep wall of about 25 feet (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Two Hearted River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Two Hearted River Wetland are classified as Deer Park fine sand, Rubicon sand, and Griffin loamy fine sand (Veatch, 1929).

Hydrology

No streams flow through the wetland, but the Two Hearted River flows past is at a few points (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Two Hearted River Wetland is located in Whitefish Point, Michigan. The average annual temperature is 41.0°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.8°F and the mean monthly high for July is 63.3°F. The average annual precipitation is 37.01 inches, with a mean monthly precipitation of 6.01 inches in January and 1.44 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

BIOTIC SETTING LS 096

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Two Hearted River Wetland.

Fish

A list of fishes found in the Two Hearted River appears in Table 4-5. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Two Hearted River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Luce County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Two Hearted River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Two Hearted River Wetland.

Table 4-5. Fish Species Found in Two Hearted River, Luce County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
sea lamprey	longnose sucker
American brook lamprey	
	Ictaluridae
Salmonidae	black bullhead*
brown trout	brown bullhead*
rainbow trout	
brook trout	Gadidae
round whitefish	burbot
Osmeridae	Gasterosteidae
rainbow smelt	brook stickleback*
	ninespine stickleback
Umbridae	
central mudminnow*	Percopsidae
	trout-perch
Esocidae	
northern pike*	Centrarchidae
	largemouth bass*
Cyprinidae	pumpkinseed*
creek chub	rock bass
pearl dace	
lake chub	Percidae
blacknose dace	yellow perch*
longnose dace	logperch*
finescale dace	johnny darter*
northern redbelly dace	Iowa darter*
goldenshiner*	
emerald shiner	Cottidae
common shiner	mottled sculpin*
spottail shiner	slimy sculpin
blackchin shiner*	
blacknose shiner*	
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Two Hearted River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Two Hearted River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 096

Population

Two Hearted River Wetland is located in McMillan Township of Luce County, Michigan. The county is sparsely populated, having a density of 7 persons per square mile. Table 4-6 indicates that Luce County experienced a moderate rate of population growth between 1970 and 1975, but growth in McMillan Township was more rapid. Projections for 1990 indicate that Luce County is expected to undergo a rapid rate of population growth in the future.

Table 4-6. Population Data for the Vicinity of Two Hearted River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Luce County	7,115	4.8	9,225
McMillan Township	4,035	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Two Hearted River Wetland and the surrounding area is rural open space. The Two Hearted River Campground is adjacent to the eastern section of the wetland, and a light-duty road and an unimproved dirt road are in the vicinity. The wetland is under mixed state and private ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Recreation

Two Hearted River Wetland is located in Lake Superior State Forest. Two Hearted River Campground is adjacent to the wetland, but other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Two Hearted River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Two Hearted River Wetland (U.S.G.S. quadrangle map, Betsy Lake Northwest, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Two Hearted River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Two Hearted River Wetland, but the Michigan Coastal Zone Inventory indicates that two archaeological sites are present in the vicinity. Site 20-LU-2 is a cemetery of the historical time period, and site 20-LU-3 is a habitation of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 096

The literature search identified no on-going or impending research projects pertaining to Two Hearted River Wetland.

MUSKALLONGE LAKE WETLAND

PHYSIOGRAPHIC SETTING

LS 097

Setting

Muskallonge Lake Wetland is located approximately 0.2 mile from the southern shoreline of Lake Superior in McMillan Township of Luce County, Michigan, along the northern shore of Muskallonge Lake. There are no major population centers in the area. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Topography

Muskallonge Lake Wetland has a relief of five feet and a maximum elevation of 637 feet above mean sea level (35 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The wetland lies south of the beach bluff, on land that slopes gently down to Muskallonge Lake (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Muskallonge Lake Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Muskallonge Lake Wetland are classified as Newton sand and AuTrain loamy sand (Veatch, 1929).

Hydrology

No streams flow through Muskallonge Lake Wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Muskallonge Lake Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately

five and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

BIOTIC SETTING LS 097

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Muskallonge Lake Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Muskellunge Lake Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Muskallonge Lake Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Luce County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Muskallonge Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Muskallonge Lake Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Muskallonge Lake Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Muskallonge Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 097

Population

Muskallonge Lake Wetland is located in McMillan Township of Luce County, Michigan. The county is sparsely populated, having a density of 7 persons per square mile. Table 4-7 indicates that Luce County experienced a moderate rate of population growth between 1970 and 1975, but growth in McMillan Township was more rapid. Projections for 1990 indicate that Luce County is expected to undergo a rapid rate of population growth in the future.

Table 4-7. Population Data for the Vicinity of Muskallonge Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Luce County	7,115	4.8	9,225
McMillan Township	4,035	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Muskallonge Lake Wetland and most of the surrounding area is rural open space. A light-duty road is adjacent to the northern boundary of

the wetland. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Recreation

Muskallonge Lake Wetland is located in Muskallonge Lake State Park and Lake Superior State Forest. A boat ramp, a campground, and swimming facilities are nearby.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Muskallonge Lake Wetland, but the area surrounding the wetland is wooded and represents a potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Muskallonge Lake Wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Muskallonge Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Muskallonge Lake Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 097

The literature search identified no on-going or impending research projects pertaining to Muskallonge Lake Wetland.

BLIND SUCKER RIVER AREA WETLAND

PHYSIOGRAPHIC SETTING LS 098

Setting

Blind Sucker River Area Wetland is located approximately 0.1 mile from the southern shoreline of Lake Superior in McMillan Township of Luce County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Topography

Blind Sucker River Area Wetland has ten feet of relief and a maximum elevation of 630 feet above mean sea level (28 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is very irregular with some beach ridges and knolls (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Blind Sucker River Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Blind Sucker River Area Wetland are classified as Deer Park fine sand (Veatch, 1929).

Hydrology

No streams flow through Blind Sucker River Area Wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Blind Sucker River Area Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately five and three-fourths months long, with the last

killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

BIOTIC SETTING LS 098

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Blind Sucker River Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Blind Sucker River Area Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Blind Sucker River Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Luce County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Blind Sucker River Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Blind Sucker River Area Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Blind Sucker River Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Blind Sucker River Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 098

Population

Blind Sucker River Area Wetland is located in McMillan Township of Luce County, Michigan. The county is sparsely populated, having a density of 7 persons per square mile. Table 4-8 indicates that Luce County experienced a moderate rate of population growth between 1970 and 1975, but growth in McMillan Township was more rapid. Projections for 1990 indicate that Luce County is expected to undergo a rapid rate of population growth in the future.

Table 4-8. Population Data for the Vicinity of Blind Sucker River Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Luce County	7,115	4.8	9,225
McMillan Township	4,035	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Blind Sucker River Area Wetland and the surrounding area is rural open space. The wetland is under state ownership, and its location

suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Recreation

Blind Sucker River Area Wetland is located in Lake Superior State Forest, where there are camping facilities. Other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Blind Sucker River Area Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Blind Sucker River Area Wetland (U.S.G.S. quadrangle map, Muskallonge Lake West, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Blind Sucker River Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Blind Sucker River Area Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 098

The literature search identified no on-going or impending research projects pertaining to Blind Sucker River Area Wetland.

SUCKER RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 099

Setting

Sucker River Wetland lies on the shoreline of East Bay, which is directly connected to Lake Superior. The wetland is located in Burt Township of Alger County, Michigan, approximately 1.5 miles from Grand Marais. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Topography

Sucker River Wetland has ten feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The wetland lies in an irregular valley formed by the Sucker River, Grand Marais Creek, and Baker Creek. The valley walls are steep and regular in the south and irregular in the north (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which Sucker River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formmation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Sucker River Wetland are classified as Rifle peat, Wallace fine sand, Rubicon sand, and Griffin loamy fine sand (Veatch, 1929).

Hydrology

The Sucker River and two unnamed streams flow through Sucker River Wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sucker River Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2^{o}F and the mean monthly high for July is 62.7^{o}F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately

five and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

BIOTIC SETTING LS 099

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sucker River Wetland.

Fish

Fish species found in the Sucker River are listed in Table 4-9. Taylor (1954) listed species collected by John N. Lowe from the Sucker River near Grand Marais in 1921, and these species were also reported by Moore and Braem (1965). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed in Table 4-9, may also utilize Sucker River Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sucker River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sucker River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sucker River Wetland.

Table 4-9. Fish Species Found in the Sucker River, Alger County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
American brook lamprey	longnose sucker
Clupeidae	Ictaluridae
alewife	brown bullhead*
Salmonidae	Gadidae
rainbow trout	burbot
brook trout	
round whitefish	Gasterosteidae
	brook stickleback*
Osmeridae	ninespine stickleback
rainbow smelt	
	Percopsidae
Umbridae	trout-perch
central mudminnow*	
	Centrarchidae
Esocidae	smallmouth bass*
northern pike*	rock bass
Cyprinidae	Percidae
creek chub	yellow perch*
blacknose dace	logperch*
longnose dace	johnny darter"
northern redbelly dace	
goldenshiner*	Cottidae
common shiner	mottled sculpin*
spottail shiner	slimy sculpin
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965) and Taylor (1954)
*Species associated with wetland habitats according to Trautman (1957) and Raphael and Jaworski (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sucker River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sucker River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Sucker River Wetland is likely to be utilized by a number of fish species which are present in the river.

CULTURAL SETTING LS 099

Population

Sucker River Wetland is located in Burt Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-10 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-10. Population Data for the Vicinity of Sucker River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sucker River Wetland and the surrounding area is rural open space. A light-duty road, an unimproved road, and several buildings are located

south of the wetland. The wetland is under mixed private and local government ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Recreation

Sucker River Wetland is located in the Grand Sable State Forest, but specific facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Sucker River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sucker River Wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to Sucker River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sucker River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 099

The literature search identified no on-going or impending research projects pertaining to Sucker River Wetland.

WEST BAY WETLAND

PHYSIOGRAPHIC SETTING LS 100

Setting

West Bay Wetland is located 300 feet from the shoreline of West Bay, which is directly connected to Lake Superior, in Burt Township of Alger County, Michigan, at Grand Marais. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Topography

West Bay Wetland has five feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area's most distinctive feature is the seventy foot bluff close to the wetland. Beyond the bluff the terrain slopes generally upward and contains a few steep hills (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which West Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in West Bay Wetland are classified as coastal beach (Veatch, 1929).

Hydrology

No streams flow through West Bay Wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for West Bay Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately five and three-fourths months long, with the last killing frost (28°F) in 1975

occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

BIOTIC SETTING LS 100

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of West Bay Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in West Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in West Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in West Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing West Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity,

recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting West Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in West Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 100

Population

West Bay Wetland is located in Burt Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-11 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-11. Population Data for the Vicinity of West Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within West Bay Wetland is rural open space, but there is residential development in the surrounding area. A light-duty road and several buildings are located south of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Recreation

No known state or federal recreational facilities are present in the vicinity of West Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of West Bay Wetland are limited to gravel (Great Lakes Basin Commission, 1974).

West Bay Wetland and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of West Bay Wetland (U.S.G.S. quadrangle map, Grand Marais, Michigan, 1968).

Pollution Sources

There are no NPDES permit holders adjacent to West Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of West Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 100

The literature search identified no on-going or impending research projects pertaining to West Bay Wetland.

AU SABLE POINT WETLAND

PHYSIOGRAPHIC SETTING LS 101

Setting

Au Sable Point Wetland is located approximately 100 to 500 feet from the southern shoreline of Lake Superior in Burt Township of Alger County, Michigan, 0.7 mile from Grand Marais. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Topography

Au Sable Point Wetland has 31 feet of relief and a maximum elevation of 641 feet above mean sea level (39 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. A bluff about 50 feet high lies inland of the wetland, and the terrain further inland is irregular and hilly (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Au Sable Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Au Sable Point Wetland are classified as coastal beach, Rifle peat, Shelldrake sand, and Newton sand (Veatch, 1929).

Hydrology

No streams flow through Au Sable Point Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Au Sable Point Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately five and three-fourths months long, with the last killing frost (28°F) in 1975

occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

BIOTIC SETTING LS 101

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Au Sable Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Au Sable Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Au Sable Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Au Sable Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Au Sable Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Au Sable Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Au Sable Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 101

Population

Au Sable Point Wetland is located in Burt Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-12 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-12. Population Data for the Vicinity of Au Sable Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Au Sable Point Wetland and the surrounding area is rural open space. An unimproved dirt road is located north of the western section of the wetland, and there is a trail east of the other sections. The wetland is

under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Recreation

Au Sable Point Wetland is located in Pictured Rocks National Lakeshore and Grand Sable State Forest, but there are no known specific recreational facilities.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Au Sable Point Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Au Sable Point Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Au Sable Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Au Sable Point Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 101

The literature search identified no on-going or impending research projects pertaining to Au Sable Point Wetland.

SULLIVAN CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 102

Setting

Sullivan Creek Wetland is located 0.1 mile from the southern shoreline of Lake Superior, in Burt Township of Alger County, Michigan, approximately 3.4 miles from Grand Marais. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Topography

Sullivan Creek Wetland has little relief and lies at an elevation of 650 feet above mean sea level (48 feet above the approximte mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is irregular with steep hills (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Sullivan Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Sullivan Creek Wetland are classified as Shelldrake sand, Rubicon sand, and AuTrain loamy sand (Veatch, 1929).

Hydrology

No streams flow through Sullivan Creek Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sullivan Creek Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately five and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

BIOTIC SETTING LS 102

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sullivan Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Sullivan Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sullivan Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sullivan Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sullivan Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sullivan Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sullivan Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 102

Population

Sullivan Creek Wetland is located in Burt Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-13 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-13. Population Data for the Vicinity of Sullivan Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sullivan Creek Wetland and the surrounding area is rural open space. A light-duty highway is located northwest of the wetland. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Recreation

Sullivan Creek Wetland is located in Pictured Rocks National Lakeshore and Grand Sable State Forest, but there are no known recreational facilities.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Sullivan Creek Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sullivan Creek Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Sullivan Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sullivan Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 102

The literature search identified no on-going or impending research projects pertaining to Sullivan Creek Wetland.

SULLIVAN'S LANDING WETLAND

PHYSIOGRAPHIC SETTING LS 103

Setting

Sullivan's Landing Wetland is located 0.1 mile from the southern shoreline of Lake Superior in Burt Township of Alger county, Michigan, approximately 4.0 miles from Grand Marais. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Topography

Sullivan's Landing Wetland has 20 feet of relief and a maximum elevation of 650 feet above mean sea level (48 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commmission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is irregular and hilly (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Sullivan's Landing Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soils in Sullivan's Landing Wetland are classified as Rubicon sand, Saugatuck sand, and Greenwood peat (Veatch, 1929).

Hydrology

No streams flow through Sullivan's Landing Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sullivan's Landing Wetland is located in Grand Marais, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.2°F and the mean monthly high for July is 62.7°F. The average annual precipitation is 31.41 inches, with a mean monthly precipitation of 2.26 inches in January and 2.72 inches in July. The growing season is approximately five and three-fourths months long, with the last killing frost (28°F) in 1975

occurring on April 27 and the first killing frost on October 19 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

BIOTIC SETTING LS 103

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sullivan's Landing Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Sullivan's Landing Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sullivan's Landing Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sullivan's Landing Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sullivan's Landing Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sullivan's Landing Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sullivan's Landing Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 103

Population

Sullivan's Landing Wetland is located in Burt Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-14 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-14. Population Data for the Vicinity of Sullivan's Landing Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sullivan's Landing Wetland and the surrounding area is rural open space. A light-duty road is located east of Sullivan's Landing Wetland, and an unimproved dirt road is adjacent to the western boundary, but

the wetland is under federal ownership and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Recreation

Sullivan's Landing Wetland is located in Pictured Rocks National Lakeshore and Grand Sable State Forest, but there are no known specific recreational facilities.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Sullivan's Landing Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sullivan's Landing Wetland (U.S.G.S. quadrangle map, Au Sable Point, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Sullivan's Landing Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sullivan's Landing Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 103

The literature search identified no on-going or impending research projects pertaining to Sullivan's Landing Wetland.

PICTURED ROCKS AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 104-111

Setting

The Pictured Rocks Area Wetland Complex is located in the coastal zone of Lake Superior in Burt and Munising Townships of Alger County, Michigan. The various components of the complex extend from the southern shoreline of Lake Superior to approximately 1.5 miles inland. Pictured Rocks Area Wetland #8 lies 3.5 miles from Munising, Michigan. This wetland complex is a Palustrine System and occupies predominantly wooded sites, but Pictured Rocks Area Wetland is partially non-wooded (U.S.G.S. quadrangle maps, Grand Portal Point, Michigan, 1958; Au Sable Point Southwest, Michigan, 1966; Wood Island, Michigan, 1958; and Munising, Michigan, 1958).

Topography

The Pictured Rock Area Wetland Complex has 238 feet of relief and a maximum elevation of 840 feet above mean sea level (238 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as non-erodible high bluff and erodible low bluff. The surrounding area consists of bluffs along the coast with hills inland (U.S.G.S. quadrangle maps, Grand Portal Point, Michigan, 1958; Munising, Michigan, 1958; Wood Island, Michigan, 1958; Au Sable Point Southwest, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which the Pictured Rocks Area Wetland Complex lies is characterized by lake bed sand and ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Munising formation, and of the Ordovician period and the Hermansville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soil types present in the Pictured Rocks Area Wetland Complex include Shelldrake sand, Rubicon sand, and AuTrain loamy sand (Veatch, 1929).

Hydrology

Pictured Rocks Area Wetland #4 is adjacent to the Mosquito River. No streams flow through any of the other wetlands in the Pictured Rocks Area Wetland Complex (U.S.G.S. quadrangle maps, Grand Portal Point, Michigan, 1958; Munising, Michigan, 1958; Au Sable Point Southwest, Michigan, 1966; Wood Island, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Pictured Rocks Area Wetland Complex is located in Munising, Michigan. The average annual temperature is 41.6°F, based on the normal period from 1931-1960. The mean monthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. The average annual precipitation is 34.08 inches, with a mean monthly precipitation of 2.51 inches in January and 3.19 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Grand Portal Point, Michigan, 1958; Munising, Michigan, 1958; Au Sable Point, Michigan, 1966; Wood Island, Michigan, 1958).

BIOTIC SETTING LS 104-111

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Pictured Rocks Area Wetland Complex.

Fish

Fish species found in the Mosquito River, which impinges on Pictured Rocks Wetlands #4-#6, include sea lamprey (Petromyzon marinus), American brook lamprey (Lampetra lamottei), rainbow trout (Salmo gairdneri), brook trout (Salvelinus fontinalis), and blacknose dace (Rhinichthys atratulus) (Moore and Bream, 1965). However, none of these species is associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these may utilize the eight wetlands of the Pictured Rocks Area Wetland Complex.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Pictured Rocks Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Pictured Rocks Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Pictured Rocks Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Pictured Rocks Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Pictured Rocks Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

LS 104-111

CULTURAL SETTING

Population

The Pictured Rocks Area Wetland Complex is located in Burt and Munising Townships of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-15 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but growth in Burt Township was more rapid growth figures for Munising Township are not available. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-15. Population Data for the Vicinity of the Pictured Rocks Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Burt Township	475	12.0	--
Munising Township	--	--	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Pictured Rocks Area Wetland Complex and the surrounding area is rural open space. Several trails are in the vicinity of the wetlands, including trails south of Pictured Rocks Area Wetlands #3 and #6, and north and east of Wetland #2. Pictured Rocks Area Wetland #8 has a light-duty highway adjacent to the western boundary; several buildings are also located in this area. The wetlands are under federal ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Grand Portal Point, Michigan, 1958; Wood Island, Michigan, 1958; Au Sable Point Southwest, Michigan, 1966).

Recreation

A large portion of the Pictured Rocks Area Wetland Complex is located in Hiawatha National Forest. Recreational facilities are available in the forest for camping, picnicking, swimming, fishing, day hikes, and snowmobiling. Pictured Rocks Area Wetland #1 is located in Pictured Rocks National Lakeshore and Grand Sable State Forest, where no known recreational facilities are provided.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Pictured Rocks Area Wetland Complex are limited to gravel (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Pictured Rocks Area Wetland Complex (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Grand Portal Point, Michigan, 1958; Wood Island, Michigan, 1958; Au Sable Point Southwest, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to the Pictured Rocks Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Pictured Rocks Area Wetland Complex (Peebles and Black, 1976), but the Michigan Coastal Zone Inventory indicates that one archaeological site (20-AR-4) is present near Pictured Rocks Area Wetland #8, consisting of a habitation of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and exact location of this site can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 104-111

The literature search identified no on-going or impending research projects pertaining to the Pictured Rocks Area Wetland Complex.

GRAND ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 112-114

Setting

The Grand Island Wetland Complex is located in the coastal zone of Lake Superior on Grand Island, in Grand Island Township of Alger County, Michigan. Grand Island Harbor Area Wetland and Williams Landing Wetland lie on the Lake Superior shoreline approximately 4.3 miles from Munising, Michigan. Echo Lake Wetland lies approximately 100 feet from the shoreline and 5.0 miles from Munising. This wetland complex is a Palustrine System and occupies predominantly wooded sites except for part of Grand Island Harbor Area Wetland (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Wood Island, Michigan, 1958).

Topography

The Grand Island Wetland Complex has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The surrounding area is composed of steep hills (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Wood Island, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which the Grand Island Wetland Complex lies is characterized by lake bed sand or rock at or near surface. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

Soil types present in the Grand Island Wetland Complex include coastal beach, Shelldrake sand, Carbondale muck, and Saugatuck sand (Veatch, 1929).

Hydrology

Two unnamed streams flow through Echo Lake Wetland, (LS 114) and Echo Lake Creek flows from Echo Lake to Lake Superior through a portion of this wetland. No streams flow through the other wetlands in the Grand Island Wetland Complex (U.S.G.S. quadrangle maps, Wood Island, Michigan, 1958; Munising, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Grand Island Wetland Complex is located in Munising, Michigan. The average annual temperature is 41.6°F, based on the normal period from 1931-1960. The mean monthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. The average annual precipitation is 34.08 inches, with a mean monthly precipitation of 2.51 inches in January and 3.19 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Wood Island, Michigan, 1958; Munising, Michigan, 1958).

BIOTIC SETTING LS 112-114

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Grand Island Wetland Complex.

Fish

Fish species found in Echo Lake Creek (Moore and Braem, 1965) include longnose dace (Rhinichthys atratulus), blacknose shiner (Notropis heterolepis), and white sucker (Catostomus commersoni). The white sucker and blacknose shiner are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed above, may also utilize Echo Lake Wetland and the other two wetlands of the Grand Island Wetland Complex. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Grand Island Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific

information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Grand Island Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Grand Island Wetland Complex.

Mammals

Several mammalian species, including moose (Alces alces), caribou (Rangifer tarandus), and elk (Cervus elaphus), were introduced to Grand Island during the late 1800's and early 1900's (Shiras, 1921). None of the introduced species established sustaining populations. Also in the early 1900's albino white-tailed deer (Odocoileus virginianus) were frequently observed on Grand Island.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands of the Grand Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Grand Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 112-114

Population

The Grand Island Wetland Complex is located in Grand Island Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-16 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but population declined in Grand Island Township during the same time period. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-16. Population Data for the Vicinity of the Grand Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Grand Island Township	31	-3.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Grand Island Wetland Complex is rural open space, with some residential development in the surrounding area. A light-duty road and an unimproved dirt road are located between the two sections of Echo Lake Wetland, the latter crossing the western section. These two roads also run along the northern and eastern boundaries of Williams Landing Wetland, which also has a cable leading from its southern point to Powell Point. A tower is located in the southeastern section of Grand Island Harbor Area Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Wood Island, Michigan, 1958;).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Grand Island Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the Grand Island Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Grand Island Wetland Complex (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Wood Island, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to the three wetlands of the Grand Island Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Grand Island is listed on the Michigan State Historical Register. It is an unusually-formed island covered with northern hardwood and hemlock, and was first described by Europeans in the 17th century and later surveyed by Lewis and Clark (Peebles and Black, 1976).

The Michigan Coastal Zone Inventory indicates that five archaeological sites are present in the vicinity of the Grand Island Wetland Complex. Sites AR-E, AR-D, AR-C, AR-B, and AR-A are historic-period trading posts (Peebles and Black, 1976). Further information regarding the field research and exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 112-114

The literature search identified no on-going or impending research projects pertaining to the Grand Island Wetland Complex.

POWELL POINT WETLAND

PHYSIOGRAPHIC SETTING LS 115

Setting

Powell Point Wetland is located on the southern shoreline of Lake Superior in Au Train Township of Alger County, Michigan, approximately 0.8 mile from Munising. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

Topography

Powell Point Wetland has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which Powell Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

The soils of Powell Point Wetland are classified as Carbondale muck, Saugatuck sand, Tahquamenon peat, and Shelldrake sand (Veatch, 1929).

Hydrology

One unnamed stream flows through Powell Point Wetland (U.S.G.S. quadrangle map, Munising, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Powell Point Wetland is located in Munising, Michigan. The average annual temperature is 41.6°F, based on the normal period from 1931-1960. The mean monthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. The average annual precipitation is 34.08 inches, with a mean monthly precipitation of 2.51 inches in January and 3.19 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

BIOTIC SETTING LS 115

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Powell Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Powell Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Powell Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Powell Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Powell Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Powell Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Powell Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

LS 115

CULTURAL SETTING

Population

Powell Point Wetland is located in Au Train Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-17 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Au Train Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-17. Population Data for the Vicinity of Powell Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Au Train Township	681	25.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Powell Point Wetland is rural open space, with some residential development in the surrounding area. A heavy-duty road is adjacent to the northern boundary of Powell Point Wetland, and a light-duty road runs from this highway across the wetland, terminating at a sandpit located to the south. An unimproved dirt road runs along the northwestern border, and another crosses the northeastern section. Numerous buildings, a light-duty road, and two lighthouses lie northwest of the wetland, and a cable leads from the northernmost point of this wetland to Echo Lake Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

Recreation

Powell Point Wetland is located in Hiawatha National Forest, where recreational activities include camping, picnicking, swimming, fishing, day hikes, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Powell Point Wetland include sand and gravel (Great Lakes Basin Commission, 1974).

Powell Point Wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Powell Point Wetland (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to Powell Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Powell Point Wetland, but the Michigan Coastal Zone Inventory indicates that one archaeological site (20-AR-5) is present near the wetland, a habitation of an unknown culture and date (Peebles and Black, 1976). Further information regarding the field research and exact location of this site can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 115

The literature search identified no on-going or impending research projects pertaining to Powell Point Wetland.

FIVEMILE POINT WETLAND

PHYSIOGRAPHIC SETTING LS 116

Setting

Fivemile Point Wetland is located on the southern shoreline of Lake Superior in Au Train Township of Alger County, Michigan, approximately 5.0 miles from Munising. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

Topography

Fivemile Point Wetland has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Munising, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which Fivemile Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

The soils in Fivemile Point Wetland are classified as Newton sand and Onota stony fine sandy loam (Veatch, 1929).

Hydrology

No streams flow through Fivemile Point Wetland (U.S.G.S. quadarangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Fivemile Point Wetland is located in Munising, Michigan. The average annual temperature is 41.6°F, based on the normal period from 1931-1960. The mean monthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. The average annual precipitation is 34.08 inches, with a mean monthly precipitation of 2.51 inches in January and 3.19 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

BIOTIC SETTING LS 116

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Fivemile Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Fivemile Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Fivemile Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Fivemile Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Fivemile Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Fivemile Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Fivemile Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

LS 116

CULTURAL SETTING

Population

Fivemile Point Wetland is located in Au Train Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-18 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Au Train Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-18. Population Data for the Vicinity of Fivemile Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Au Train Township	681	25.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Fivemile Point Wetland and the surrounding area is rural open space. A light-duty road lies south of the wetland, while an unimproved dirt road and one building are located along the northeastern boundary of the eastern section. The wetland is under mixed private and federal ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

Recreation

Fivemile Point Wetland is located in Hiawatha National Forest, where recreational activities include camping, picnicking, swimming, fishing, day hikes, and snowmobiling.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Fivemile Point Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Fivemile Point Wetland (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to Fivemile Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Fivemile Point Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 116

The literature search identified no on-going or impending research projects pertaining to Fivemile Point Wetland.

AU TRAIN POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LS 117

Setting

Au Train Point Area Wetland is located approximately 100 feet from the southern shoreline of Lake Superior in Au Train Township of Alger County, Michigan, 4.0 miles from the town of Au Train. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

Topography

Au Train Point Area Wetland has little relief and lies at an elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which Au Train Point Area Wetland lies is characterized by rock at or near the surface, which is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

The soils of Au Train Point Area Wetland are classified as Carbondale muck, Saugatuck sand, and Onota stony fine sandy loam (Veatch, 1929).

Hydrology

No streams flow through Au Train Point Area Wetland (U.S.G.S. quadrangle map, Au Train, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Au Train Point Area Wetland is located in Munising, Michigan. The average annual temperature is 41.6°F, based on the normal period from 1931-1960. The mean monthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. The average annual precipitation is 34.08 inches, with a mean monthly precipitation of 2.51 inches in January and 3.19 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

BIOTIC SETTING LS 117

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Au Train Point Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Au Train Point Area Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Au Train Point Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Au Train Point Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Au Train Point Area Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Au Train Point Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Au Train Point Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

LS 117

CULTURAL SETTING

Population

Au Train Point Area Wetland is located in Au Train Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-19 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Au Train Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-19. Population Data for the Vicinity of Au Train Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Au Train Township	681	25.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Au Train Point Area Wetland and the surrounding area is rural open space. A light-duty highway is adjacent to the northern boundary, a gravel pit lies to the northwest, and there is a trail southeast of the wetland. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

Recreation

Au Train Point Area Wetland is located in Hiawatha National Forest, where recreational activities include camping, picnicking, swimming, fishing, day hikes, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Au Train Point Area Wetland are limited to gravel (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Au Train Point Area Wetland (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to Au Train Point Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Au Train Point Area Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 117

The literature search identified no on-going or impending research projects pertaining to Au Train Point Area Wetland.

AU TRAIN BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 118-120

Setting

The Au Train Bay Wetland Complex lies 50 feet from the shoreline of Au Train Bay, which is directly connected to Lake Superior, within Au Train Township of Alger County, Michigan. Au Train River Wetland is located in Au Train, Michigan, and Au Train Bay East Shore Wetland and Au Train Bay Southwest Shore Wetland lie approximately 2.5 miles from Au Train. This wetland complex is Palustrine-Riverine System and occupies both wooded and non-wooded sites (U. S. G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

Topography

The Au Train Bay Wetland Complex has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly (U.S.G.S. quadrangle maps, Au Train, Michigan, 1958; Munising, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which the Au Train Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Munising formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soil types present in the Au Train Bay Wetland Complex include Shelldrake sand, Newton sand, Onota stony fine sandy loam, and Carbondale muck (Veatch, 1929).

Hydrology

The Au Train River flows through Au Train River Wetland, and two unnamed streams flow through Au Train Bay Southwest Shore Wetland. Au Train Bay East Shore Wetland has no streams flowing through it (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Au Train Bay Wetland Complex is located in Munising, Michigan. The average annual

emperature is 41.6°F, based on the normal period from 1931-1960. The mean onthly low for January is 19.1°F and the mean monthly high for July is 65.0°F. he average annual precipitation is 34.08 inches, with a mean monthly recipitation of 2.51 inches in January and 3.19 inches in July. The growing eason is approximately five months long, with the last killing frost (28°F) in 1973 occurring on May 30 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

LS 118-120

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Au Train Bay Wetland Complex.

Fish

Fish species found in the Au Train River are listed in Table 4-20. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species, in addition to those listed in Table 4-20, may also utilize the wetlands of the Au Train Bay Wetland Complex. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Au Train Bay Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Au Train Bay Wetland Complex.

Table 4-20. Fish Species Found in the Au Train River, Alger County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
ammocetes (northern brook or silver lamprey)	longnose sucker
sea lamprey	Ictaluridae
American brook lamprey	black bullhead*
	brown bullhead*
Salmonidae	
rainbow trout	Gadidae
brook trout	burbot
Osmeridae	Gasterosteidae
rainbow smelt	brook stickleback*
Umbridae	Percopsidae
central mudminnow*	trout-perch
Esocidae	Centrarchidae
northern pike*	smallmouth bass*
	largemouth bass*
Cyprinidae	pumpkinseed*
carp*	rock bass
creek chub	
hornyhead chub	Percidae
blacknose dace	yellow perch*
longnose dace	walleye*
finescale dace	logperch*
northern redbelly dace	johnny darter*
goldenshiner*	Iowa darter*
common shiner	
spottail shiner	Cottidae
blackchin shiner*	mottled sculpin*
mimic shiner	
bluntnose minnow	

[a]Moore and Braem (1965) and Taylor (1954)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Au Train Bay Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands of the Au Train Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Au Train Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

LS 118-120

CULTURAL SETTING

Population

The Au Train Bay Wetland Complex is located in Au Train Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-21 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Au Train Township was more rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-21. Population Data for the Vicinity of the Au Train Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Au Train Township	681	25.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Au Train Bay Wetland Complex is rural open space, with residential development in the surrounding area. A medium-duty highway runs south of Au Train Bay East Shore Wetland, is adjacent to the northern border of Au Train River Wetland, and crosses the northern section of Au Train Bay Southwest Shore Wetland. A branch of this highway also intersects the southern part of Au Train River Wetland. A railroad track follows approximately the same route, but does not intersect Au Train River Wetland, and it crosses a greater area of Au Train Bay Southwest Shore Wetland. There are several light-duty roads near the wetlands. The community of Au Train is northwest of Au Train River Wetland, and contains many roads and buildings; a landing field extends into the lower section of this wetland. The wetlands are under mixed federal and private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Au Train, Michigan, 1958; Munising, Michigan, 1958).

Recreation

The Au Train Bay Wetland Complex is located in Hiawatha National Forest, where recreational activities include camping, picnicking, swimming, fishing, day hikes, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Au Train Bay Wetland Complex are limited to gravel (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Au Train Bay Wetland Complex (U.S.G.S. quadrangle map, Au Train, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to the three wetlands of the Au Train Bay Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Au Train Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 118-120

The literature search identified no on-going or impending research projects pertaining to the Au Train Bay Wetland Complex.

LAUGHING FISH POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 121-127

Setting

The Laughing Fish Point Area Wetland Complex is located on the southern shoreline of Lake Superior in Onota Township of Alger County, Michigan, at Laughing Fish Point. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958).

Topography

The Laughing Fish Point Area Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of a flat narrow coastal plain with interior hills (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which the Laughing Fish Point Area Wetland Complex lies is characterized by rock at or near the surface, which is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

Soil types present in the Laughing Fish Point Area Wetland Complex include, in Laughing Fish Point Area Wetlands #1, #2, and #5: Coastal beach and Carbondale muck; in Laughing Fish Poit Wetland: Coastal beach and Onota stony fine sandy loam; in Laughing Whitefish River Wetland: Coastal beach, Greenwood peat, Carbondale muck, Onota stony fine sandy loam, and Ewen loam; Laughing Fish Point Area Wetland #3: Coastal beach and Greenwood peat; and in Laughing Fish Point Wetland #4: Coastal beach, Greenwood peat, and Carbondale muck (Veatch, 1929).

Hydrology

Laughing Whitefish River flows through Laughing Whitefish River Wetland. No streams flow through the other wetlands of the Laughing Fish Point Area Wetland Complex (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Laughing Fish Point Area Wetland Complex is located in Marquette, Michigan. The average annual temperature is 42.6°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.4°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 37.26 inches, with a mean monthly precipitation of 2.85 inches in January and 1.45 inches in July. The growing season is approximately six and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958).

LS 121-127

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Laughing Fish Point Area Wetland Complex.

Fish

Fish species found in the Laughing Whitefish River are listed in Table 4-22. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed in Table 4-22, may also utilize the Laughing Fish Point Wetland Complex. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Laughing Fish Point Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Alger County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Laughing Fish Point Area Wetland Complex.

Table 4-22. Fish Species Found in Laughing Whitefish River, Alger County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
ammocetes (northern brook or silver lamprey)	white sucker*
sea lamprey	longnose sucker
American brook lamprey	Ictaluridae
Salmonidae	brown bullhead*
rainbow trout	Gadidae
brook trout	burbot
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	rock bass
Esocidae	Percidae
northern pike*	yellow perch*
Cyprinidae	logperch*
creek chub	Cottidae
pearl dace	mottled sculpin*
hornyhead chub	
blacknose dace*	
longnose dace	
common shiner	
spottail shiner	

[a] Moore and Braem (1965)
* Species associated with wetland habitats according to Trautman (1957) and Jaworski and Raphael (1978)

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Laughing Fish Point Area Wetland Complex.

Mammals

A survey of the mammalian species of northwestern Alger County (Wood, 1917) provides information concerning the relative abundance of the mammals which historically may have utilized the seven wetlands of the Laughing Fish Point Area Wetland Complex and may suggest the mammalian species which may presently be found there (Appendix C-3).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Laughing Fish Point Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Laughing Fish Point Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, parts of the Laughing Fish Point Area Wetland Complex are likely to be utilized by numerous fish species found in the Laughing Whitefish River.

CULTURAL SETTING LS 121-127

Population

The Laughing Fish Point Area Wetland Complex is located in Onata Township of Alger County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-23 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Onata Township was rapid. Projections for 1990 indicate that Alger County is expected to undergo a rapid rate of population growth in the future.

Table 4-23. Population Data for the Vicinity of the Laughing Fish Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alger County	8,977	4.8	11,324
Onata Township	229	78.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Laughing Fish Point Area Wetland Complex and the surrounding area is rural open space. There are unimproved dirt roads to the west and to the east of Laughing Whitefish River Wetland, an unimproved dirt road which crosses the southwestern section of Laughing Fish Point Wetland, and trails located between Laughing Fish Point Area Wetlands #1 and #2, and also between #3 and #4. A few buildings are located within Laughing Fish Point Wetland and Laughing Whitefish River Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Laughing Fish Point Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Laughing Fish Point Area Wetland Complex include sand and gravel (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Laughing Fish Point Area Wetland Complex (U.S.G.S. quadrangle map, Laughing Fish Point, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to the three wetlands of the Laughing Fish Point Area Wetland Complex (Michigan Water Quality Division,

1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Laughing Fish Point Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 121-127

The literature search identified no on-going or impending research projects pertaining to the Laughing Fish Point Area Wetland Complex.

SHOT POINT WETLAND

PHYSIOGRAPHIC SETTING LS 128

Setting

Shot Point Wetland is located on the southern shoreline of Lake Superior in Chocolay Township of Marquette County, Michigan, at Shot Point. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Skandia, Michigan, 1958; Laughing Fish Point, Michigan, 1958).

Topography

Shot Point Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low dunes. The surrounding area is composed of sand ridges (U.S.G.S. quadrangle maps, Laughing Fish Point, Michigan, 1958; Skandia, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which Shot Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

No streams flow through Shot Point Wetland (U.S.G.S. quadrangle maps, Skandia, Michigan, 1958; Laughing Fish Point, Michigan, 1958). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Shot Point Wetland is located in Marquette, Michigan. The average annual temperature is 42.6°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.4°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 37.26 inches, with a mean monthly precipitation of 2.85 inches in January and 1.45 inches in July. The growing season is approximately six and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Skandia, Michigan, 1958; Laughing Fish Point, Michigan, 1958).

BIOTIC SETTING LS 128

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Shot Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Shot Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Shot Point Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Shot Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Shot Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Shot Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Shot Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 128

Population

Shot Point Wetland is located in Chocolay Township of Marquette County, Michigan. The county is sparsely populated, having a density of 35 persons per square mile. Table 4-24 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-24. Population Data for the Vicinity of Shot Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Chocolay Township	3,528	6.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Shot Point Wetland and the surrounding area is rural open space. A medium-duty road, a railroad track, two unimproved dirt roads, and several buildings are located either south of or adjacent to the southern border

of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Laughing Fish Point, Michigan, 1958; Skandia, Michigan, 1958).

Recreation

Shot Point Wetland is located in Michigamme State Forest, where snowmobiling is permitted. Other recreational activities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Shot Point Wetland include sand and gravel (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Shot Point Wetland (U.S.G.S. quadrangle maps, Laughing Fish Point, Michigan, 1958; Skandia, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to Shot Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Shot Point Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 128

The literature search identified no on-going or impending research projects pertaining to Shot Point Wetland.

MARQUETTE STATE PRISON AREA WETLAND

PHYSIOGRAPHIC SETTING LS 129

Setting

Marquette State Prison Area Wetland lies 500 feet from the southern shoreline of Marquette Bay, which is directly connected to Lake Superior. The wetland is located in Marquette Township of Marquette County, Michigan, approximately 1.0 miles from the city of Marquette. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Topography

Marquette State Prison Area Wetland has little relief and lies at an elevation of 615 feet above mean sea level (13 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is composed of steep hills (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Marquette State Prison Area Wetland lies is characterized by rock at or near the surface, which is of the Huronian period. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

Marquette State Prison Area Wetland is adjacent to the Carp River (U.S.G.S. quadrangle map, Marquette, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Marquette State Prison Area Wetland is located in Marquette, Michigan. The average annual temperature is 42.6^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 18.4^{o}F and the mean monthly high for July is 66.3^{o}F. The average annual precipitation is 37.26 inches, with a mean monthly precipitation of 2.85 inches in January and 1.45 inches in July. The growing season is approximately six and three-fourths months long, with the last killing

rost (28°F) in 1975 occurring on April 21 and the first killing frost on ovember 13 (National Oceanic and Atmospheric Administration, 1975).

pecial Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

LS 129

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Marquette State Prison Area Wetland.

Fish

Fish species found in the Carp River are listed in Table 4-25. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed in Table 4-25, may also utilize Marquette State Area Prison Wetland.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Marquette State Prison Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Marquette State Prison Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Marquette State Prison Area Wetland.

Table 4-25. Fish Species Found in the Carp River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
ammocetes (northern brook or silver lamprey)	white sucker*
sea lamprey	longnose sucker
American brook lamprey	Gasterosteidae
Salmonidae	brook stickleback*
brown trout	ninespine stickleback
rainbow trout	Centrarchidae
brook trout	rock bass
Osmeridae	Percidae
rainbow smelt	yellow perch*
Cyprinidae	logperch*
carp*	Cottidae
longnose dace	slimy sculpin
goldenshiner*	mottled sculpin*
common shiner	
northern redbelly dace	

[a]Moore and Braem (1965) and Taylor (1954)
*Species associated with wetland habitats according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Marquette State Prison Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Marquette State Prison Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the Marquette Waste Water Treatment Plant discharges into the Carp River. The effect of this discharge on Marquette State Prison Area Wetland is not known. The wetland is likely to be utilized by a number of fish species known to be present in the Carp River.

LS 129

CULTURAL SETTING

Population

Marquette State Prison Area Wetland is located within the municipal boundaries of the city of Marquette, in Marquette Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-26 indicates that the county, the city, and the township all experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-26. Population Data for the Vicinity of Marquette State Prison Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Marquette Township	2,010	18.0	--
City of Marquette	23,978	5.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Marquette State Prison Area Wetland is rural open space. The surrounding area is institutional. A sewage disposal plant is located adjacent to the northeastern boundary of the wetland, and a heavy-duty highway (U.S. Route 41) and a railroad track lie just beyond the plant. A light-duty road runs along the western border of this wetland and leads to a power station, which is located approximately 1500 feet to the southwest. Marquette State prison is on the southeast. The wetland is under state ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Recreation

No known state or federal recreational facilitiesare present in the vicinity of Marquette State Prison Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Marquette State Prison Area Wetland include sand and gravel (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

The Cliffs Electric Service Carp River hydroelectric power station is situated southwest of Marquette State Prison Area Wetland. The power station is rated at two megawatts. A sewage disposal site is adjacent to the northeast side of the wetland (Federal Energy Administration, 1977; U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Pollution Sources

There is one NPDES permit holder adjacent to Marquette State Prison Area Wetland. The Marquette Waste Water Treatment Plant is located at the northeastern end of Carp River Wetland and discharges into the Carp River. The nature and extent of this discharge, and its effect on Marquette State Prison Area Wetland, are not known. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of Marquette State Prison Area Wetland, but the Michigan Coastal Zone Inventory indicates that one archaeological site (20-MQ-5) is present near the wetland, a cemetery from an unknown culture and time period (Peebles and Black, 1976). Further information regarding the field research and exact location of this site can be obtained from the Michigan History Division.

The literature search identified no on-going or impending research projects pertaining to Marquette State Prison Area Wetland.

MIDDLE BAY WETLAND

PHYSIOGRAPHIC SETTING LS 130

Setting

Middle Bay Wetland is located on the shoreline of Middle Bay, which is directly connected to Lake Superior, in Marquette Township of Marquette County, Michigan, approximately 1.3 miles from the city of Marquette. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Topography

Middle Bay Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low dunes. The surrounding are is composed of low hills (U.S.G.S. Marquette, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Middle Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Archean period. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

Campeace Creek flows through Middle Bay Wetland (U.S.G.S. quadrangle map, Marquette, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Middle Bay Wetland is located in Marquette, Michigan. The average annual temperature is 42.6°F, based on the normal period from 1941-1970. The mean monthly low for January is 18.4°F and the mean monthly high for July is 66.3°F. The average annual precipitation is 37.26 inches, with a mean monthly precipitation of 2.85 inches in January and 1.45 inches in July. The growing season is approximately six and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on November 13 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

BIOTIC SETTING LS 130

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Middle Bay Wetland.

Fish

The only fish species reported by Moore and Breams (1965) in Campeau Creek, which flows through Middle Bay Wetland, was brook trout (Salvelinus fontinalis). Taylor (1954) listed species collected in Campeau Creek at the city of Marquette in 1925. These species were rainbow trout (Salmo gairdneri), brook trout, white sucker (Catostomus commersoni), and northern redbelly dace (Phoxinus eos), which are probably still present in Campeau Creek, although of these only the white sucker is generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these may also utilize this wetland.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Middle Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Middle Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Middle Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

health, life histories, relationship to water levels, or major food sources of the birds utilizing Middle Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Middle Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Middle Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

LS 130

CULTURAL SETTING

Population

Middle Bay Wetland is located in Marquette Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-27 indicates that both the county and township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-27. Population Data for the Vicinity of Middle Bay Wetland

	Estimated population 1975[a]	Estimated % Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Marquette Township	2,010	18.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Middle Bay Wetland and the surrounding area is rural open space. A four to six lane medium-duty highway corsses the western section and runs north of the wetland. An unimproved dirt road is adjacent to the northwestern boundary. Numerous railroad tracks lie adjacent to the southeastern boundary, and a large pit lies to the south. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Recreation

No known state or federal recreational facilities re present in the vicinity of Middle Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Middle Bay Wetland include sand and gravel (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

The Presque Isle electric generating plant, owned by the Upper Penninsula Generating Company, is situated southeast of Middle Bay Wetland. It burns coal, is rated at 335 megawatts (with increased capacity projected in 1979), and utilizes Lake Superior for its source of cooling water. Transmission lines from the Presque Isle plant run south of the wetland (Federal Energy Administration, 1977; Federal Power Commission 1972; U.S.G.S. quadrangle map, Marquette, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Middle Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Middle Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 130

The literature search identified no on-going or impending research projects pertaining to Middle Bay Wetland.

LITTLE GARLIC RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 131

Setting

Little Garlic River Wetland is located on the southern shoreline of Lake Superior in Powell Township of Marquette County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Topography

Little Garlic River Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is composed of a plain bordered by hills (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Little Garlic River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Archean period. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

The Little Garlic River flows through Little Garlic River Wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Little Garlic River Wetland is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

LS 131

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Little Garlic River Wetland.

Fish

Fish species found in the Little Garlic River are listed in Table 4-28. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species, in addition to those listed in Table 4-28, may also utilize Little Garlic River Wetland.

Table 4-28. Fish Species Found in Little Garlic River, Marquette County, Michgian[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
	longnose sucker
Salmonidae	
rainbow trout	Gasterosteidae
brook trout	brook stickleback*
Osmeridae	Percidae
rainbow smelt	logperch*
	johnny darter
Cyprinidae	
longnose dace	Cottidae
common shiner	mottled sculpin

[a] Moore and Braem (1965) and Taylor (1954)
* species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Little Garlic River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Little Garlic River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Little Garlic River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Little Garlic River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Little Garlic River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Little Garlic River Wetland is likely to be utilized by several fish species which are present in the river.

LS 131

CULTURAL SETTING

Population

Little Garlic River Wetland is located in Powell Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-29 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975.

Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-29. Population Data for the Vicinity of Little Garlic River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Little Garlic River Wetland and the surrounding area is rural open space. An unimproved dirt road is adjacent to the western and northern boundaries of the wetland, and crosses its northeastern section. There are some buildings in the northeastern part of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Recreation

Little Garlic River Wetland is located 0.1 mile from Michigamme State Forest, where snowmobiling is permitted. Other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Little Garlic River Wetland are limited to gravel.

The area surrounding Little Garlic River Wetland is wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Little Garlic River Wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to Little Garlic River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Little Garlic River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 131

The literature search identified no on-going or impending research projects pertaining to Little Garlic River Wetland.

BIG GARLIC RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 132

Setting

Big Garlic River Wetland is located approximately 50 feet from the southern shoreline of Lake Superior in Powell Township of Marquette County, Michigan. There are no population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Topography

Big Garlic River Wetland has ten feet of relief and a maximum elevation of 630 feet above mean sea level (28 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly; the adjacent hills have elevations up to 850 feet above mean sea level (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Big Garlic River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Archean period. The wetland lies in an area formerly covered by Glacial Lake Algonquin (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

The Big Garlic River and three of its tributaries flow through Big Garlic River Wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Big Garlic River Wetland is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

LS 132

BIOTIC SETTING

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Big Garlic River Wetland.

Fish

Fish species found in the Big Garlic River are listed in Table 4-30. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species, in addition to those listed in Table 4-30, may also utilize Big Garlic River Wetland. Sauk Head Lake, which adjoins this wetland, was reported to contain white sucker (Catostomus commersoni) (Taylor, 1954).

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Big Garlic River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Big Garlic River Wetland.

Table 4-30. Fish Species Found in the Big Garlic River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
American brook lamprey	longnose sucker
Salmonidae	Ictaluridae
rainbow trout	brown bullhead*
brook trout	
	Gasterosteidae
Osmeridae	brook stickleback*
rainbow smelt	
	Centrarchidae
Esocidae	largemouth bass*
northern pike*	rock bass
Cyprinidae	Percidae
carp*	yellow perch*
creek chub	walleye*
pearl dace	logperch*
lake chub	johnny darter*
longnose dace	Iowa darter*
common shiner	
spottail shiner	Cottidae
sand shiner	slimy sculpin

[a]Moore and Braem (1965)
*species associated with wetland habitats according to Trautman (1957) and Jaworski and Raphael (1978)

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Big Garlic River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Big Garlic River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Big Garlic River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Big Garlic River Wetland is likely to be utilized by some of the fish species present in the river.

CULTURAL SETTING LS 132

Population

Big Garlic River Wetland is located in Powell Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-31 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-31. Population Data for the Vicinity of Big Garlic River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Big Garlic River Wetland and most of the surrounding area is rural open space. A medium-duty highway is adjacent to the western border of the wetland. Unimproved dirt roads are adjacent to the southeastern and nothwestern borders, and cross two northern sections. A railroad track crosses the southern part of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of Big Garlic River Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Big Garlic River Wetland are limited to gravel.

The wetland and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Big Garlic River Wetland (U.S.G.S. quadrangle map, Negaunee, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to Big Garlic River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Big Garlic River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 132

The literature search identified no on-going or impending research projects pertaining to Big Garlic River Wetland.

YELLOW DOG POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 133-136

Setting

The Yellow Dog Point Area Wetland Complex is located in the coastal zone of Lake Superior in Powell Township of Marquette County, Michigan. Yellow Dog Point Area Wetland #1 lies on the shoreline, and Yellow Dog Point Area Wetlands #2, #3, and #4 lie approximately 50 feet from the shoreline of Lake Superior. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Topography

The Yellow Dog Point Area Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is composed of a small hill with a low area beyond, followed by steep large hills (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Yellow Dog Point Area Wetland Complex lies is characterized by rock at or near the surface, is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

No streams flow through the Yellow Dog Point Area Wetland Complex (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Yellow Dog Point Area Wetland Complex is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing

season is approximately five and one-fourth months long, with the last killing frost ($28^{o}F$) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

BIOTIC SETTING LS 133-136

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Yellow Dog Point Area Wetlands #1-#4.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Yellow Dog Point Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Yellow Dog Point Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Yellow Dog Point Area Wetlands #1-#4.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Yellow Dog Point Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Yellow Dog Point Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Yellow Dog Point Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 133-136

Population

The Yellow Dog Point Area Wetland Complex is located in Powell Township of Marquette County, Michigan. The county is sparsely populated, having a density of 35 persons per square mile. Table 4-32 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-32. Population Data for the Vicinity of the Yellow Dog Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Yellow Dog Point Area Wetland Complex and the surrounding area is rural open space. An unimproved dirt road is located north of Yellow Dog Point Area Wetland #1. The wetlands are under private ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Yellow Dog Point Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the Yellow Dog Point Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Yellow Dog Point Area Wetland Complex (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to the three wetlands of the Yellow Dog Point Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Yellow Dog Point Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 133-136

The literature search identified no on-going or impending research projects pertaining to the Yellow Dog Point Area Wetland Complex.

IRON RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 137

Setting

Iron River Wetland is located on the southern shoreline of Lake Superior in Powell Township of Marquette County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Topography

Iron River Wetland has 13 feet of relief and a maximum elevation of 615 feet above mean sea level (13 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is composed of small mounds and low areas, with steep hills further inland (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Iron River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

Iron River Wetland is adjacent to the Iron River (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Iron River may be found in Schneiderwent (1974).

Climate

The closest weather station providing climatic data for Iron River Wetland is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring

on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

BIOTIC SETTING LS 137

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Iron River Wetland.

Fish

Fish species found in the Iron River are listed in Table 4-33. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species, in addition to those listed in Table 4-33, may also utilize Iron River Wetland.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Iron River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Iron River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Iron River Wetland.

Table 4-33. Fish Species Found in Iron River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	Ictaluridae
sea lamprey	brown bullhead*
Salmonidae	Gadidae
brown trout	burbot
rainbow trout	
brook trout	Gasterosteidae
lake herring	brook stickleback*
	ninespine stickleback
Osmeridae	
rainbow smelt	Percopsidae
	trout-perch
Esocidae	
northern pike*	Centrarchidae
	smallmouth bass*
Cyprinidae	pumpkinseed*
carp*	rock bass
creek chub	
blacknose dace	Percidae
longnose dace	yellow perch*
finescale dace	walleye*
goldenshiner*	logperch*
emerald shiner	johnny darter
common shiner	Iowa darter*
spottail shiner	
blackchin shiner*	Cottidae
mimic shiner	mottled sculpin*
blacknose shiner*	
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978).

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Iron River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Iron River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Iron River Wetland is likely to be utilized by a variety of the fish species found in the Iron River.

CULTURAL SETTING LS 137

Population

Iron River Wetland is located in Powell Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-34 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-34. Population Data for the Vicinity of Iron River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Iron River Wetland and the surrounding area is rural open space. There is an unimproved dirt road west of the central section of the

wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of Iron River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Iron River Wetland, but the surrounding area is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Iron River Wetland (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to Iron River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Iron River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 137

The literature search identified no on-going or impending research projects pertaining to Iron River Wetland.

BIG BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING — LS 138-140

Setting

The Big Bay Wetland Complex is located in the coastal zone of Big Bay, which is directly connected to Lake Superior, in Powell Township of Marquette County, Michigan. Big Bay Point Wetland and Squaw Beach Wetland lie on the shoreline, and Big Bay West Shore Wetland lies approximately 80 feet from the shoreline of Big Bay. There are no major population centers in the area. This wetland complex is a Palustrine complex and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Topography

The Big Bay Wetland Complex has 138 feet of relief and a maximum elevation of 740 feet above mean sea level (138 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as erodible low bluff and non-erodible high bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which the Big Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

No streams flow through the Big Bay Wetland Complex (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Big Bay Wetland Complex is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

BIOTIC SETTING LS 138-140

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Big Bay Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Big Bay Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Big Bay Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Big Bay Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Big Bay Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity,

recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Big Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Big Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the Negaunee Mine Company discharges overburden dewatering well water into the groundwater, which may affect Squaw Beach Wetland.

CULTURAL SETTING LS 138-140

Population

The Big Bay Wetland Complex is located in Powell Township of Marquette County, Michigan. The county is sparsely populated, having a density of 35 persons per square mile. Table 4-35 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-35. Population Data for the Vicinity of the Big Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Big Bay Wetland Complex and the surrounding area is rural open space. Unimproved dirt roads are adjacent to the southwestern boundary of Big Bay West Shore Wetland and the northern boundary of Squaw Beach Wetland. Light-duty roads are adjacent to the western boundaries of both Squaw

Beach Wetland and Big Bay Point Wetland. Burns Landing and several buildings lie northwest of Squaw Beach Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Big Bay Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Big Bay Wetland Complex are limited to gravel. The wetlands and the surrounding area are wooded, representing potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Big Bay Wetland Complex (U.S.G.S. quadrangle map, Big Bay, Michigan, 1954).

Pollution Sources

The Negaunee Mine Company, located south of Squaw Beach Wetland, discharges overburden dewatering well water into the groundwater. The extent and effect of this discharge on Squaw Beach Wetland is not known. There are no other NPDES permit holders adjacent to the complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Big Bay Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 138-140

The literature search identified no on-going or impending research projects pertaining to the Big Bay Wetland Complex.

SALMON TROUT RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 141

Setting

Salmon Trout River Wetland is located on the shoreline of Salmon Trout Bay, which is directly connected to Lake Superior, in Powell Township of Marquette County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and is predominantly wooded (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954).

Topography

Salmon Trout River Wetland has 78 feet of relief and a maximum elevation of 680 feet above mean sea level (78 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The wetland occupies a low area between the coastal bluffs (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Salmon Trout River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

The Salmon Trout River and Sullivan Creek flow through Salmon Trout River Wetland (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Salmon Trout River Wetland is located in Big Bay, Michigan. The average annual temperature is 43.5^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7^{o}F and the mean monthly high for July is 68.3^{o}F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28^{o}F) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954).

BIOTIC SETTING LS 141

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Salmon Trout River Wetland.

Fish

Fish species found in the Salmon Trout River are listed in Table 4-36. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species, in addition to those listed in Table 4-36, may also utilize Salmon Trout River Wetland.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Salmon Trout River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Salmon Trout River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Salmon Trout River Wetland.

Table 4-36. Fish Species Found in Salmon Trout River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	Gadidae
sea lamprey	burbot
Salmonidae	Gasterosteidae
rainbow trout	brook stickleback*
brook trout	ninespine stickleback
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	rock bass
Cyprinidae	Percidae
creek chub	yellow perch*
pearl dace	logperch*
blacknose dace	johnny darter*
longnose dace	
finescale dace	Cottidae
northern redbelly dace	mottled sculpin*
goldenshiner*	
common shiner	

[a] Moore and Braem (1965)
*fish species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

Information discussed for Huron River Point Area Wetland (LS 145) may apply to Salmon Trout River Wetland. A survey of the mammalian species of the Huron Mountains (Manville, 1948) provides information concerning the mammals which historically were present and which may still utilize this wetland (Appendix C-4).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Salmon Trout River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Salmon Trout River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Salmon Trout River Wetland is likely to be utilized by some of the fish species present in the river.

CULTURAL SETTING LS 141

Population

Salmon Trout River Wetland is located in Powell Township of Marquette County, Michigan. Marquette County is sparsely populated, having a density of 35 persons per square mile. Table 4-37 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-37. Population Data for the Vicinity of Salmon Trout River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Salmon Trout River Wetland and the surrounding area is rural open space. A light-duty road and an unimproved dirt road cross the wetland. Another unimproved dirt road lies to the west, and there is a smaller section of road on the east. Gillet Landing is located at the northern-most point of the wetland. The wetland is under private ownership and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of Salmon Trout River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Salmon Trout River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Salmon Trout River Wetland (U.S.G.S. quadrangle map, Huron Mountain, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to Salmon Trout River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Salmon Trout River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 141

The literature search identified no on-going or impending research projects pertaining to Salmon Trout River Wetland.

HURON MOUNTAINS AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 142-147

Setting

The Huron Mountains Area Wetland Complex is located along the southern shoreline of Lake Superior in Powell Township of Marquette County, Michigan. The various parts of the complex extend from the shoreline to approxiimately 200 feet inland. Pine River Wetland lies 50 feet from Huron Mountain, Michigan. This wetland complex is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Munising, Michigan, 1958; Au Train, Michigan, 1958).

Topography

The Huron Mountains Area Wetland Complex has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as non-erodible high bluff and low sand dunes. The surrounding area is composed of a narrow coastal plain with steep hills inland (U.S.G.S. quadrangle maps, Huron Mountain, Michigan, 1954; Skanee, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which the Huron Mountains Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Marquette County.

Hydrology

The Pine River flows through Pine River Wetland, and the Huron River flows through Huron River Wetland, but no streams flow through the other four wetlands of the Huron Mountains Area Wetland Complex (U.S.G.S. quadrangle maps, Huron Mountain, Michigan, 1954; Skanee, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Huron Mountain Area Wetland Complex is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean

monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Huron Mountain, Michigan; 1954; Skanee, Michigan, 1954).

BIOTIC SETTING LS 142-147

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Huron Mountains Area Wetland Complex.

Fish

Fish species found in the Little Huron River, which impinges on Little Huron River Wetland (LS 146) include ammocetes of northern brook lamprey (Ichthyomyzon fossor) or silver lamprey (Ichthyomyzon unicuspis), rainbow trout (Salmo gairdneri), brook trout (Salvelinus fontinalis), rainbow smelt (Osmerus mordax), creek chub (Semotilus atromaculatus), longnose dace (Rhinichthys cataractae), white sucker (Catostomus commersoni), and longnose sucker (Catostomus catostomus). Of these species only the white sucker is generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species found in the Pine River (Wetland #144) are listed in Table 4-38, and in the Huron River (Wetland #147), in Table 4-39.

A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these, in addition to those listed in Tables 4-38 and 4-39, may utilize the six wetlands of this complex. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Huron Mountains Area Wetland Complex.

Table 4-38. Fish Species Found in Pine River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	Gadidae
sea lamprey	burbot
Salmonidae	Gasterosteidae
rainbow trout	brook stickleback*
brook trout	ninespine stickleback
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	smallmouth bass*
	rock bass
Esocidae	Percidae
northern pike*	yellow perch*
	walleye*
Cyprinidae	logperch*
creek chub	johnny darter*
lake chub	Iowa darter*
longnose dace	
finescale dace	Cottidae
northern redbelly dace	mottled sculpin*
commin shiner	slimy sculpin
spottail shiner	
mimic shiner	
blacknose shiner	
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Table 4-39. Fish Species Found in the Huron River, Marquette County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey	
sea lamprey	Gadidae
	burbot
Salmonidae	
rainbow trout	Gasterosteidae
brook trout	brook stickleback*
	Percopsidae
Osmeridae	trout-perch
rainbow smelt	
	Centrarchidae
Umbridae	smallmouth bass*
central mudminnow*	rock bass
	Percidae
Esocidae	yellow perch*
northern pike*	logperch*
	johnny darter*
Cyprinidae	
creek chub	Cottidae
pearl dace	mottled sculpin
lake chub	
blacknose dace	
longnose dace	
northern redbelly dace	
common shiner	
spottail shiner	
blacknose shiner*	
brassy minnow	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Reptiles and Amphibians

A record of the herpetofauna of Marquette County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Huron Mountains Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Huron Mountains Area Wetland Complex.

Mammals

Twelve mammalian species have been found on Huron River Point Area Wetland (Table 4-40), and the population density has been determined for five species of small mammals in the same wetland (Table 4-41).

Table 4-40. Mammalian Species Trapped or Observed on Huron River Point Area Wetland[a]

Common name	Common name
Pygmy shrew	Gapper's red-backed mouse
masked shrew	Deer mouse
short-tailed shrew	meadow vole
snowshoe hare	black bear
least chipmunk	porcupine
red squirrel	white-tailed deer

[a] Manville, 1949

Table 4-41. Population Densities (number per hectare/acre) of Small Mammals Trapped on Huron River Point Area Wetland from 1940 to 1942[a]

Common name	Number per hectare/acre			
	1940	1941[b]	1941[c]	1942
masked shrew	0.412/0.167	0.164/0.066	1.648/0.667	-
short-tailed shrew	-	-	0.068/0.028	3.852/1.560
least chipmunk	0.480/0.194	0.144/0.058	-	-
Gapper's red-backed mouse	0.68 /0.275	1.292/0.523	1.768/0.716	0.272/0.110
deer mouse	0.34 /0.138	0.82 /0.331	1.024/0.415	0.752/0.304

[a] Manville, 1949
[b] Spring population density
[c] Summer population density

The masked shrew (Sorex cinereus) is more abundant in Huron River Point Area Wetland than in other habitat types of the Huron Mountains (Manville, 1949). Breeding begins in late April and ends in early September. Female masked shrews have three litters per season. The shore-tailed shrew (Blarina brevicauda) appears to have two distinct breeding periods on Huron River Point Area Wetland, one from May to June, and the other in September. Females have one litter during each period.

The least chipmunk (Eutamias minimus) breeds from April to July or early August on Huron River Point Area Wetland (Manville, 1949). Female least chipmunks typically have one or two litters per season. Young probably do not breed until their first winter.

Gapper's red-backed mouse (Clethrionomys gapperi) is more abundant in Huron River Point Wetland Area than in other habitat types of the Huron Mountains (Manville, 1949). Breeding begins in May and ends in September; some females breed in their first year. The deer mouse (Peromyscus maniculatus) is more common in other habitat types than in Huron River Point Area Wetland. The first spring mating occurs in early April and the last mating occurs in late August or early September. Females do not appear to breed until after their first winter, and usually produce three to four litters per season. The meadow vole (Microtus pennsylvanicus) breeds from April to late September or October (Manville, 1949).

The mammalian fauna of the five remaining wetlands of the Huron Mountains Area Wetland Complex is probably similar to that of Huron River Point Area Wetland. Other mammalian species of the Huron Mountains area (Appendix C-4) also may utilize all six wetlands.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship

to water levels of the mammals inhabiting the Huron Mountains Area Wetland Complex other than that discussed for Huron River Point Area Wetland (LS 145).

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Huron Mountains Area Wetland Complex by the literature search.

Health

Since the Huron River Point Area Wetland provides habitat for numerous species of mammals and fish, its environmental quality appears to be good.

CULTURAL SETTING LS 142-147

Population

The Huron Mountains Area Wetland Complex is located in Powell Township of Marquette County, Michigan. The county is sparsely populated, having a density of 35 persons per square mile. Table 4-42 indicates that the county and township both experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Marquette County.

Table 4-42. Population Data for the Vicinity of the Huron Mountains Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Marquette County	69,467	7.4	83,180
Powell Township	443	19.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Huron Mountains Area Wetland Complex and the surrounding area is rural open space. Unimproved dirt roads are located south of Pine River Area Wetland, west of Little Huron River Wetland, and north of Huron River Wetland and Pine River Wetland. The wetlands are under private

ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Huron Mountain, Michigan, 1954; Skanee, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Huron Mountains Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the Huron Mountains Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Huron Mountains Area Wetland Complex (U.S.G.S. quadrangle maps, Huron Mountain, Michigan; Skanee, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to the Huron Mountains Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites exist within 500 feet of the Huron Mountains Area Wetland Complex, but the Michigan Coastal Zone Inventory indicates that two archaeological sites (20-MQ-2, 20-MQ-7, Woodland Culture habitations) are present in the vicinity of Pine River Wetland (Peebles and Black, 1976). Further information regarding the field research and exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 142-147

The literature search identified no on-going or impending research projects pertaining to the Huron Mountains Area Wetland Complex.

LIGHTFOOT BAY WETLAND

PHYSIOGRAPHIC SETTING LS 148

Setting

Lightfoot Bay Wetland lies on the shoreline of Huron Bay, which is directly connected to Lake Superior, in Arvon Township of Baraga County, Michigan. There are no major population centers in the area. This wetland is a partially wooded, Palustrine System (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Topography

Lightfoot Bay Wetland has only two feet of relief and lies at an elevation of 604 feet above mean sea level (two feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low dunes. The surrounding area is composed of hills (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Lightfoot Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Baraga County.

Hydrology

No streams flow through Lightfoot Bay Wetland (U.S.G.S. quadrangle map, Skanee, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Lightfoot Bay Wetland is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

BIOTIC SETTING LS 148

Vegetation

Much of Lightfoot Bay Wetland is conifer swamp, but the northern portion is a bog. The predominant vegetation is sedge (Cyperus sp.; Carex sp.). Associates include leatherleaf (Chamaedaphne sp.), labrador tea (Ledum groenlandicum), and sweet gale (Myrica gale). A sand ridge vegetated in red pine (Pinus resinosa), white pine (P. strobus), and jack pine (P. banksiana) borders the wetland to the north (Riha, 1977).

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

According to Taylor (1954), creek chub (Semotilus atromaculatus) and common shiner (Notropis cornutus) were collected in Huron Bay at Skanee in 1920. Neither of these species is generally associated with wetland habitats. A list of fish species associated with coastal wetlands of Michigan appears in Appendix A-1, and some of these species may utilize Lightfoot Bay Wetland. However, a search of the literature provided no site-specific information pertaining to other major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Lightfoot Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Baraga County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lightfoot Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Lightfoot Bay Wetland.

Mammals

No sign of muskrat (Ondatra zibethicus) activity has been noted on Lightfoot Bay Wetland (Riha, 1977). This wetland is considered low quality habitat for muskrat.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Lightfoot Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Lightfoot Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 148

Population

Lightfoot Bay Wetland is located in Arvon Township of Baraga County, Michigan. Baraga County is sparsely populated, having a density of 9 persons per square mile. Table 4-43 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the rate of growth in Arvon Township was slower. Projections for 1990 indicate that Baraga County is expected to undergo rapid population growth in the future.

Table 4-43. Population Data for the Vicinity of Lightfoot Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Baraga County	8,060	3.5	10,081
Arvon Township	326	2.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Lightfoot Bay Wetland and the surrounding area is rural open space. Unimproved dirt roads are located east of both sections of the wetland; these roads cross the wetland in four places. Several buildings are located in or adjacent to the southern section. The wetland is under private ownership and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of Lightfoot Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Lightfoot Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Lightfoot Bay Wetland (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to Lightfoot Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Lightfoot Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to Lightfoot Bay Wetland.

REEDS POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 149-150

Setting

The Reeds Point Area Wetland Complex is located on the Abbaye Peninsula along the shore of Huron Bay, which is directly connected to Lake Superior, in Arvon Township of Baraga County, Michigan. Reeds Point Wetland lies on the shoreline, and Reeds Point Area Wetland lies approximately 150 feet from the shoreline of Huron Bay. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Topography

The Reeds Point Area Wetland Complex has 48 feet of relief and a maximum elevation of 650 feet above mean sea level (48 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff with rock ledges. The surrounding area is hilly (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which the Reeds Point Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Baraga County.

Hydrology

No streams flow through the Reeds Point Area Wetland Complex (U.S.G.S. quadrangle map, Skanee, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Reeds Point Area Wetland Complex is located in Big Bay, Michigan. The average annual temperature is 43.5°F, based on the normal period from 1941-1970. The mean monthly low for January is 21.7°F and the mean monthly high for July is 68.3°F. The average annual precipitation is 32.04 inches, with a mean monthly precipitation of 3.06 inches in January and 1.84 inches in July. The growing season is approximately five and one-fourth months long, with the last killing

frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

BIOTIC SETTING LS 149-150

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Reeds Point Area Wetland Complex.

Fish

According to Taylor (1954), creek chub (Semotilus atromaculatus) and common shiner (Notropis cornutus) were collected in Huron Bay at Skanee in 1920. Neither of these species is generally associated with wetland habitats. A list of fish species associated with coastal wetlands of Michigan appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Reeds Point Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Reeds Point Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Baraga County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Reeds Point Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Reeds Point Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Reeds Point Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Reeds Point Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 149-150

Population

The Reeds Point Area Wetland Complex is located in Arvon Township of Baraga County, Michigan. The county is sparsely populated, having a density of 9 persons per square mile. Table 4-44 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in Arvon Township was slower. Projections for 1990 indicate that Baraga County is expected to undergo rapid population growth in the future.

Table 4-44. Population Data for the Vicinity of the Reeds Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Baraga County	8,060	3.5	10,081
Arvon Township	326	2.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Reeds Point Area Wetland Complex and the surrounding area is rural open space. A trail is located west of Reeds Point Wetland and an

unimproved dirt road runs east of Reeds Point Area Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Recreation

A portion of the Reeds Point Area Wetland Complex is in Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the Reeds Point Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Reeds Point Area Wetland Complex (U.S.G.S. quadrangle map, Skanee, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to the Reeds Point Area Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Reeds Point Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 149-150

The literature search identified no on-going or impending research projects pertaining to the Reeds Point Area Wetland Complex.

Table 4-45. Data Gaps-Lake Section 4

Data Gap*		Wetland Number	094	095	096	097	098	099	100	101	102	103	104-111	112-114	115	116	117	118-120	121-127	128	129	130	131
Physiographic Setting		Setting																					
		Topography																					
		Surficial Geology																					
		Soils																			*	*	*
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Climate																					
		Special Features																					
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Major Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species	*	*		*	*		*	*	*	*		*	*	*				*	*	*	*
		Species Composition	*	*		*	*		*	*	*	*		*	*	*				*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species																					
		Health	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cultural Setting		Population																					
		Land Use and Ownership																					
		Recreation																					
		Mineral, Energy, Forest Resource																					
		Public Utilities/Facilities																					
		Point Pollution Sources																					
		Non-Point Pollution Sources																					
		Historic Features																					
		Archeologic Features																					

Table 4-45. Data Gaps-Lake Section 4 (concluded)

Data Gap*		Wetland Number*	132	133–136	137	138–140	141	142–147	148	149–150
Physiographic Setting		Setting								
		Topography								
		Surficial Geology								
		Soils								
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*
		Climate								
		Special Features								
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*		*
		Major Species Composition	*	*	*	*	*	*		*
		Density/Productivity	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Fish	Major species	*	*		*				
		Species Composition	*	*		*			*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*			*
		Seasonal Distribution	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*		*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*		*	*
		Food Sources	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*
		Endangered Species								
		Health	*	*	*	*	*		*	*
Cultural Setting		Population								
		Land Use and Ownership								
		Recreation								
		Mineral, Energy, Forest Resource								
		Public Utilities/Facilities								
		Point Pollution Sources								
		Non-Point Pollution Sources								
		Historic Features								
		Archeologic Features								

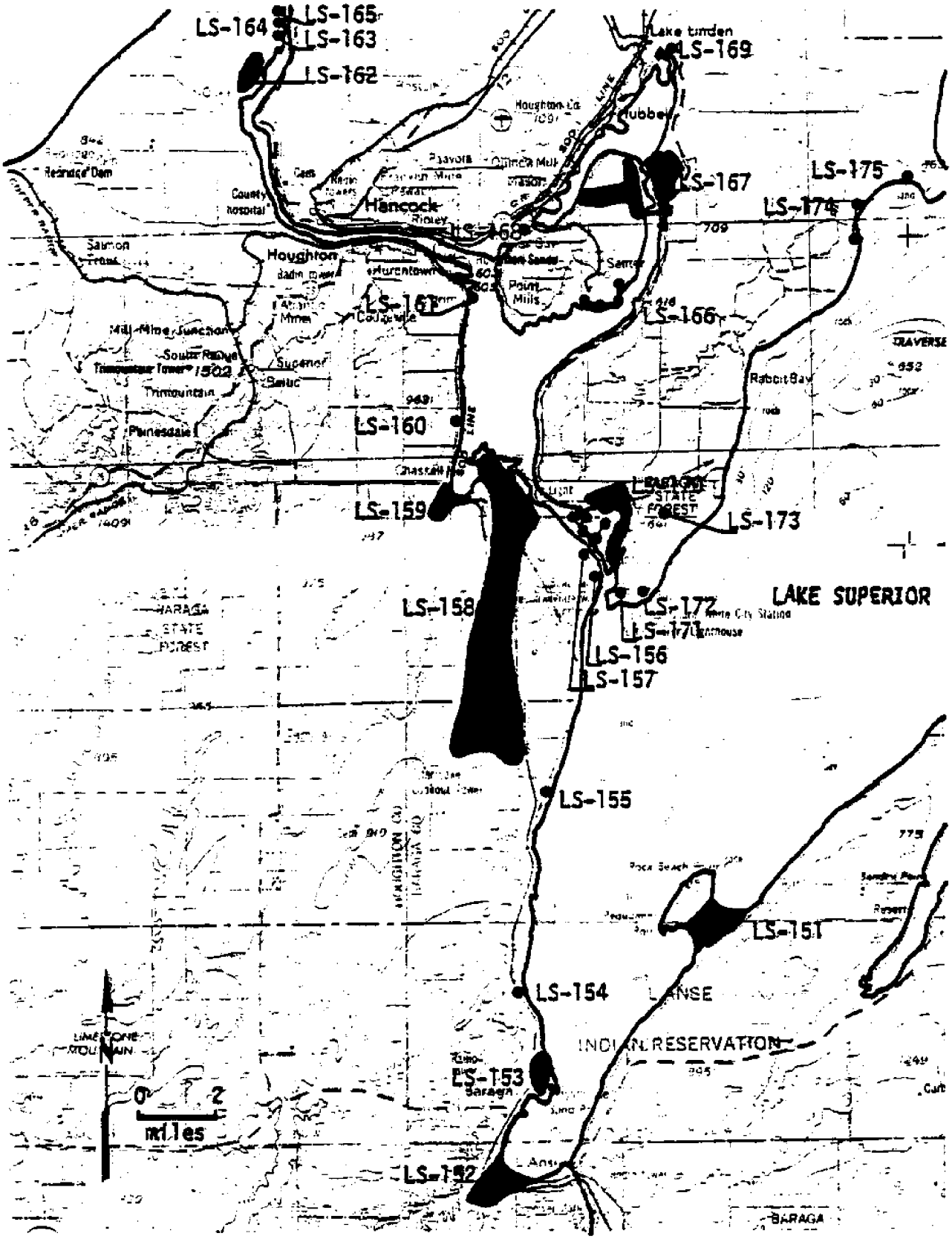
LAKE SECTION 5

INTRODUCTION

Lake Section 5 extends from Point Abbaye to Keweenaw Point along shoreline portions of Baraga, Keweenaw, and Houghton Counties, Michigan. The region features predominantly hilly topography in the vicinity of the wetlands. The predominant shore type along this 90 mile stretch of shoreline is low sand dunes.

Figures 5-1 and 5-2 show the approximate location of the 32 coastal wetlands of Lake Section 5. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 5-1. The wetlands of Lake Section 5 are located at elevations between 605 and 660 feet above sea level, 3 to 58 feet above the mean elevation of Lake Superior. The Section 5 wetlands are all classified as Palusterine and Riverine.

Available information related to physiographic and cultural features of these 32 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.


LS-164
LS-165
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LS-153
LS-152
LAKE SUPERIOR
Houghton
Hancock
Lake Linden
Hubbell
Point Mills
Rabbit Bay
Painesdale
Mohawk
Copper Harbor
Eagle River
Eagle Harbor
Fort Wilkins
Keweenaw Point
Lighthouse Point
Manganese Point
Gratiot River
Copper Harbor Lighthouse
Eagle River Lighthouse
Fort Wilkins Lighthouse
Keweenaw Point Lighthouse
Manganese Point Lighthouse
Gratiot River Lighthouse

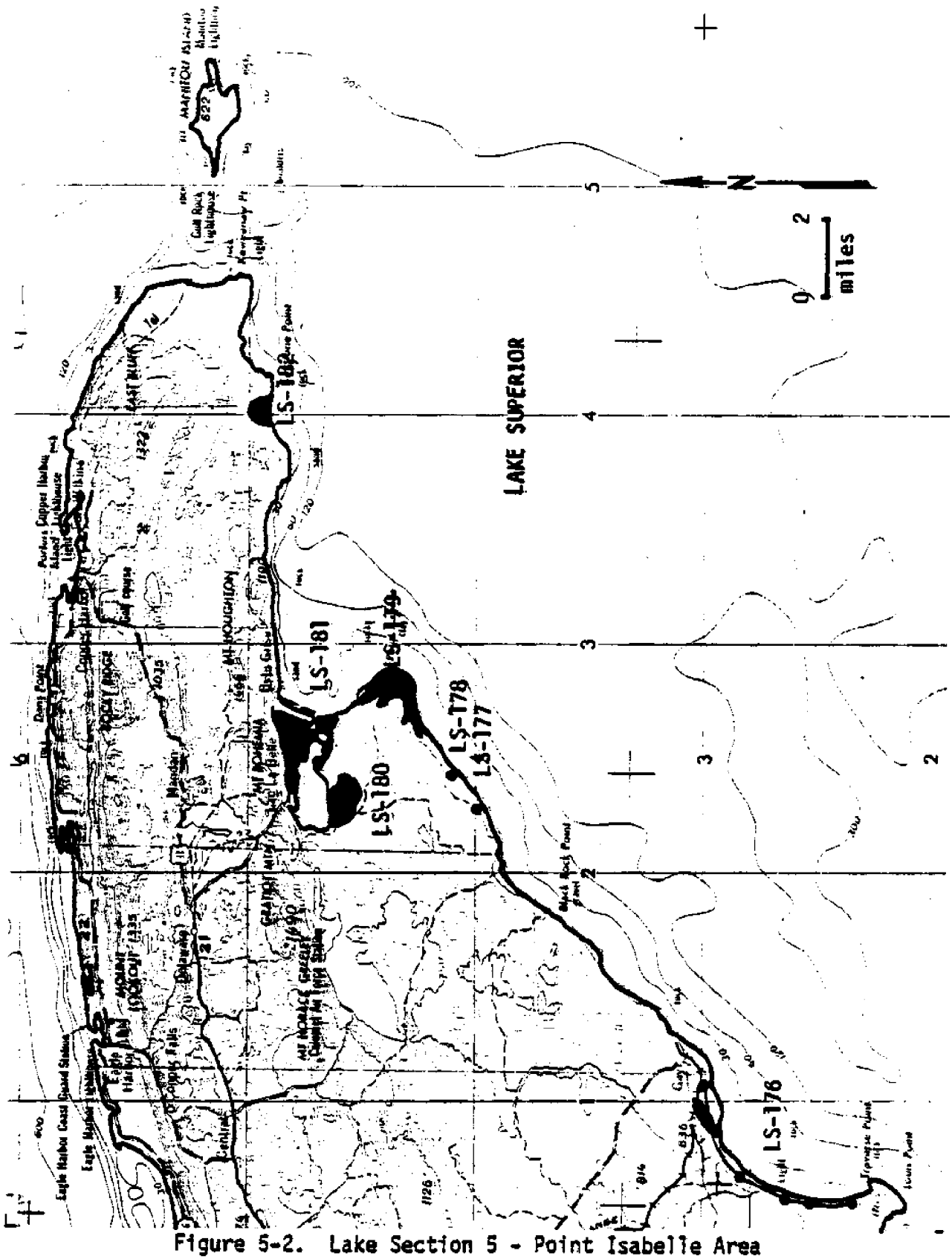


Figure 5-2. Lake Section 5 - Point Isabelle Area

Table 5-1. Location, Acreage, and Classification of Wetlands in Lake Section 5

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	KEWEENAW BAY WETLAND COMPLEX				
LS 151	Pequaming Wetland	46°51'15"	88°22'25"	640	P
LS 152	L'Anse Bay Wetland	map not available			
LS 153	Sand Point Wetland	46°47'37"	88°28'15"	405	P
LS 154	Assinins Area Wetland	46°49'10"	88°29'01"	105	P
LS 155	Arnheim Area Wetland	46°55'00"	88°27'40"	40	P
	PORTAGE RIVER WETLAND COMPLEX				
LS 156	Portage River Wetland #1	46°59'31"	88°26'15"	10	P
LS 157	Portage River Wetland #2	47°00'03"	88°24'30"	10	P
LS 158	Sturgeon River-Snake River Delta Wetland	47°00'06"	88°29'39"	8155	P-R
LS 159	Pike River Wetland	47°01'06"	88°31'41"	90	P-R
LS 160	Denton Creek Wetland	47°03'47"	88°31'14"	10	P
LS 161	Pilgrim River Wetland	47°06'12"	88°30'47"	35	P
LS 162	Oskar Area Wetland	47°11'01"	88°38'12"	270	P
	PORTAGE LAKE SHIP CANAL WETLAND COMPLEX				
LS 163	Portage Lake Ship Canal Wetland #1	47°13'01"	88°37'18"	11	P
LS 164	Portage Lake Ship Canal Wetland #2	47°13'14"	88°37'27"	7	P
LS 165	Portage Lake Ship Canal Wetland #3	47°13'29"	88°37'44"	5	P
LS 166	Torch Bay Wetland	47°05'46"	88°25'56"	20	P
LS 167	Torch Lake Wetland	47°08'40"	88°25'08"	1180	P
LS 168	Dollar Bay Wetland	47°07'36"	88°28'48"	202	P
LS 169	Rock River Wetland	47°11'54"	88°23'44"	20	P-R
LS 170	Silver Creek Wetland	map not available			
	WHITE CITY AREA WETLAND COMPLEX				
LS 171	White City Area Wetland #1	46°58'40"	88°26'00"	45	P
LS 172	White City Area Wetland #2	46°59'31"	88°25'00"	25	P
LS 173	LeChance Creek Wetland	47°01'52"	88°22'57"	475	P
LS 174	Mud Lake Creek Wetland	47°08'20"	88°16'57"	32	P
LS 175	Little Traverse Bay Wetland	47°08'47"	88°15'44"	25	P
LS 176	Grand Traverse Bay Wetland	47°10'54"	88°13'27"	685	P
	OLIVER BAY WETLAND COMPLEX				
LS 177	Oliver Bay Wetland #1	47°19'03"	87°59'56"	20	P
LS 178	Oliver Bay Wetland #2	47°19'37"	87°58'48"	10	P
LS 179	Point Isabelle Wetland	47°20'42"	87°57'16"	445	P
	LAC LABELLE WETLAND COMPLEX				
LS 180	Lac LaBelle Area Wetland	47°21'41"	88°00'28"	835	P
LS 181	Lac LaBelle Wetland	47°22'40"	87°58'44"	1275	P
LS 182	Big Bay Wetland	47°24'02"	87°47'08"	325	P

[a] P=palustrine

KEWEENAW BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING — LS 151-155

Setting

The Keweenaw Bay Wetland Complex is located along Keweenaw Bay, which is directly connected to Lake Superior, in L'Anse and Baraga Townships of Baraga County, Michigan. The various parts of the complex extend from the Keweenaw Bay shoreline to approximately 0.5 mile inland. The largest municipalities in the area are Baraga and L'Anse, Michigan. This complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Pelkie, Michigan, 1954; Sidnaw, Michigan, 1954).

Topography

The Keweenaw Bay Wetland Complex has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is primarily hilly (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Pelkie, Michigan, 1954; Sidnaw, Michigan, 1954).

Surficial Geology

The surfical geology of the area in which Keweenaw Bay Wetland Complex lies is characterized by lake bed clay and sand, and ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Baraga County.

Hydrology

No streams flow through the Keweenaw Bay Wetland Complex (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Pelkie, Michigan, 1954; Sidnaw, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Keweenaw Bay Wetland Complex is located in Baraga, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.3°F and the mean monthly high for July is 69.1°F. The average annual precipitation is 32.24 inches, with a mean monthly precipitation of 3.67

inches in January and 0.90 inches in July. The growing season is approximately three and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 16 and the first killing frost on September 9 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Pelkie, Michigan, 1954; Sidnaw, Michigan, 1954).

BIOTIC SETTING LS 151-155

Vegetation

Riha (1977) provides brief characterizations of the vegetation occurring at Pequaming Wetland, L'Anse Bay Wetland and Sand Point Wetland.

Pequaming Wetland supports dense stands of leatherleaf (Chamaedaphne sp.), and sweet gale (Myrica gale) as well as open sedge meadows. Dr. Robert T. Brown of Michigan Technological University states that many rare orchids occur in this shrub bog. Lowland spruce (Picea sp.) forest borders the wetland to the southeast, and a conifer swamp lies on the northwest.

L'Anse Bay Wetland is predominantly a conifer swamp. Along the northern border of the wetland bullhead-lily (Nuphar sp.) and water-lily (Nymphaea sp.) predominate, with leatherleaf and blueberry (Vaccinium sp.) occurring as associates in drier areas. Very little submersed vegetation occures except for small colonies of water-milfoil (Myriophyllum sp.).

Sand Point Wetland supports lush growths of marsh cinquefoil (Potentilla palustris), bulrush (Scirpus sp.), cattail (Typha sp.), bullhead-lily, and arrowhead (Sagittaria sp.). Water-milfoil and pondweed (Potamogeton sp.) thrive in open water north of the access road.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of the Keweenaw Bay Wetland Complex, nor to major species composition and distribution in Assinins Area Wetland and Arnheim Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Keweenaw Bay Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Keweenaw Bay Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Baraga County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the five wetlands comprising the Keweenaw Bay Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Keweenaw Bay Wetland Complex.

Mammals

Pequaming Wetland, L'Anse Bay Wetland, and Sand Point Wetland are used to only a small extent by muskrat (Ondatra zibethicus) (Riha, 1977), and these three wetlands are considered unsuitable habitat for muskrat.

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Keweenaw Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Keweenaw Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

Population

The Keweenaw Bay Wetland Complex is located in L'Anse and Baraga Townships of Baraga County, Michigan. Baraga County is sparsely populated, having a density of 9 persons per square mile. Table 5-2 indicates that the county experienced a moderate rate of population growth between 1970 and 1975, but the growth rate in L'Anse Township was slower and that in Baraga Township was stable. Projections for 1990 indicate that Baraga County is expected to undergo rapid population growth in the future.

Table 5-2. Population Data for the Vicinity of the Keweenaw Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Baraga County	8,060	3.5	10,081
L'Anse Township	4,185	2.4	--
Baraga Township	1,109	-0.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Keweenaw Bay Wetland Complex is rural open space, but there is some residential development in the surrounding area. A light-duty road is adjacent to the northwestern and southwestern boundaries of Pequaming Wetland, and an unimproved dirt road borders the northeastern and part of the southeastern boundaries of that wetland. L'Anse Bay Wetland is characterized by a light-duty road adjacent to the northwestern boundary, a heavy-duty highway (U.S. Route 41) adjacent to the northeastern boundary, unimproved dirt roads along to the southeastern boundary, and a railroad track and an old railroad grade crossing the wetland. U.S. Route 41 and the railroad track pass between the two sections of Sand Point Wetland. The latter wetland also has unimproved dirt roads adjacent to it and crossing its southern part, several buildings and a church on the southern border, and a light and a building on the southeastern border. The railroad track, U.S. Route 41, and a light-duty road pass adjacent to the eastern boundary of Assinins Area Wetland; two buildings and two churches are also located in this area. U.S. Route 41 passes west of Arnheim Area Wetland, which is crossed by a light-duty road; there are an unimproved dirt road and several buildings adjacent to the eastern boundary of this wetland. The wetlands are under mixed private, state, and federal ownership, but their

location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Sidnaw, Michigan, 1954; Pelkie, Michigan, 1954; Keweenaw Bay, Michigan, 1954).

Recreation

L'Anse Bay Wetland is in the Baraga State Forest, and Second Sand Beach Park is adjacent to Pequaming Wetland. However, no known recreational facilities exist in either Baraga State Forest or Second Sand Beach Park.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the Keweenaw Bay Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Keweenaw Bay Wetland Complex (U.S.G.S. quadrangle maps, Sidnaw, Michigan, 1954; Pelkie, Michigan, 1954; Keweenaw Bay, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to the Keweenaw Bay Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Keweenaw Bay Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 151-155

The literature search identified no on-going or impending research projects pertaining to the Keweenaw Bay Wetland Complex.

PORTAGE RIVER WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 156-157

Setting

The Portage River Wetland Complex lies on the shoreline of the Portage River, which is located in Chassell and Torch Lake Townships of Houghton County, Michigan, approximately 200 feet from the city of Portage Entry. This wetland complex is a Palustrine System and occupies non-wooded sites (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Topography

The Portage River Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The surrounding area is hilly (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which the Portage River Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

The Portage River Wetland Complex is adjacent to the Portage River, but no streams run through the wetlands (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands. However, additional information regarding the Portage River may be found in U.S. Army Corps of Engineers (1976).

Climate

The closest weather station providing climatic data for the Portage River Wetland Complex is located in Baraga, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.3°F and the mean monthly high for July is 69.1°F. The average annual precipitation is 32.24 inches, with a mean monthly precipitation of 3.67 inches in January and 0.90 inches in July. The growing season is approximately

three and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 16 and the first killing frost on September 9 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

BIOTIC SETTING LS 156-157

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Portage River Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in the Portage River Wetland Complex are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Portage River Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Portage River Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Portage River Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus) have been observed on both wetlands of the Portage River Wetland Complex (Riha, 1977).

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Portage River Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING

LS 156-157

Population

The Portage River Wetland Complex is located in Torch Lake and Chassell Townships of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-3 indicates that the county and both townships experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-3. Population Data for the Vicinity of the Portage River Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--
Chassell Township	1,659	17.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Portage River Wetland Complex and the surrounding area is rural open space. A light-duty road and several buildings are located west of Portage River Wetland #1. There is a light just off the northeastern border of Portage River Wetland #2. The wetlands are under private ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Portage River Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Portage River Wetland Complex include sand, stone, gravel, and copper (Great Lakes Basin Commission, 1974).

The area surrounding the wetlands is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Portage River Wetland Complex (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Portage River Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Portage River Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 156-157

The literature search identified no on-going or impending research projects pertaining to the Portage River Wetland Complex.

STURGEON RIVER-SNAKE RIVER DELTA WETLAND

PHYSIOGRAPHIC SETTING LS 158

Setting

Sturgeon River-Snake River Delta Wetland lies on the shoreline of Portage Lake, in Chassell Township of Houghton County and Baraga Township of Baraga County, Michigan, approximately 0.5 mile from the city of Chassell. This wetland is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Chassell, Michigan, 1975; Pelkie, Michigan, 1954; Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Topography

Sturgeon River-Snake River Delta Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The surrounding area varies from flat delta to very hilly terrain (U.S.G.S. quadrangle maps, Pelkie, Michigan, 1954; Chassell, Michigan, 1975; Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Sturgeon River-Snake River Delta Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton or Baraga Counties.

Hydrology

The Snake River, the Sturgeon River, five unnamed streams, and one intermittent stream flow through Sturgeon River-Snake River Delta Wetland (U.S.G.S. quadrangle maps, Chassell, Michigan, 1975; Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954; Pelkie, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Snake River may be found in U.S. Geological Survey (1977).

Climate

The closest weather station providing climatic data for Sturgeon River-Snake River Delta Wetland is located in Baraga, Michigan. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.3°F and the mean monthly high for July is 69.1°F.

The average annual precipitation is 32.24 inches, with a mean monthly precipitation of 3.67 inches in January and 0.90 inches in July. The growing season is approximately three and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 16 and the first killing frost on September 9 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Chassell, Michigan, 1975; Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975; Pelkie, Michigan, 1954).

BIOTIC SETTING LS 158

Vegetation

According to Riha (1977), the marsh area of Sturgeon River-Snake River Delta Wetland is a floating mat composed of sedges (Cyperus sp., Carex sp.) and cattail (Typha sp.). Large stands of bulrush (Scirpus sp.) occur offshore. Channels support bullhead-lily (Nuphar sp.), waterlily (Nymphaea sp.), and floating-leaved pondweed (Potamogeton sp.). Submersed vegetation occurring offshore consists largely of water-milfoil (Myriophyllum sp.) with some wild celery (Vallisneria americana) and pondweed. Adjacent lands support lowland shrubs, hardwoods, and spruce (Picea sp.).

The literature search yielded no site-specific information pertaining to density and productivity, or relationship to water levels of the vegetation of Sturgeon River-Snake River Delta Wetland.

Fish

Fish species found in the Sturgeon River are listed in Table 5-4. A list of fishes known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these species may also utilize Sturgeon River-Snake River Delta Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sturgeon River-Snake River Delta Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Baraga and Houghton Counties, as according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life

Table 5-4. Fish Species Found in the Sturgeon River

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker*
ammocetes (northern brook or silver lamprey)	silver redhorse*
sea lamprey	shorthead redhorse*
Acipenseridae	Ictaluridae
lake sturgeon	black bullhead*
	brown bullhead*
Salmonidae	Gadidae
brown trout	burbot
rainbow trout	
brook trout	Gasterosteidae
	brook stickleback*
Osmeridae	
rainbow smelt	Percopsidae
	trout-perch
Umbridae	
central mudminnow*	Centrarchidae
	smallmouth bass*
Esocidae	largemouth bass*
northern pike*	pumpkinseed*
	bluegill*
Cyprinidae	rock bass
carp*	black crappie*
creek chub	
lake chub	Percidae
blacknose dace	yellow perch*
longnose dace	walleye*
northern redbelly dace	logperch*
goldenshiner	johnny darter*
emerald shiner	Iowa darter*
common shiner	
spottail shiner	
bigmouth shiner	
sand shiner	
blacknose shiner*	
fathead minnow*	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sturgeon River-Snake River Delta Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sturgeon River-Snake River Delta Wetland.

Mammals

Muskrat (Ondatra zibethicus) heavily utilize Sturgeon River-Snake River Delta Wetland. Black bear (Visus americanus), raccoon (Procyon lotor), and white-tailed deer (Odocoileus virginianus) are also present. The wetland is considered exceptional muskrat habitat (Jaworski and Raphael, 1978), and muskrat trapping is an important activity there.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sturgeon River-Snake River Delta Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Sturgeon River-Snake River Delta Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the wetland provides habitat for a variety of fish species. The Chassell Township Waste Water Treatment Plant discharges into the Sturgeon River, but the effect of this discharge is not known.

CULTURAL SETTING LS 158

Population

Sturgeon River-Snake River Delta Wetland is located in Baraga Township of Baraga County and in Chassell Township of Houghton County, Michigan. Table 5-5 indicates that Baraga County experienced a moderate rate of population growth between 1970 and 1975, and the population of Baraga Township remained stable during the same time period. Both Houghton County and Chassell Township underwent rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected in both Houghton and Baraga Counties.

Table 5-5. Population Data for the Vicinity of Sturgeon River-Snake River Delta Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Baraga County	8,060	3.5	10,081
Baraga Township	1,109	-0.6	--
Houghton County	36,960	6.7	43,324
Chassell Township	1,659	17.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Sturgeon River-Snake River Wetland and the surrounding area is rural open space. U.S. Route 41 is a major highway running through the wetland; in addition, a railroad track crosses the entire wetland. Unimproved dirt roads are adjacent to several sections of the northwestern, eastern, and southwestern boundaries; light-duty roads are also located in the eastern areas and along the southern border. Two lights are situated on the section of this wetland located on an island in the Portage River. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975; Pelkie, Michigan, 1954; Chassell, Michigan, 1975).

Recreation

Sturgeon River-Snake River Delta Wetland is located in Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Sturgeon-River-Snake River Delta Wetland include sand, stone, gravel, and copper (Great Lakes Basin Commission, 1974).

Sturgeon River-Snake River Delta Wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

The Chassell Township Waste Water Treatment Plant is located east of Sturgeon River-Snake River Delta Wetland (Michigan Department of Natural Resources, Permit Coordination and Enforcement Section, 1978; U.S.G.S. quadrangle maps, Pelkie, Michigan, 1954; Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975; Chassell, Michigan, 1975).

Pollution Sources

The Chassell Township Waste Water Treatment Plant is located west of Sturgeon River-Snake River Delta Wetland and discharges into the Sturgeon River. The nature of this discharge, as well as its extent and effect on the wetland, is not known. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sturgeon River-Snake River Delta Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 158

The literature search identified no on-going or impending research projects pertaining to Sturgeon River-Snake River Delta Wetland.

PIKE RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 159

Setting

Pike River Wetland lies on the shoreline of Pike Bay, which is directly connected to Portage Lake. The wetland is located in Chassell Township of Houghton County, Michigan, at the city of Chassell. This wetland is a Palustrine-Riverine System and occupies a partially wooded site (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Topography

Pike River Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Portage Lake. The surrounding area is composed of flat delta to the east and hills to the west (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Pike River Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

The Pike River flows through Pike River Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Pike River Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

BIOTIC SETTING LS 159

Vegetation

According to Riha (1977), small colonies of cattail (Typha sp.) and waterlily (Nymphaea sp.) occur along the shoreline of the Pike River. Drier sites throughout the wetland support leatherleaf (Chamaedaphne sp.), sedges (Carex spp., Cyperus spp.) and sweet gale (Myrica gale). The last 50 meters of the Pike River at its mouth support a lush growth of water-milfoil (Myriophyllum sp.), but in the upstream reaches submersed vegetation is sparse. Adjacent land is largely agricultural.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of Pike River Wetland.

Fish

Fish species found in the Pike River (Moore and Braem, 1965) include silver lamprey (Ichthyomyzon unicuspis), northern brook lamprey (Ichthyomyzon fossor), ammocetes of one or both of the preceding two species, brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and brook trout (Salvelinus fontinalis). None of these species is generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Pike River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Pike River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pike River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Pike River Wetland.

Mammals

Muskrat (Ondatra zibethicus) are found on Pike River Wetland (Riha, 1977), and dens in the riverbank are their most common dwellings. Jaworski and Raphael (1978) consider Pike River Wetland exceptional habitat for muskrat, and trapping is heavy (Riha, 1977).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the mammals inhabiting Pike River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Pike River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 159

Population

Pike River Wetland is located in Chassell Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-6 indicates that the county and township both underwent a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-6. Population Data for the Vicinity of Pike River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Chassell Township	1,659	17.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Pike River Wetland and the surrounding area is rural open space. U.S. Route 41 and a light-duty road both cross the wetland, and a light-duty road is adjacent to the northwestern boundary. There are several buildings along the southeastern and northwestern boundaries of the wetland, and some buildings are located within the northwestern part. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pike River Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pike River Wetland include stone, sand, gravel, and copper (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are partially wooded but do not represent a significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Pike River Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Pike River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Pike River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 159

The literature search identified no on-going or impending research projects pertaining to Pike River Wetland.

DENTON CREEK WETLAND

PHYSIOGRAPHIC SETTING

LS 160

Setting

Denton Creek Wetland lies approximately 400 feet from the shoreline of Portage Lake in Portage Township of Houghton County, Michigan, 1.9 miles from the town of Chassell. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Topography

Denton Creek Wetland has 20 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Portage Lake). The surrounding area is hilly (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Denton Creek Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Denton Creek Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Denton Creek Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

BIOTIC SETTING LS 160

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Denton Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Denton Creek Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Denton Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Denton Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Denton Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, food

sources, or relationship to water levels of the mammals inhabiting Denton Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Denton Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 160

Population

Denton Creek Wetland is located in Portage Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-7 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but growth in Portage Township was moderate during the same time period. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-7. Population Data for the Vicinity of Denton Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Portage Township	2,699	4.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Denton Creek Wetland and the surrounding area is rural open space. A heavy-duty road (U.S. Route 41) and several buildings are located adjacent to the eastern boundary of Denton Creek Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Denton Creek Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Denton Creek Wetland include stone, sand, gravel, and copper (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are partially wooded but do not represent a significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Denton Creek Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Denton Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Denton Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 160

The literature search identified no on-going or impending research projects pertaining to Denton Creek Wetland.

PILGRIM RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 161

Setting

Pilgrim River Wetland is located on the shoreline of Portage Lake in Portage Township of Houghton County, Michigan, approximately 1.8 miles from Houghton. This wetland is a Palustrine System and occupies a partially wooded site (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Topography

Pilgrim River Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The surrounding area is flat artificial fill, but there are interior hills (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Pilgrim River Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Pilgrim River Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Pilgrim River Wetland is located in Houghton, Michigan. The average annual temperature is 41.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7^{o}F and the mean monthly high for July is 69.2^{o}F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28^{o}F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

BIOTIC SETTING LS 161

Vegetation

Riha (1977) provides a brief characterization of the vegetation occurring in Pilgrim River Wetland. While small patches of leatherleaf (Chamaedaphne sp.) and cattail (Typha sp.) occur along the edges of the bay, little other emergent vegetation is present. However, the bay is rich in water milfoil (Myriophyllum sp.) with patches of pondweed (Potamogeton sp.) occurring in water over 30 inches in depth. Portions of the shoreline and adjacent land are dominated by leatherleaf, willow (Salix sp.) and tag alder (Betula pumila).

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Fishes found in the Pilgrim River are listed in Table 5-8. A list of species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnnesota, which may also occur in Pilgrim River Wetland, appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Pilgrim River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pilgrim River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

Table 5-8. Fish Species Found in Pilgrim River, Houghton County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Gadidae
ammocetes of northern brook or silver lamprey	burbot
sea lamprey	Percopsidae
Salmonidae	trout-perch
brown trout	Centrarchidae
rainbow trout	smallmouth bass*
brook trout	bluegill*
Osmeridae	Percidae
rainbow smelt	yellow perch
Esocidae	logperch
northern pike*	johnny darter
Cyprinidae	Cottidae
creek chub	mottled sculpin
longnose dace	
spottail shiner	
Catostomidae	
white sucker*	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

health, life histories, relationship to water levels, or major food sources of the birds utilizing Pilgrim River Wetland.

Mammals

Muskrat (Ondatra zibethicus) have been observed on Pilgrim River Wetland (Riha, 1977).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Pilgrim River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the wetland is likely to provide habitat for several of the fish species present in the Pilgrim River.

CULTURAL SETTING LS 161

Population

Pilgrim River Wetland is located in Portage Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-9 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but growth in Portage Township was moderate during the same time period. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-9. Population Data for the Vicinity of Pilgrim River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Portage Township	2,699	4.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Pilgrim River Wetland and the surrounding area is rural open space. A heavy-duty road (U.S. Route 41) is adjacent to the western boundary of Pilgrim River Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pilgrim River Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pilgrim River Wetland include stone, sand, gravel, and copper (Great Lakes Basin Commission, 1974).

The area surrounding the wetland is partially wooded but represents no significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Pilgrim River Wetland (U.S.G.S. quadrangle map, Chassell, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Pilgrim River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Pilgrim River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 161

The literature search identified no on-going or impending research projects pertaining to Pilgrim River Wetland.

OSKAR AREA WETLAND

PHYSIOGRAPHIC SETTING

LS 162

Setting

Oskar Area Wetland is located approximately 0.1 mile from the shoreline of Portage Lake, in Stanton Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Oskar, Michigan, 1975).

Topography

Oskar Area Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Portage Lake). The surrounding area is hilly (U.S.G.S. quadrangle map, Oskar, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Oskar Area Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

Two unnamed streams flow through Oskar Area Wetland (U.S.G.S. quadrangle map, Oskar, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Oskar Area Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Oskar, Michigan, 1975).

BIOTIC SETTING LS 162

Vegetation

According to Riha (1977), two bulrush (Scirpus sp.) communities occur at the mouth of the creek, and are the only emergent vegetation observed at Oskar Area Wetland. Water milfoil (Myriophyllum sp.) and pondweed (Potamogeton sp.) occur in the bay, but owing to dredging, the stream is devoid of vegetation. Most of this wetland is forested by a mixed conifer swamp community.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Oskar Area Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Oskar Area Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Oskar Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Oskar Area Wetland.

Mammals

No evidence of muskrat (Ondatra zibethicus) has been noted on Oskar Area Wetland (Riha, 1977).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the mammals inhabiting Oskar Area Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Oskar Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 162

Population

Oskar Area Wetland is located in Stanton Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-10 indicates that both the county and township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-10. Population Data for the Vicinity of Oskar Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Stanton Township	1,168	20.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Oskar Area Wetland and the surrounding area is rural open space. Several branches of a light-duty road cross Oskar Area Wetland. A medium-duty highway is adjacent to the southwestern boundary, a light-duty highway lies along the northern boundary, and an unimporved dirt road is located along the lower eastern boundary. There are several buildings in the southeast. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Oskar, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Oskar Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Oskar Area Wetland include stone, sand, gravel, and copper (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are partially wooded but represent no significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Oskar Area Wetland (U.S.G.S. quadrangle map, Oskar, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Oskar Area Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Oskar Area Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 162

The literature search identified no on-going or impending research projects pertaining to Oskar Area Wetland.

PORTAGE LAKE SHIP CANAL WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 163-165

Setting

The Portage Lake Ship Canal Wetland Complex is located in the coastal zone of Portage Lake, in Stanton Township of Houghton County, Michigan. Portage Lake Ship Canal Wetlands #1 and #2 lie on the shoreline, and Portage Lake Ship Canal Wetland #3 lies approximately 0.1 mile from the shoreline of Portage Lake. The complex is approximately 5.5 miles from Hancock, Michigan, and is a Palustrine System which occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Hancock, Michigan, 1975, Oskar, Michigan, 1975).

Topography

The Portage Lake Ship Canal Wetland Complex has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The surrounding area is composed of low hills (U.S.G.S. quadrangle maps, Hancock, Michigan, 1975; Oskar, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Portage Lake Ship Canal Wetland Complex lies is characterized by ground moraines. Rock occurring at or near the surface is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through the Portage Lake Ship Canal Wetland Complex (U.S.G.S. quadrangle maps, Oskar, Michigan, 1975; Hancock, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Portage Lake Ship Canal Wetland Complex is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing

frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Oskar, Michigan, 1975; Hancock, Michigan, 1975).

BIOTIC SETTING LS 163-165

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Portage Lake Ship Canal Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in the three wetlands comprising the Portage Lake Ship Canal Wetland Complex, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Portage Lake Ship Canal Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Portage Lake Ship Canal Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Portage Lake Ship Canal Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands comprising the Portage Lake Ship Canal Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Portage Portage Lake Ship Canal Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 163-165

Population

The Portage Lake Ship Canal Wetland Complex is located in Stanton Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-11 indicates that both the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-11. Population Data for the Vicinity of the Portage Lake Ship Canal Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Stanton Township	1,168	20.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Portage Lake Ship Canal Wetland Complex and the surrounding area is rural open space. An unimproved dirt road crosses Portage Lake Ship Canal Wetland #3, a light-duty road is adjacent to its eastern boundary, and another unimproved dirt road runs along the northern boundary. There are two buildings also to the east of the same wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Hancock, Michigan, 1975; Oskar, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Portage Lake Ship Canal Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Portage Lake Ship Canal Wetland Complex include sand, stone, gravel, and copper (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are partially wooded but represent no significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Portage Lake Ship Canal Wetland Complex (U.S.G.S. quadrangle maps, Oskar, Michigan, 1975; Hancock, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Portage Lake Ship Canal Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Portage Lake Ship Canal Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 163-165

The literature search identified no on-going or impending research projects pertaining to the Portage Lake Ship Canal Wetland Complex.

TORCH BAY WETLAND

PHYSIOGRAPHIC SETTING LS 166

Setting

Torch Bay Wetland is located along the shore of Torch Bay, which is directly connected to Portage Lake, in Torch Lake Township of Houghton County, Michigan. The various parts of the wetland extend from the shoreline to approximately 0.3 mile inland, and lie 3.3 miles from Dollar Bay, Michigan. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975).

Topography

Torch Bay Wetland has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Portage Lake). The surrounding area is irregular with low hills (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Torch Bay Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Torch Bay Wetland (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Torch Bay Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975).

BIOTIC SETTING LS 166

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Torch Bay Wetland.

Fish

A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Torch Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Torch Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Torch Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Torch Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the mammals inhabiting Torch Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Torch Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 166

Population

Torch Bay Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-12 indicates that both the county and township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-12. Population Data for the Vicinity of Torch Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Torch Bay Wetland and the surrounding area is rural open space. A light-duty road runs east and south of the northern section of Torch Bay Wetland, and north of the other three sections. There are several buildings within the southern portions of this wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Torch Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Torch Bay Wetland. The wetland and the surrounding area are partially wooded but represent no significant potential for forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Torch Bay Wetland (U.S.G.S. quadrangle map, Point Mills, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Torch Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Torch Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 166

The literature search identified no on-going or impending research projects pertaining to Torch Bay Wetland.

TORCH LAKE WETLAND

PHYSIOGRAPHIC SETTING LS 167

Setting

The northern portions of Torch Lake Wetland touch the shoreline of Torch Lake, but the majority of the wetland lies on the shoreline of Portage Lake. The wetland is located in Torch Lake Township of Houghton County, Michigan, approximately 1.0 mile from the city of Hubbell. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Topography

Torch Lake Wetland has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Portage Lake). The surrounding area is composed of hills with a maximum elevation of about 750 feet above mean sea level (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Torch Lake Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

Three unnamed streams and McCallum Creek flow through Torch Lake Wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Torch Lake Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five

and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

BIOTIC SETTING LS 167

Vegetation

According to Riha (1977), dense stands of bulrush (Scirpus sp.) and small patches of cattail (Typha sp.) characterize the marsh portion of Torch Lake Wetland. In drier sites within the marsh, leatherleaf (Chamaedaphne sp.) and blueberry (Vaccinium sp.) occur. Water milfoil (Myriophyllum sp.) and pondweed (Potamogeton sp.) form a rich submersed growth in open water areas. Conifer swamp surrounds the marsh with interspersion of lowland spruce (Picea sp.) forest, and tag alder (Betula pumila) along the swamp border.

The literature search yielded no site-specific information pertaining to density and productivity, or relationship to water levels of the vegetation of Torch Lake Wetland.

Fish

Fish species found in McCallum Creek (Moore and Braem, 1965) include sea lamprey (Petromyzon marinus), carp (Cyprinus carpio), and logperch (Percina caprodes). Of these, only the carp and logperch are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these, in addition to those listed above, may also utilize Torch Lake Wetland.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Torch Lake Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and

abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Torch Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Torch Lake Wetland.

Mammals

Muskrat (Ondatra zibethicus) are abundant on Torch Lake Wetland and trapping is permitted (Riha, 1977). Raccoons (Procyon lotor) also are found there.

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the mammals inhabiting Torch Lake Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Torch Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 167

Population

Torch Lake Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-13 indicates that both the county and township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-13. Population Data for the Vicinity of Torch Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Torch Lake Wetland and the surrounding area is rural open space. A medium-duty highway runs through the southern section and along the eastern border of Torch Lake Wetland. Unimproved dirt roads cross the northern and western sections, and run along the western boundary. There are several buildings adjacent to the western and eastern borders, and one building is located within the northern section. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Torch Lake Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Torch Lake Wetland. The wetland and the surrounding area are partially wooded but represent no significant potential for forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Torch Lake Wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Torch Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Torch Lake Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 167

The literature search identified no on-going or impending research projects pertaining to Torch Lake Wetland.

DOLLAR BAY WETLAND

PHYSIOGRAPHIC SETTING LS 168

Setting

The northern portion of Dollar Bay Wetland lies on the shoreline of Torch Lake, and the southern portion touches the shoreline of Dollar Bay, which is directly connected to Portage Lake. The wetland is located in Osceola Township of Houghton County, Michigan, approximately 0.2 mile from the city of Dollar Bay. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Laurium, Michigan, 1946).

Topography

Dollar Bay Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Torch Lake). The surrounding area is composed of hills, with a maximum elevation of about 1100 feet above mean sea level (U.S.G.S. quadrangle maps, Laurium, Michigan, 1975; Point Mills, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Dollar Bay Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

One unnamed stream and Gooseneck Creek flow through Dollar Bay Wetland (U.S.G.S. quadrangle maps, Laurium, Michigan, 1975; Point Mills, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Dollar Bay Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring

on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Laurium, Michigan, 1975; Point Mills, Michigan, 1975).

BIOTIC SETTING LS 168

Vegetation

According to Riha (1977), willow (Salix sp.) and tag alder (Betula pumila) predominate in Dollar Bay Wetland, with occasional patches of leatherleaf (Chamaedaphne sp.). Open water sites support an abundant growth of water-milfoil (Myriophyllum sp.). The wetland is bordered by lowland shrubs grading into northern hardwoods.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Dollar Bay Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Dollar Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Dollar Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Dollar Bay Wetland.

Mammals

Only a small population of muskrat (Ondatra zibethicus) occur on Dollar Bay Wetland (Riha, 1977), and this wetland is considered poor muskrat habitat.

The literature search provided no site-specific data pertaining to other species, density and productivity, seasonal distribution and abundance, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Dollar Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Dollar Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Copper Country Dairy Company holds three NPDES permits and is adjacent to Dollar Bay Wetland. The company discharges cooling water and process water into Gooseneck Creek and irrigation waters into the groundwater. The effect of these discharges is not known.

CULTURAL SETTING LS 168

Population

Dollar Bay Wetland is located in Osceola Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-14 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-14. Population Data for the Vicinity of Dollar Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Osceola Township	2,211	13.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Dollar Bay Wetland and the surrounding area is rural open space. A light-duty road lies adjacent to the southwestern boundary. Unimproved dirt roads run between the two southern sections, through the two eastern-most sections, and adjacent to the southeastern section of the wetland, and a heavy-duty highway and a railroad track are on the northern border. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Laurium, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Dollar Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Dollar Bay Wetland. The wetland and the surrounding area are partially wooded but represent no significant potential for forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Dollar Bay Wetland (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Laurium, Michigan, 1975).

Pollution Sources

The Copper Country Dairy Company holds three NPDES permits and is adjacent to Dollar Bay Wetland. The dairy company discharges cooling water and process water into Gooseneck Creek and irrigation waters into the groundwater. The extent and the effect of these discharges on the wetland is not known (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Dollar Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 168

The literature search identified no on-going or impending research projects pertaining to Dollar Bay Wetland.

ROCK RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 169

Setting

Trap Rock River Wetland lies on the shoreline of the Trap Rock River, 0.2 mile upstream from Torch Lake. The wetland is located in Schoolcraft Township of Houghton County, Michigan, approximately 0.3 mile from the community of Lake Linden. This wetland is a Palustrine-Riverine System and occupies a wooded site (U.S.G.S. quadrangle may, Laurium, Michigan, 1975).

Topography

Trap Rock River Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Torch Lake. The surrounding area consists of flat artificial fill and hilly areas (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Trap Rock River Wetland lies is characterized by ground moraines. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

The Trap Rock River flows through Trap Rock River Wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Trap Rock River Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

BIOTIC SETTING LS 169

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Trap Rock River Wetland.

Fish

Fish species found in the Trap Rock River (Moore and Braem, 1965) are listed in Table 5-15. A list of fish species known to utilize the coastal wetlands of Michigan appears in Appendix A-1, and some of these, in addition to those listed in Table 5-15, may also utilize Trap Rock River Wetland. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Trap Rock River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Trap Rock River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Trap Rock River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity,

Table 5-15. Fish Species Found in Trap Rock River, Houghton County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
ammocetes of silver or northern brook lamprey	white sucker*
	longnose sucker
Salmonidae	Gadidae
rainbow trout	burbot
brook trout	
	Percopsidae
Osmeridae	trout-perch
rainbow smelt	
	Centrarchidae
Cyprinidae	rock bass
carp*	
blacknose dace	Percidae
longnose dace	yellow perch*
common shiner	logperch*
spottail shiner	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Trap Rock River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Trap Rock River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Trap Rock River Wetland is likely to be utilized by a variety of the fish species present in the river.

CULTURAL SETTING LS 169

Population

Trap Rock River Wetland is located in Schoolcraft Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-16 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-16. Population Data for the Vicinity of Trap Rock River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Schoolcraft Township	2,086	7.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Trap Rock River Wetland and the surrounding area is rural open space. A medium-duty highway and several buildings are adjacent to the southern and eastern boundaries of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Trap Rock River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Trap Rock River Wetland. The wetland and the surrounding area are partially wooded but represent no significant potential for forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Trap Rock River Wetland (U.S.G.S. quadrangle map, Laurium, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Trap Rock River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Trap Rock River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 169

The literature search identified no on-going or impending research projects pertaining to Trap Rock River Wetland.

SILVER CREEK WETLAND

PHYSIOGRAPHIC SETTING

LS 170

Setting

Silver Creek Wetland lies on the shoreline of the Portage River in Torch Lake Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a partially wooded site (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

Topography

Silver Creek Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The surrounding area is composed of low hills (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which Silver Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

Silver Creek Wetland is adjacent to the Portage River and Silver Creek flows through it (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Portage River may be found in U.S. Army Corps of Engineers (1976).

Climate

The closest weather station providing climatic data for Silver Creek Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately

five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

BIOTIC SETTING LS 170

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Silver Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Silver Creek Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Silver Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Silver Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Silver Creek Wetland.

Mammals

Muskrat (Ondatra zibethicus) are abundant on Silver Creek Wetland (Riha, 1977), which is considered exceptional habitat for them (Jaworski and Raphael, 1978).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Silver Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Silver Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 170

Population

Silver Creek Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-17 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-17. Population Data for the Vicinity of Silver Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Silver Creek Wetland and the surrounding area is rural open space. A light-duty highway runs east of Silver Creek Wetland and crosses the main section of the wetland. A cemetery, an unimproved dirt road, a large pit, and several buildings are along the eastern border. A trail is located in the northern part of the wetland and there are two lights, one along the southwestern wetland boundary, and the other on one of the western islands. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Keweenaw Bay, Michigan, 1954).

Recreation

A portion of Silver Creek Wetland is in Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Silver Creek Wetland include stone, sand, gravel, and copper (Great Lakes Basin Commission, 1974).

The area surrounding Silver Creek wetland is partially wooded but represents no significant potential for forest resources, and no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Silver Creek Wetland (U.S.G.S. quadrangle maps, Keweenaw Bay, Michigan, 1954; Point Mills, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Silver Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Silver Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 170

The literature search identified no on-going or impending research projects pertaining to Silver Creek Wetland.

WHITE CITY AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 171-172

Setting

The White City Area Wetland Complex is located on the shoreline of Lake Superior in Torch Lake Township of Houghton County, Michigan, at White City. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954).

Topography

The White City Area Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as low sand dunes. The surrounding area is composed of rolling hills (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954).

Surficial Geology

The surficial geology of the area in which White City Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through the White City Area Wetland Complex (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the White City Area Wetland Complex is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954).

BIOTIC SETTING LS 171-172

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the White City Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in the two wetlands comprising the White City Area Wetland Complex, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the White City Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the White City Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the White City Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity,

recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the two wetlands comprising the White City Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the White City Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 171-172

Population

The White City Area Wetland Complex is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-18 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-18. Population Data for the Vicinity of the White City Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the White City Area Wetland Complex and the surrounding area is rural open space. A light-duty road and several buildings are located in the northwestern section of White City Area Wetland #1. Another light-duty road and several buildings lie east of White City Area Wetland #2. An unimproved dirt road and four buildings are located between the two wetlands.

The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954).

Recreation

No known state or federal recreational facilities are present in the vicinity of the White City Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of the White City Area Wetland Complex. The wetlands and the surrounding area are partially wooded but represent no significant potential for forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the White City Area Wetland Complex (U.S.G.S. quadrangle map, Keweenaw Bay, Michigan, 1954).

Pollution Sources

There are no NPDES permit holders adjacent to the White City Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the White City Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 171-172

The literature search identified no on-going or impending research projects pertaining to the White City Area Wetland Complex.

LECHANCE CREEK WETLAND

PHYSIOGRAPHIC SETTING

LS 173

Setting

LeChance Creek Wetland lies on the shoreline of Keweenaw Bay, which is directly connected to Lake Superior, in Torch Lake Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a partially wooded site (U.S.G.S. quadrangle maps, Traverse Island, Michigan, 1975; Point Mills, Michigan, 1975).

Topography

LeChance Creek Wetland has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is composed of low rolling land in the east with irregular hills of greater elevation in the west (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Traverse Island, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which LeChance Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

LeChance Creek Wetland has LeChance Creek flowing through it (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Traverse Island, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for LeChance Creek Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Traverse Island, Michigan, 1975).

BIOTIC SETTING LS 173

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of LeChance Creek Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in LeChance Creek Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in LeChance Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in LeChance Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing LeChance Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting LeChance Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in LeChance Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 173

Population

LeChance Creek Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-19 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-19. Population Data for the Vicinity of LeChance Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within LeChance Creek Wetland and the surrounding area is rural open space. An unimproved dirt road intersects one section of the southern

border of LeChance Creek Wetland. Trails are located along the northern boundary and within the eastern section of this wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Traverse Island, Michigan, 1975).

Recreation

A portion of LeChance Creek Wetland is in Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of LeChance Creek Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of LeChance Creek Wetland (U.S.G.S. quadrangle maps, Point Mills, Michigan, 1975; Traverse Island, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to LeChance Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of LeChance Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 173

The literature search identified no on-going or impending research projects pertaining to LeChance Creek Wetland.

MUD LAKE CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 174

Setting

Mud Lake Creek Wetland is located approximately 300 feet from the shoreline of Little Traverse Bay, which is directly connected to Lake Superior, in Torch Lake Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Topography

Mud Lake Creek Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is flat in the immediate area with a low hill just south and irregular hills west of the wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Mud Lake Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

Mud Lake Creek and one unnamed stream flow through Mud Lake Creek Wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Mud Lake Creek Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975

occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

BIOTIC SETTING LS 174

Vegetation

According to Riha (1977), bullhead-lily (Nuphar sp.) and water-lily (Nymphaea sp.) dominate in Mud Lake Creek Wetland, which has no significant emergent community. Open water areas lack submersed vegetation; however, small colonies of floating-leaved pondweeds (Potamogeton sp.) occur sporadically. Leatherleaf (Chamaedaphne sp.) borders the open water. The wetland is bordered to the east by a sandy ridge dominated by red pine (Pinus resinosa), to the west by a lowland shrub community, and to the southwest by a mixed conifer swamp.

The literature search yielded no site-specific information pertaining to density, productivity or relationship to water levels of the vegetation of this wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Mud Lake Creek Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Mud Lake Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Mud Lake Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Mud Lake Creek Wetland.

Mammals

No evidence of muskrat (Ondatra zibethicus) has been noted on Mud Lake Creek Wetland (Riha, 1977), which is considered unsuitable muskrat habitat.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Mud Lake Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Mud Lake Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 174

Population

Mud Lake Creek Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-20 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-20. Population Data for the Vicinity of Mud Lake Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Mud Lake Creek Wetland and the surrounding area is rural open space. Several buildings and an unimproved dirt road are located east of Mud Lake Creek Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Mud Lake Creek Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Mud Lake Creek Wetland, but the area surrounding the wetland is wooded, representing potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Mud Lake Creek Wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Mud Lake Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Mud Lake Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to Mud Lake Creek Wetland.

LITTLE TRAVERSE BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 175

Setting

Little Traverse Bay Wetland lies on the shoreline of Little Traverse Bay, which is directly connected to Lake Superior, in Torch Lake Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Topography

Little Traverse Bay Wetland has little relief and lies at an elevation of about 605 feet above mean sea level (three feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is low plain with some low hills in the distance (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Little Traverse Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Little Traverse Bay Wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Little Traverse Bay Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

BIOTIC SETTING LS 175

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Little Traverse Bay Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Little Traverse Bay Wetland are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Little Traverse Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Little Traverse Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Little Traverse Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Little Traverse Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Little Traverse Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 175

Population

Little Traverse Bay Wetland is located in Torch Lake Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 5-21 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 5-21. Population Data for the Vicinity of Little Traverse Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Torch Lake Township	1,311	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Little Traverse Bay Wetland and the surrounding area is rural open space. An unimproved dirt road and one building lie southeast of

Little Traverse Bay Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Little Traverse Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in the vicinity of Little Traverse Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Little Traverse Bay Wetland (U.S.G.S. quadrangle map, Rice Lake, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Little Traverse Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Little Traverse Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 175

The literature search identified no on-going or impending research projects pertaining to Little Traverse Bay Wetland.

GRAND TRAVERSE BAY WETLAND

PHYSIOGRAPHIC SETTING LS 176

Setting

Grand Traverse Bay Wetland is located along Grand Traverse Bay, which is directly connected to Lake Superior, within Torch Lake, Schoolcraft, and Sherman Townships of Houghton and Keweenaw Counties, Michigan.

The various parts of the wetland extend from the shoreline to approximately 0.9 mile inland. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Gay, Michigan, 1975).

Topography

Grand Traverse Bay Wetland has 30 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is flat along the beach with inland hills that have a maximum local elevation of 820 feet above mean sea level (U.S.G.S. quadrangle map, Gay, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Grand Traverse Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton or Keweenaw Counties.

Hydrology

One unnamed stream flows through Grand Traverse Bay Wetland (U.S.G.S. quadrangle map, Gay, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Grand Traverse Bay Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57

inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Gay, Michigan, 1975).

BIOTIC SETTING LS 176

Vegetation

According to Riha (1977), wetter sites in Grand Traverse Bay Wetland support bullhead-lily (Nuphar sp.) and water-lily (Nymphaea sp.) with very little bulrush (Scirpus sp.), while drier sites support sedges (Cyperus sp., Carex sp.), leatherleaf (Chamaedaphne sp.), and sweet gale (Myrica gale). Nearshore open water sites support water-milfoil (Myriophyllum sp.). Red pine (Pinus resinosa) dominates barrier beaches, and lowland shrubs and spruce (Picea sp.) occur in land adjacent to the marsh. Riha reports that this area is highly valuable owing to the occurrence of bog plants such as orchids and pitcher plant (Sarracenis sp.).

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Grand Traverse Bay Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Grand Traverse Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton and Keweenaw Counties, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life

histories, major food sources, or relationship to water levels of the reptiles and amphibians in Grand Traverse Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Grand Traverse Bay Wetland.

Mammals

No muskrat (Ondatra zibethicus) have been observed on the southern portion of Grand Traverse Bay Wetland, which is considered unsuitable muskrat habitat (Riha, 1977).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Grand Traverse Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Grand Traverse Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 176

Population

Grand Traverse Bay Wetland is located in Schoolcraft and Torch Lake Townships of Houghton County, and in Sherman Township of Keweenaw County, Michigan. Both Houghton and Keweenaw Counties are sparsely populated, having a density of 34 and four persons per square mile respectively. Table 5-22 indicates that Houghton County and all three townships experienced rapid rates of population growth between 1970 and 1975, but Keweenaw County had a moderate decline in population. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County and that Keweenaw County will also undergo a rapid growth rate.

Table 5-22. Population Data for the Vicinity of Grand Traverse Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Schoolcraft Township	2,086	7.6	--
Torch Lake Township	1,311	7.7	--
Keweenaw County	2,173	-4.0	2,571
Sherman Township	78	14.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Grand Traverse Bay Wetland and the surrounding area is rural open space. A light-duty road and several buildings are adjacent to the eastern boundaries of the southern parts of Grand Traverse Bay Wetland. Unimproved dirt roads are located south of the wetland and in one of the northern sections. Light-duty roads cross a central section and both northern sections of the wetland, while a medium-duty highway is adjacent to the northwestern border. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Gay, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Grand Traverse Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Grand Traverse Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Grand Traverse Bay Wetland (U.S.G.S. quadrangle map, Gay, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Grand Traverse Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Grand Traverse Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 176

The literature search identified no on-going or impending research projects pertaining to Grand Traverse Bay Wetland.

OLIVER BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 177-179

Setting

The Oliver Bay Wetland Complex is located approximately 400 feet from the southern shoreline of Lake Superior in Grant Township of Keweenaw County, Michigan. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle maps, Point Isabelle, Michigan, 1975; Deer Lake, Michigan, 1975).

Topography

The Oliver Bay Wetland Complex has little relief and lies at an elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area contains a generally rising slope with some lower areas followed by a plain (U.S.G.S. quadrangle map, Point Isabelle, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Oliver Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through the Oliver Bay Wetland Complex (U.S.G.S. quadrangle maps, Point Isabelle, Michigan, 1975; Deer Lake Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Oliver Bay Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2^{o}F and the mean monthly high for July is 63.8^{o}F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing

season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Point Isabelle, Michigan, 1975; Deer Lake, Michigan, 1975).

BIOTIC SETTING LS 177-179

Vegetation

According to Riha (1977), the Oliver Bay Wetland Complex is essentially a shrub bog. Major species include leatherleaf (Chamaedaphne sp.), blueberry (Vaccinium sp.), bog-rosemary (Andromeda glaucaphylla), cotton grass (Eriophorum sp.), and sedges (Carex sp., Cyperus sp.), with interspersion of lowland spruce (Picea sp.) and red pine (Pinus resinosa).

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of these wetlands.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in the Oliver Bay Wetland Complex, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Oliver Bay Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the three wetlands comprising the Oliver Bay Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Oliver Bay Wetland Complex.

Mammals

No evidence of muskrat (Ondatra zibethicus) activity has been observed on Point Isabelle Wetland (Riha, 1977).

The literature search provided no site-specific data pertaining to other species seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting any of the three wetlands of the Oliver Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Oliver Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 177-179

Population

The Oliver Bay Wetland Complex is located in Grant Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of 4 persons per square mile. Table 5-23 indicates that the county and township both experienced a loss in population between 1970 and 1975. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 5-23. Population Data for the Vicinity of the Oliver Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Grant Township	63	-7.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Oliver Bay Wetland Complex and the surrounding area is rural open space. A medium-duty highway is adjacent to the eastern borders of all three wetlands in the Oliver Bay Wetland Complex. Point Isabelle Wetland also has two trails crossing the northern and southwestern sections. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Point Isabelle, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Oliver Bay Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Oliver Bay Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Oliver Bay Wetland Complex (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Point Isabelle, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Oliver Bay Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Oliver Bay Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 177-179

The literature search identified no on-going or impending research projects pertaining to the Oliver Bay Wetland Complex.

LAC LABELLE WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 180-181

Setting

The Lac LaBelle Wetland Complex is located along the shore of Bete Grise Bay, which is directly connected to Lake Superior, in Grant Township of Keweenaw County, Michigan. Lac LaBelle Area Wetland lies approximately 300 feet from the shoreline, and Lac La Belle Wetland lies 1.2 miles from the shoreline of Bete Grise Bay. There are no major population centers in the area (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Point Isabelle, Michigan, 1975; Lake Medora, Michigan, 1975).

Topography

The Lac LaBelle Wetland Complex has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as low sand dunes. The surrounding area is fairly flat, but a small interior hill has an elevation of 745 feet above mean sea level (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Point Isabelle, Michigan, 1975; Lake Medora, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Lac LaBelle Wetland Complex lies is characterized by ground moraines. Rock occurring at or near the surface is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through the Lac LaBelle Wetland Complex (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Lake Medora, Michigan, 1975; Point Isabelle, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Lac LaBelle Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is

63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Lake Medora, Michigan, 1975; Point Isabelle, Michigan, 1975).

BIOTIC SETTING LS 180-181

Vegetation

According to Riha (1977), bullhead-lily (Nuphar sp.) comprises the dominant emergent vegetation of the Lack LaBelle Wetland Complex. Submersed plants occur in occasional dense colonies precominantly composed of water-milfoil (Myriophyllum sp.) and floating-leaved pondweed (Potamogeton sp.). Leatherleaf (Chamaedaphne sp.) dominates shoreline areas, while lowland spruce (Picea sp.) and red pine (Pinus resinosa) dominate sand ridges.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of these wetlands.

Fish

According to Taylor (1954), white sucker (Catostomus commersoni), longnose sucker (Catostomus catostomus), longnose dace (Rhinichthys cataractae), yellow perch (Perca flavescens), logperch (Percina caprodes), Iowa darter (Etheostoma exile), and mottled sculpin (Cottus bairdi) were collected from the west shore of Lac LaBelle in 1926. Of these, the white sucker, yellow perch, logperch, Iowa darter, and mottled sculpin are generally associated with submersed vegetation or other wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978) and may occur in the two wetlands of the Lac LaBelle Wetland Complex. Fish species generally associated with coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Lac LaBelle Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Lac LaBelle Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Lac LaBelle Wetland Complex.

Mammals

Lac LaBelle Wetland provides poor habitat for muskrat (Ondatra zibethicus) (Riha, 1977).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Lac LaBelle Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Lac LaBelle Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 180-181

Population

The Lac LaBelle Wetland Complex is located in Grant Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of 4 persons per square mile. Table 5-24 indicates that the county and township both experienced a loss in population between 1970 and 1975. However, projections for 1990 indicate that Keweenaw County is expected to under a rapid rate of population growth in the future.

Table 5-24. Population Data for the Vicinity of the Lac LaBelle Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Grant Township	63	-7.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Lac LaBelle Wetland Complex is rural open space, with some residential development in the surrounding area. A medium-duty highway is adjacent to the northern boundary of Lac LaBelle Area Wetland; there is a paved road along the western boundary, as well as two sections of an unimproved dirt road along the northern and southern borders which are connected by a trail running through the wetland. A medium-duty highway runs south of Lac LaBelle Wetland; the same type of highway is adjacent to its northern and northeastern boundaries, several buildings and an unimproved dirt road are northeast of the wetland, and there are numerous buildings and an unimproved dirt road in the southwestern section. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Point Isabelle, Michigan, 1975; Deer Lake, Michigan, 1975; Lake Medora, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Lac La Belle Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Lac LaBelle Wetland Complex, but the area surrounding the wetlands is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Lac LaBelle Wetland Complex (U.S.G.S. quadrangle maps, Deer Lake, Michigan, 1975; Lake Medora, Michigan, 1975; Point Isabelle, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Lac LaBelle Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Lac LaBelle Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 180-181

The literature search identified no on-going or impending research projects pertaining to the LaBelle Wetland Complex.

BIG BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 182

Setting

Big Bay Wetland is located on the shoreline of Big Bay, which is directly connected to Lake Superior, in Grant Township of Keweenaw County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Topography

Big Bay Wetland has 48 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly; the greatest local elevation is about 1300 feet above mean sea level (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Big Bay Wetland lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through Big Bay Wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Big Bay Wetland is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

BIOTIC SETTING LS 182

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Big Bay Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota, which may occur in Big Bay Wetland, are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Big Bay Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Big Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Big Bay Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Big Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Big Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 182

Population

Big Bay Wetland is located in Grant Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 5-25 indicates that the county and township both experienced a loss in population between 1970 and 1975. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 5-25. Population Data for the Vicinity of Big Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Grant Township	63	-7.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Big Bay Wetland and the surrounding area is rural open space. A trail is located along a western section of Big Bay Wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Big Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Big Bay Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Big Bay Wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Big Bay Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Big Bay Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 182

The literature search identified no on-going or impending research projects pertaining to Big Bay Wetland.

Table 5-26. Data Gaps-Lake Section 5

Data Gap*		Wetland Number	151-155	156-157	158	159	160	161	162	163-165	166	167	168	169	170	171-172	173	174	175	176	177-179	180-181	182
Physiographic Setting		Setting																					
		Topography																					
		Surficial Geology																					
		Soils	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Climate																					
		Special Features																					
Biotic Setting	Vegetation	Major Species Distribution		*			*			*	*			*	*	*			*				*
		Major Species Composition		*			*			*	*			*	*	*	*		*				*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			*
		Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species					*		*	*	*			*	*	*		*		*			*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species																					
		Health	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cultural Setting		Population																					
		Land Use and Ownership																					
		Recreation																					
		Mineral, Energy, Forest Resource																					
		Public Utilities/Facilities																					
		Point Pollution Sources																					
		Non-Point Pollution Sources																					
		Historic Features																					
		Archeologic Features																					

LAKE SECTION 6

INTRODUCTION

Lake Section 6 extends from Manitou Island off Keweenaw Point to the Michigan-Wisconsin border in Keweenaw County, Michigan. The region features irregular, hilly topography in the vicinity of the wetlands. The predominant shore types along this 159 mile stretch of shoreline are non-erodible high and low bluffs.

Figures 6-1, 6-2, and 6-3 show the approximate location of the 38 coastal wetlands of Lake Section 6. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 6-1. The wetlands of Lake Section 6 are located at elevations between 605 and 750 feet above sea level, 3 to 148 feet above the mean elevation of Lake Superior. The Section 6 wetlands are all classified as Palustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 38 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

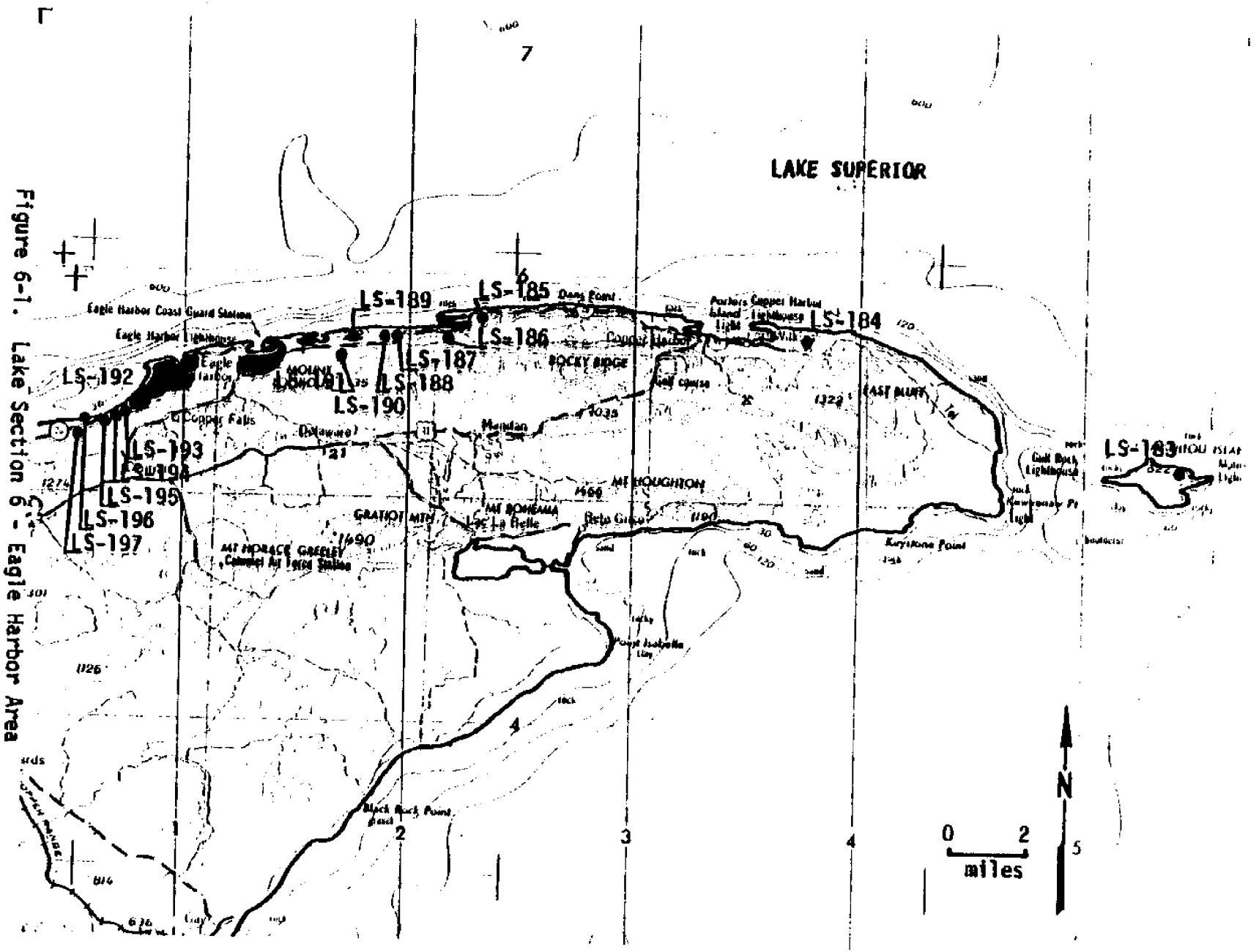


Figure 6-1. Lake Section 6 - Eagle Harbor Area

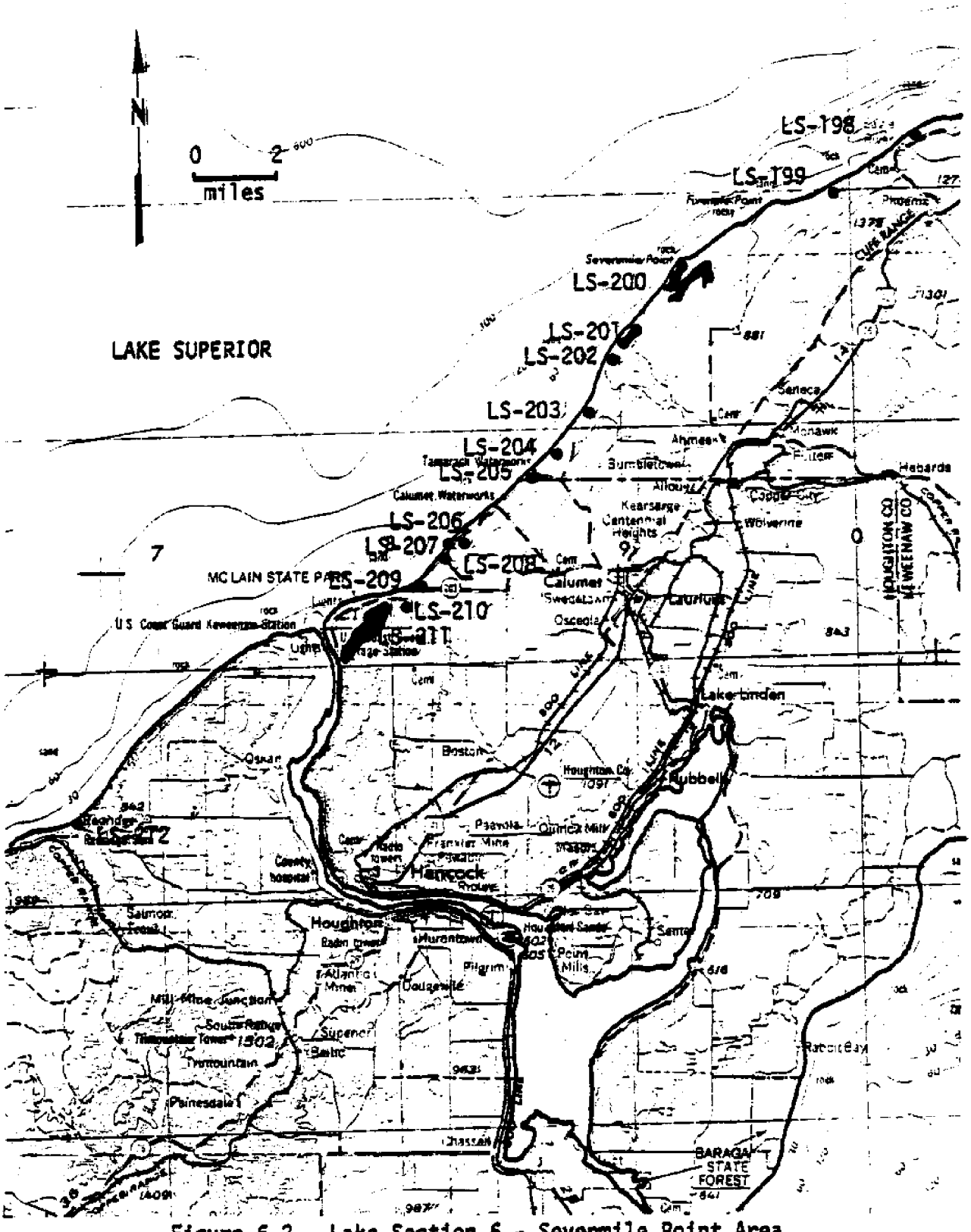


Figure 6-2. Lake Section 6 - Sevenmile Point Area

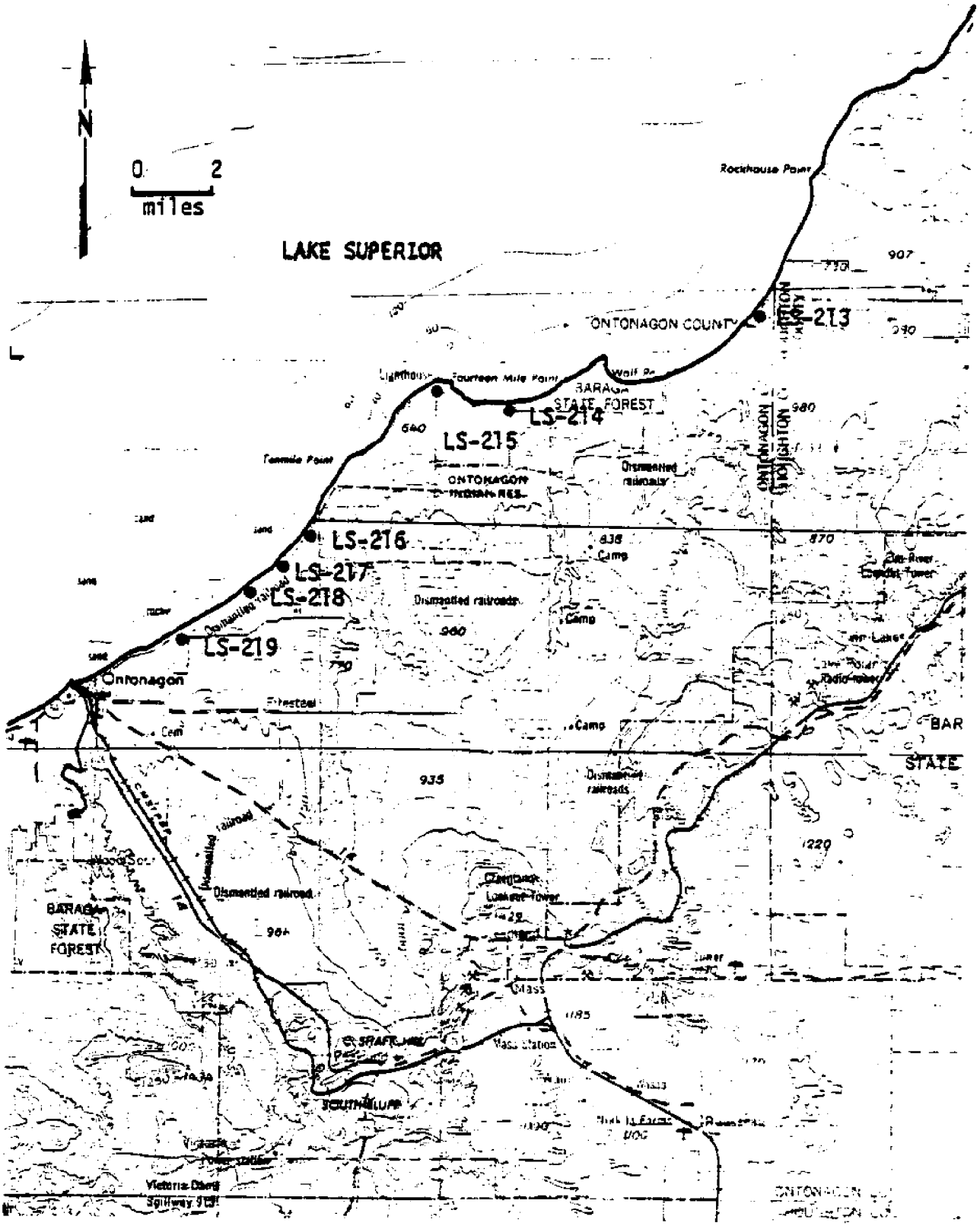


Figure 6-3. Lake Section 6 - Fourteenmile Point Area

Table 6-1. Location, Acreage, and Classification of Wetlands in Lake Section 6

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 183	Manitou Island Wetland	47°25'10"	87°36'27"	80	P
LS 184	Lake Lily Wetland	47°28'04"	87°49'24"	147	P
	AGATE HARBOR WETLAND COMPLEX				
LS 185	South Bay Area Wetland #1	47°28'28"	88°01'10"	20	P
LS 186	South Bay Area Wetland #2	47°27'59"	88°02'48"	105	P
LS 187	Silver River Area Wetland	47°27'57"	88°04'13"	5	P
LS 188	Silver River Wetland	47°27'54"	88°04'40"	73	P
	CEDAR SWAMP AREA WETLAND COMPLEX				
LS 189	Grand Marais Harbor Area Wetland	47°27'51"	88°06'12"	5	P
LS 190	Lake Bailey Wetland	47°27'27"	88°06'57"	80	P
LS 191	Cedar Swamp	47°27'23"	88°08'40"	440	P
	THE MARSHES AREA WETLAND COMPLEX				
LS 192	The Marshes	47°26'39"	88°11'58"	640	P
LS 193	Great Sand Bay Area Wetland #1	47°26'16"	88°13'02"	2	P
LS 194	Great Sand Bay Area Wetland #2	47°26'10"	88°13'19"	2	P
LS 195	Great Sand Bay Area Wetland #3	47°26'01"	88°13'30"	2.5	P
LS 196	Jacobs	47°25'44"	88°14'20"	12	P
	EAGLE RIVER AREA WETLAND COMPLEX				
LS 197	Dunes Drive Wetland	47°25'13"	88°16'15"	35	P
LS 198	Eagle River Area Wetland	47°25'08"	88°17'12"	8	P
LS 199	Silver Creek Area Wetland	47°24'03"	88°19'35"	10	P
LS 200	Mud Lake Wetland	47°21'31"	88°25'06"	350	P
LS 201	Gratiot River Wetland	47°20'30"	88°26'51"	105	P
LS 202	Black Creek Wetland	47°20'03"	88°27'42"	5	P
	BREWERY CREEK AREA WETLAND COMPLEX				
LS 203	Brewery Creek Area Wetland #1	47°18'31"	88°28'34"	140	P
LS 204	Brewery Creek Area Wetland #2	47°17'41"	88°29'35"	55	P
LS 205	Brewery Creek Wetland	47°17'20"	88°30'15"	5	P
	MUGGUN CREEK AREA WETLAND COMPLEX				
LS 206	Muggun Creek Area Wetland #1	47°15'42"	88°32'56"	6	P
LS 207	Muggun Creek Area Wetland #2	47°15'25"	88°33'25"	5	P
LS 208	Muggun Creek Area Wetland #3	47°15'18"	88°33'21"	2	P
	SEVENMILE CREEK WETLAND COMPLEX				
LS 209	Sevenmile Creek Wetland #1	47°14'45"	88°34'13"	23	P
LS 210	Sevenmile Creek Wetland #2	47°14'21"	88°34'43"	105	P
LS 211	Bear Lake Wetland	47°13'40"	88°35'57"	175	P
LS 212	Salmon Trout River Wetland	47°09'12"	88°46'03"	2	P
LS 213	Little Elm River Wetland	47°01'18"	88°56'18"	1	P
LS 214	East Sleeping River Wetland	46°59'02"	89°04'53"	22	P
LS 215	Fourteen Mile Point Wetland	46°59'22"	89°07'18"	130	P
	FLINTSTEEL MILE RIVER AREA WETLAND COMPLEX				
LS 216	Firesteel River Wetland	46°56'06"	89°11'46"	40	P,R
LS 217	Flintsteel River Wetland	46°55'22"	89°12'29"	40	P,R
LS 218	Flintsteel River Area Wetland	46°54'34"	89°13'32"	145	P
LS 219	Paddys Creek Wetland	46°53'23"	89°15'30"	130	P
LS 220	Graveyard Creek Wetland	46°34'21"	90°29'30"	125	P

[a]P=palustrine

MANITOU ISLAND WETLAND

PHYSIOGRAPHIC SETTING LS 183

Setting

Manitou Island Wetland is located on Manitou Island in Lake Superior, within Grant Township of Keweenaw County, Michigan. The wetland lies approximately 100 feet from the Lake Superior shoreline. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975).

Topography

Manitou Island Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The surrounding area is relatively flat with a few low knolls (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Manitou Island Wetland lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through Manitou Island Wetland (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Manitou Island Wetland is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975).

BIOTIC SETTING LS 183

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Manitou Island Wetland.

Fish

According to Taylor (1954), goldenshiner (Notemigonus crysoleucas), rock bass (Ambloplites rupestris), yellow perch (Perca flavescens), Iowa darter (Etheostoma exile), slimy sculpin (Cottus cognatus), and brook stickleback (Culea inconstans) were collected from "Manitou Lake" on Manitou Island in 1926. It is uncertain whether this refers to the present Perch Lake or one of the two wetlands on the island at a period when more water was present. In any case, goldenshiner, yellow perch, Iowa darter, and brook stickleback are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978) and may occur in Manitou Island Wetland. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Manitou Island Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Manitou Island Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

health, life histories, relationship to water levels, or major food sources of the birds utilizing Manitou Island Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Manitou Island Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Manitou Island Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 183

Population

Manitou Island Wetland is located in Manitou Island, offshore from the Keweenaw Peninsula of Michigan. Manitou Island is part of Grant Township of Keweenaw County, but has no permanent residents. There are some summer residents in the Fishermans Bay Area.

Land Use and Ownership

Land use within Manitou Island Wetland and the surrounding area is rural open space. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Manitou Island Wetland.

Mineral, Energy, and Forest Resources

No significant known mineral or energy or forest resources are present in the vicinity of Manitou Island Wetland.

Public Utilities and Facilities

A telephone line is located southeast of the wetland (U.S.G.S. quadrangle map, Manitou Island, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Manitou Island Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Manitou Island Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 183

The literature search identified no on-going or impending research projects pertaining to Manitou Island Wetland.

LAKE LILY WETLAND

PHYSIOGRAPHIC SETTING

LS 184

Setting

Lake Lily Wetland is located approximately 0.2 mile from the Horseshoe Harbor shoreline, which is directly connected to Lake Superior, in Grant Township of Keweenaw County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Topography

Lake Lily Wetland has 57 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of very steep hills and bluffs. The greatest local elevation is 1,322 feet above mean sea level (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Lake Lily Wetland lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through Lake Lily Wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Lake Lily Wetland is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

BIOTIC SETTING LS 184

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Lake Lily Wetland.

Fish

According to Taylor (1954), northern pike (Esox lucius), blacknose shiner (Notropis heterolepis), bluntnose minnow (Pimephales notatus), rock bass (Ambloplites rupestris), yellow perch (Perca flavescens), johnny darter (Etheostoma nigrum), and Iowa darter (Etheostoma exile) were collected from Lake Lily, then known as Perch Lake, in 1926. Of these all except the bluntnose minnow and rock bass are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978) and probably still utilize Lake Lily Wetland. Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Lake Lily Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lake Lily Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Lake Lily Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Lake Lily Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Lake Lily Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 184

Population

Lake Lily Wetland is located in Grant Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-2 indicates that the county and township both experienced a loss in population between 1970 and 1975. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-2. Population Data for the Vicinity of Lake Lily Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Grant Township	63	-7.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Lake Lily Wetland and the surrounding area is rural open space. An unimproved dirt road is located along the eastern border of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Lake Lily Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Lake Lily Wetland are limited to copper (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Lake Lily Wetland (U.S.G.S. quadrangle map, Fort Wilkins, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Lake Lily Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Lake Lily Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 184

The literature search identified no on-going or impending research projects pertaining to Lake Lily Wetland.

AGATE HARBOR WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 185-188

Setting

The Agate Harbor Wetland Complex is located near the southern shore of Lake Superior in Eagle Harbor Township of Keweenaw County, Michigan. South Bay Area Wetland #1, Silver River Area Wetland, and Silver River Wetland lie approximately 0.1 mile from the Lake Superior shoreline, and South Bay Area Wetland #2 lies approximately 0.2 mile from the shorelines of South Bay and Agate Harbor, which are directly connected to Lake Superior. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Delaware, Michigan, 1948).

Topography

The Agate Harbor Wetland Complex has 130 feet of relief and a maximum elevation of 750 feet above mean sea level (148 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of extremely steep bluffs and hills, and irregular terrain with inland valleys (U.S.G.S. quadrangle map, Delaware, Michigan, 1948).

Surficial Geology

The surficial geology of the area in which the Agate Harbor Wetland Complex lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetlands lie in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Bailey Creek and the Silver River flow through Silver River Wetland. No streams flow through the other wetlands of the Agate Harbor Wetland Complex (U.S.G.S. quadrangle map, Delaware, Michigan, 1948). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Agate Harbor Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is

63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Delaware, Michigan, 1948).

BIOTIC SETTING LS 185-188

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Agate Harbor Wetland Complex.

Fish

Fish species recorded from the Silver River (Moore and Braem, 1965) have included only rainbow trout (Salmo gairdneri) and brook trout (Salvelinus fontinalis). Taylor (1954) reported that longnose dace (Rhinichthys cataractae), blackchin shiner (Notropis heterolepis), blacknose shiner (Notropis heterolepis), logperch (Percina caprodes), mottled sculpin (Cottus bairdi), and slimy sculpin (Cottus cognatus) had been collected from Upson Creek, a tributary of the Silver River, in 1926. Of these the blackchin and blacknose shiners, logperch, and mottled sculpin are usually associated with aquatic vegetation and may occur in the Silver River and utilize Silver River Wetland.

Fish species known to utilize the coastal wetlands of Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Agate Harbor Wetland Complex, nor to major species in the three wetlands of the complex other than Silver River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Agate Harbor Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Agate Harbor Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Agate Harbor Wetland Complex.

Mammals

Small populations of muskrat (Ondatra zibethicus) occur in Silver River Area Wetland and Silver River Wetland (Riha, 1977).

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting any of the four wetlands of the Agate Harbor Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Agate Harbor Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 185-188

Population

The Agate harbor Wetland Complex is located in Eagle Harbor Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-3 indicates that the county experienced a moderate decline in population between 1970 and 1975, but Eagle Harbor Township grew rapidly during the same time period. Projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-3. Population Data for the Vicinity of the Agate Harbor Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Eagle Harbor Township	350	75.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Agate Harbor Wetland Complex and the surrounding area is rural open space. Medium-duty highways are located north and west of South Bay Area Wetland #1, north and south of South Bay Area Wetland #2, east of Silver River Area Wetland, and south of Silver River Wetland. A light-duty road lies east of Silver River Area Wetland, and an unimproved dirt road is adjacent to part of the northern section of Silver River Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Delaware, Michigan, 1948).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Agate Harbor Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Agate Harbor Wetland Complex are limited to copper (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Agate Harbor Wetland Complex (U.S.G.S. quadrangle map, Delaware, Michigan, 1948).

Pollution Sources

There are no NPDES permit holders adjacent to the Agate Harbor Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Agate Harbor Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 185-188

The literature search identified no on-going or impending research projects pertaining to the Agate Harbor Wetland Complex.

CEDAR SWAMP AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 189-191

Setting

The Cedar Swamp Area Wetland Complex is located on the southern coast of Lake Superior, in Eagle Harbor Township of Keweenaw County, Michigan. Grand Marais Harbor Area Wetland lies approximately 0.1 mile from the southern shoreline of Lake Superior and 2.5 miles from the city of Eagle Harbor. Lake Bailey Wetland lies 0.2 mile from the shoreline of Grand Marais Harbor, which is directly connected to Lake Superior, and is 1.6 miles from Eagle Harbor. Cedar Swamp lies 200 feet from the shoreline of Eagle Harbor, which also is directly connected to Lake Superior, at the city of Eagle Harbor. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle maps, Eagle Harbor, Michigan, 1975; Delaware, Michigan, 1948).

Topography

The Cedar Swamp Area Wetland Complex has 110 feet of relief and a maximum elevation of 720 feet above mean sea level (118 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of steep hills and bluffs (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975; Delaware, Michigan, 1948).

Surficial Geology

The surficial geology of the area in which the Cedar Swamp Area Wetland Complex lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetlands lie in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Cedar Creek and Eliza Creek flow through Cedar Swamp. No streams flow through the other two wetlands of the Cedar Swamp Area Wetland Complex (U.S.G.S. quadrangle maps, Eagle Harbor, Michigan, 1975; Delaware, Michigan, 1948). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Cedar Swamp Area Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The

average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Eagle Harbor, Michigan, 1975; Delaware, Michigan, 1948).

BIOTIC SETTING LS 189-191

Vegetation

According to Riha (1977), the greatest part of the Cedar Swamp Area Wetland Complex consists of conifer swamp, although ridges to the south support a northern hardwood community. Cedar Swamp contains a large bog area (20 acres) in which leatherleaf (Chamaedaphne sp.) completely dominates to the exclusion of herbaceous plants, except in open water sties in which bullhead-lily (Nuphar sp.) and water-lily (Nymphaea sp.) form profuse colonies to the exclusion of submersed plants. Small hummocks in the bog are vegetated with tag alder (Betula pumila).

Lake Bailey Wetland supports bullhead-lily (Nuphar sp.), floating-leaved pondweed (Potamogeton sp.), and some bulrush (Scirpus sp.). More importantly, Lake Bailey supports a lush growth of submersed plants dominated by red-head pondweed (Potamogeton richardsonii) and water-milfoil (Myriophyllum sp.), which provide an abundant food supply for migratory waterfowl.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of the Cedar Swamp Area Wetland Complex.

Fish

According to Taylor (1954), goldenshiner (Notemigonus crysoleucas), blackchin shiner (Notropis heterodon), spottail shiner (Notropis hudsonius), blacknose shiner (Notropis heterolepis), yellow perch (Perca flavescens), johnny darter (Etheostoma nigrum), Iowa darter (Etheostoma exile), and mottled sculpin (Cottus bairdi) were collected from Lake Bailey in 1926. All these species except the spottail shiner are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978) and may currently utilize Lake Bailey Wetland. Moore and Braem (1965) reported the presence of at least 10 species of fishes in Eliza Creek, which flows through the western end of Cedar Swamp, based on collections between 1950 and 1965 (Table 6-4). Taylor (1954) reported that in 1926, John Lowe collected 14 fish species and intergrades in Eliza Creek, six species and intergrades in Lake Eliza, and eight

Table 6-4. Fish Species Found in Eliza Creek, Lake Eliza, and Cedar Creek, Keweenaw County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
ammocetes of silver or northern brook lamprey (EC-1)	white sucker (EC-1, LE)
sea lamprey (EC-1)	Gadidae
Salmonidae	burbot (EC-1)
rainbow trout (EC-1, CC)	Gasterosteidae
brook trout (EC-1, CC)	brook stickleback* (EC-1, EC-2, CC, LE)
Cyprinidae	Percidae
creek chub (EC-1, LE)	yellow perch* (EC-2, CC)
longnose dace (EC-1, EC-2, CC)	logperch* (EC-2)
finescale dace (LE, EC-2)	Cottidae
northern redbelly dace (LE, EC-2)	mottled sculpin* (EC-1, EC-2, CC)
finescale x northern redbelly dace (LE)	slimy sculpin (CC)
lake chub (EC-2, CC)	
lake chub x longnose dace (EC-2)	
emerald shiner (EC-2)	
spottail shiner (EC-2)	
blacknose shiner* (EC-2)	
bluntnose minnow (EC-2)	

[a]Moore and Braem (1965) and Taylor (1954)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)
EC-1=Eliza Creek in Moore and Braem (1965) LE=Lake Eliza in Taylor (1954)
EC-2=Eliza Creek in Taylor (1954) CC=Cedar Creek in Taylor (1954)

species from Cedar Creek, which flows through the central area of Cedar Swamp. Fish species generally associated with coastal wetland habitats in Michigan are listed in Appendix .

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in these wetlands.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Cedar Swamp Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Cedar Swamp Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Cedar Swamp Area Wetland Complex.

Mammals

The three wetlands of the Cedar Swamp Area Wetland Complex are utilized little by muskrat (Ondatra zibethicus) (Riha, 1977) and are considered poor habitat for this species.

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Cedar Swamp Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Cedar Swamp Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the wetlands are likely to be utilized by several of the fish species present in Cedar and Eliza Creeks and in Lake Bailey.

CULTURAL SETTING

LS 189-191

Population

The Cedar Swamp Area Wetland Complex is located in Eagle Harbor Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-5 indicates that the county experienced a moderate decline in population between 1970 and 1975, but Eagle Harbor Township grew rapidly during the same time period. Projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-5. Population Data for the Vicinity of the Cedar Swamp Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Eagle Harbor Township	350	75.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Cedar Swamp Area Wetland Complex and the surrounding area is rural open space. A medium-duty highway (State Route 26) runs north of Lake Bailey Wetland and adjacent to the northwestern boundary of Cedar Swamp, crossing the northwestern and central sections of the latter wetland. There are light-duty roads and numerous buildings in the vicinity of Cedar Swamp. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Eagle Harbor, Michigan, 1975; Delaware, Michigan, 1948).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Cedar Swamp Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Cedar Swamp Area Wetland Complex are limited to copper (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Cedar Swamp Area Wetland Complex (U.S.G.S. quadrangle maps, Delaware, Michigan, 1948; Eagle Harbor, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Cedar Swamp Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Two historical sites are located to the immediate north of Cedar Swamp. The Holy Redeemer Church is a small white-pine church, built for the mining community in 1854, which has been placed on the national Register of Historical Places. The second historical site is the Eagle Harbor Schoolhouse. Built in 1853, this one-story schoolhouse was where Justus H. Rathbone wrote the ritual for the Knights of Pythias (Peebles and Black, 1976). There are no known archaeological sites in the vicinity of the Cedar Swamp Area Wetland Complex (Peebles and Black, 1976).

RESEARCH PROJECTS LS 189-191

The literature search identified no on-going or impending research projects pertaining to the Cedar Swamp Wetland Complex.

MARSHES AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 192-196

Setting

The Marshes Area Wetland Complex is located along the southern coast of Lake Superior in Eagle Harbor and Houghton Townships of Keweenaw County, Michigan. The Marshes lie approximately 300 feet from the southern shoreline of Lake Superior and 1.2 miles from the town of Eagle Harbor. Great Sand Bay Area Wetlands #1, #2, and #3, and Jacobs Wetland lie 600 feet from the shoreline of Great Sand Bay, which is directly connected to Lake Superior, and are approximately 3.0 miles from Eagle Harbor. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975).

Topography

The Marshes Area Wetland Complex has 30 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of steep hills; the greatest local elevation is 1,383 feet above mean sea level (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Marshes Area Wetland Complex lies is characterized by rock at or near the surface, which is of the Keweenawan period. The wetlands lie in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Owl Creek and an unnamed stream flow through the Marshes, and Jacobs Creek flows through Jacobs Wetland. No streams flow through the other wetlands of the Marshes Area Wetland Complex (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Marshes Area Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960,

the mean monthly low for January is 22.2°F and the mean monthly high for July is 63.8°F. The average annual precipitation is 32.09 inches, with a mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975).

BIOTIC SETTING LS 192-196

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Marshes Area Wetland Complex.

Fish

According to Taylor (1954), brook stickleback (Culea inconstans) was collected in Owl Creek, which flows through The Marshes, in 1926. Fish species found in Jacobs Creek have included brook trout (Salvelinus fontinalis) (Moore and Braem, 1965), long nose dace (Rhinichthys cataractae), and slimy sculpin (Cottus cognatus) (Taylor, 1954, from John N. Lowe collections in 1926). Fish species known known to utilize the coastal wetlands of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the five wetlands of the Marshes Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Marshes Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Marshes Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Marshes Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the five wetlands comprising the Marshes Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Marshes Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 192-196

Population

The Marshes Area Wetland Complex is located in Eagle Harbor and Houghton Townships of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-6 indicates that the county experienced a moderate decline in population between 1970 and 1975, but Eagle Harbor Township grew rapidly and Houghton Township remained stable during the same time period. Projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-6. Population Data for the Vicinity of the Marshes Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Eagle Harbor Township	350	75.9	--
Houghton Township	231	0.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Marshes Area Wetland Complex and the surrounding area is rural open space. State Route 26 runs along the northern border of The Marshes, north of Great Sand Bay Area Wetlands #1, #2, and #3, and east and south of Jacobs Wetland. Buildings are located along the northern boundary of The Marshes and northeast of Jacobs Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Marshes Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Marshes Area Wetland Complex are limited to copper (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Marshes Area Wetland Complex (U.S.G.S. quadrangle map, Eagle Harbor, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Marshes Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Marshes Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 192-196

The literature search identified no on-going or impending research projects pertaining to the Marshes Area Wetland Complex.

EAGLE RIVER AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 197-199

Setting

The Eagle River Area Wetland Complex is located along the southern coast of Lake Superior in Houghton and Allouez Townships of Keweenaw County, Michigan. Dunes Drive Wetland and Eagle River Area Wetland lie approximately 0.2 mile from the shoreline of Lake Superior and 0.6 mile from the city of Eagle River. Silver Creek Area Wetland lies approximately 400 feet from the Lake Superior shoreline, and 1.4 miles from Eagle River. This wetland complex is a Palustrine System and occupies predominantly wooded sites except for a non-wooded area in Eagle River Area Wetland (U.S.G.S. quadrangle map, Phoenix, Michigan, 1975).

Topography

The Eagle River Area Wetland Complex has 80 feet of relief and a maximum elevation of 700 feet above mean sea level (98 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is very hilly; the greatest local elevation is 1,372 feet above mean sea level (Phoenix, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Eagle River Area Wetland Complex lies is characterized by moraines and by rock at or near the surface, which is of the Keweenawan period. The wetlands lie in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through the Eagle River Area Wetland Complex (U.S.G.S. quadrangle map, Phoenix, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Eagle River Area Wetland Complex is located in Copper Harbor-Fort Wilkins, Michigan. The average annual temperature is unavailable. Based on the normal period from 1931-1960, the mean monthly low for January is 22.2^{0}F and the mean monthly high for July is 63.8^{0}F. The average annual precipitation is 32.09 inches, with a

mean monthly precipitation of 2.12 inches in January and 3.37 inches in July. The growing season is approximately six months long, with the last killing frost ($28^{o}F$) in 1973 occurring on April 29 and the first killing frost on October 29 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Phoenix, Michigan, 1975).

BIOTIC SETTING LS 197-199

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Eagle River Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Eagle River Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Eagle River Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Eagle River Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Eagle River Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands comprising the Eagle River Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Eagle River Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 197-199

Population

The Eagle River Area Wetland Complex is located in Houghton and Allouez Townships of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-7 indicates that the county experienced a moderate decline in population between 1970 and 1975, but the population of Houghton Township remained stable during the same time period and that in Allouez Township declined rapidly. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-7. Population Data for the Vicinity of the Eagle River Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Houghton Township	231	0.9	--
Allouez Township	1,451	-14.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Eagle River Area Wetland Complex and the surrounding area is rural open space. Sand Dunes Drive (State Route 26) runs along the northern boundary of Dunes Driver Wetland and south of Eagle River Area Wetland. An unimproved dirt road is adjacent to the northern boundary of Eagle River Area Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Phoenix, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Eagle River Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Eagle River Area Wetland Complex are limited to copper (Great Lakes Basin Commission, 1974).

The wetlands and the surrounding area are wooded and represent potential forest resources, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Eagle River Area Wetland Complex (U.S.G.S. quadrangle map, Phoenix, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Eagle River Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Eagle River Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 197-199

The literature search identified no on-going or impending research projects pertaining to the Eagle River Area Wetland Complex.

MUD LAKE WETLAND

PHYSIOGRAPHIC SETTING LS 200

Setting

Mud Lake Wetland is located along the southern coast of Lake Superior in Allouez Township of Keweenaw County, Michigan. The wetland lies approximately 100 feet from the southern shoreline of Lake Superior and 3.7 miles from the town of Ahmeek. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Topography

Mud Lake Wetland has 60 feet of relief and a maximum elevation of 680 feet above mean sea level (78 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is irregular, with both rising and sinking areas and inland hills (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Mud Lake Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Three unnamed streams flow through Mud Lake Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Mud Lake Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

BIOTIC SETTING LS 200

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Mud Lake Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Mud Lake Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Mud Lake Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Mud Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Mud Lake Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Mud Lake Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Mud Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 200

Population

Mud Lake Wetland is located in Allouez Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-8 indicates that the county experienced a moderate decline in population between 1970 and 1975, and population in Allouez Township declined rapidly. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-8. Population Data for the Vicinity of Mud Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Allouez Township	1,451	-14.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Mud Lake Wetland and the surrounding area is rural open space. An unimproved dirt road runs west and south of Mud Lake Wetland, crossing a lower portion of the wetland. There are several trails in the eastern section. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Mud Lake Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Mud Lake Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Mud Lake Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Mud Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Mud Lake Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 200

The literature search identified no on-going or impending research projects pertaining to Mud Lake Wetland.

GRATIOT RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 201

Setting

Gratiot River Wetland is located along the southern coast of Lake Superior in Allouez Township of Keweenaw County, Michigan. The wetland lies approximately 50 feet from the shoreline of Lake Superior and 3.7 miles from the town of Ahmeek. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Topography

Gratiot River Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is hilly, and a river valley passes through the wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Gratiot River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Gratiot River flows through Gratiot River Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Gratiot River Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

BIOTIC SETTING LS 201

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Gratiot River Wetland.

Fish

Fish species found in the Gratiot River are listed in Table 6-9. According to Taylor (1954), four species additional to those in Table 6-9 were collected in the Gratiot River in 1926, including lake chub (Couesius plumbeus), blacknose dace (Rhinichthys atratulus), mottled sculpin (Cottus bairdi), and brook stickleback (Culea inconstans). The mottled sculpin and brook stickleback are often associated with submerged vegetation (Trautman, 1957) and may occur in Gratiot River Wetland.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Gratiot River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Gratiot River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Gratiot River Wetland.

Table 6-9 . Fish Species Found in Gratiot River, Keweenaw County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
ammocetes (northern brook or silver lamprey)	longnose sucker
sea lamprey	Gadidae
	burbot
Salmonidae	
brown trout	Percopsidae
rainbow trout	trout-perch
brook trout	
	Centrarchidae
Cyprinidae	rock bass
creek chub	
longnose dace	Percidae
common shiner	logperch*

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Gratiot River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Gratiot River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, the wetland is likely to be utilized by numerous fish species present in the Gratiot River.

CULTURAL SETTING LS 201

Population

Gratiot River Wetland is located in Allouez Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-10 indicates that the county experienced a moderate decline in population between 1970 and 1975, and population in Allouez Township declined rapidly. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-10. Population Data for the Vicinity of Gratiot River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Allouez Township	1,451	-14.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Gratiot River Wetland and the surrounding area is rural open space. An unimproved dirt road runs between the three sections of the Gratiot River Wetland, and there is a trail in the western section. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Gratiot River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Gratiot River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Gratiot River Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Gratiot River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Gratiot River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 201

The literature search identified no on-going or impending research projects pertaining to Gratiot River Wetland.

BLACK CREEK WETLAND

PHYSIOGRAPHIC SETTING

LS 202

Setting

Black Creek Wetland is located along the southern coast of Lake Superior, in Allouez Township of Keweenaw County, Michigan. The wetland lies approximately 400 feet from the southern shoreline of Lake Superior and 3.4 miles from the town of Ahmeek. This wetland is a Palustrine System and occupies a partially wooded site (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Topography

Black Creek Wetland has 20 feet of relief with an elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is hilly with some low areas (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Black Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

No streams flow through Black Creek Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Black Creek Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

BIOTIC SETTING LS 202

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Black Creek Wetland.

Fish

According to Taylor (1954), brook trout (Salvelinus fontinalis), lake chub (Coeusius plumbeus), longnose dace (Rhinichthys cataractae), slimy sculpin (Cottus cognatus), and brook stickleback (Culea inconstans) were collected from the mouth of Black Creek in 1926. Moore and Braem (1965) also reported collections of lake chub and white sucker (Catostomus commersoni) from Hills Creek, which joins Black Creek upstream of Black Creek Wetland, between 1950 and 1965. Of the above species, the white sucker and brook stickleback are often associated with wetland habitats (Trautman, 1957) and may occur in Black Creek Wetland although neither creek impinges on the wetland itself. Other species associated with coastal wetlands of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in this wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Black Creek Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Black Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use,

health, life histories, relationship to water levels, or major food sources of the birds utilizing Black Creek Wetland.

Mammals

No sign of muskrat (Ondatra zibethicus) activity has been noted on Black Creek Wetland, which is considered poor habitat for muskrat (Riha, 1977). Although this wetland is considered good habitat for beaver (Castor canadensis), no beaver have been observed either.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Black Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Black Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 202

Population

Black Creek Wetland is located in Allouez Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-11 indicates that the county experienced a moderate decline in population between 1970 and 1975, and population in Allouez Township declined rapidly. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-11. Population Data for the Vicinity of Black Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Allouez Township	1,451	-14.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Black Creek Wetland and the surrounding area is rural open space. The wetland is under private ownership and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Black Creek Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Black Creek Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Black Creek Wetland (U.S.G.S. quadrangle map, Ahmeek, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Black Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Black Creek Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to Black Creek Wetland.

BREWERY CREEK AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 203-205

Setting

The Brewery Creek Area Wetland Complex is located along the southern coast of Lake Superior in Allouez Township of Keweenaw County, Michigan. The various parts of the wetland lie approximately 0.1 mile from the shoreline of Lake Superior and 3.3 miles from the town of Calumet. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975).

Topography

The Brewery Creek Area Wetland Complex has 22 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Brewery Creek Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland complex lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Keweenaw County.

Hydrology

Brewery Creek flows through Brewery Creek Wetland and one unnamed stream flows through the other two wetlands of the Brewery Creek Area Wetland Complex (U.S.G.S. quadrangle maps, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for Brewery Creek Area Wetland Complex is located in Houghton, Michigan. The average annual temperature is 41.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7^{o}F and the mean monthly high for July is 69.2^{o}F. The average annual precipitation is 39.19 inches, with a mean monthly

precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975).

BIOTIC SETTING LS 203-205

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Brewery Creek Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnestoa are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Brewery Creek Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Brewery Creek Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Keweenaw County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Brewery Creek Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Brewery Creek Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Brewery Creek Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Brewery Creek Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 203-205

Population

The Brewery Creek Area Wetland Complex is located in Allouez Township of Keweenaw County, Michigan. Keweenaw County is sparsely populated, having a density of four persons per square mile. Table 6-12 indicates that the county experienced a moderate decline in population between 1970 and 1975, and population in Allouez Township declined rapidly. However, projections for 1990 indicate that Keweenaw County is expected to undergo a rapid rate of population growth in the future.

Table 6-12. Population Data for the Vicinity of the Brewery Creek Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Keweenaw County	2,173	-4.0	2,571
Allouez Township	1,451	-14.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Brewery Creek Area Wetland Complex and the surrounding area is rural open space. Light-duty roads run west and east of Brewery Creek Area Wetland #1, crossing a lower section of the wetland. A trail is adjacent to the northern boundary, and several buildings have been built west of the wetland. A light-duty road runs through Brewery Creek Wetland, and six buildings are located just northwest of the area. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Brewery Creek Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Brewery Creek Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Brewery Creek Area Wetland Complex (U.S.G.S. quadrangle maps, Muggun Creek, Michigan, 1975; Ahmeek, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Brewery Creek Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Brewery Creek Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 203-205

The literature search identified no on-going or impending research projects pertaining to the Brewery Creek Area Wetland Complex.

MUGGUN CREEK AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 206-208

Setting

The Muggun Creek Area Wetland Complex is located along the southern coast of Lake Superior in Calumet Township of Houghton County, Michigan. The various parts of the wetland complex lie approximately 300 feet from the shoreline of Lake Superior and 4.3 miles from the town of Calumet. This complex is a Palustrine System and occupies predominantly wooded sites except for a non-wooded portion in Muggun Creek Area Wetland #3 (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975).

Topography

The Muggun Creek Area Wetland Complex has 40 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area consists of a long, steady, steeply rising grade with hills beyond (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Muggin Creek Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland complex lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through the Muggun Creek Area Wetland Complex (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Muggun Creek Area Wetland Complex is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly

precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975).

BIOTIC SETTING LS 206-208

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Muggun Creek Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Muggun Creek Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Muggun Creek Area Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Muggun Creek Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Muggun Creek Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the three wetlands comprising the Muggun Creek Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Muggun Creek Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING

LS 206-208

Population

The Muggun Creek Area Wetland Complex is located in Calumet Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 6-13 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, while the population of Calumet Township remained stable. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 6-13. Population Data for the Vicinity of the Muggun Creek Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Calumet Township	8,194	-0.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Muggun Creek Area Wetland Complex is rural open space, but there is residential development in the surrounding area. A medium-duty highway runs northwest of Muggun Creek Area Wetlands #1 and #3 and southeast of Muggun Creek Area Wetland #2. A trail lies north of Wetland #1, and there are several buildings north of wetlands #1 and #2. The wetlands are under private ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Muggun Creek Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Muggun Creek Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Muggun Creek Area Wetland Complex (U.S.G.S. quadrangle map, Muggun Creek, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Muggun Creek Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Muggun Creek Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 206-208

The literature search identified no on-going or impending research projects pertaining to the Muggun Creek Area Wetland Complex.

SEVENMILE CREEK WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 209-210

Setting

The Sevenmile Creek Wetland Complex is located along the southern coast Lake Superior in Hancock Township of Houghton County, Michigan. The component parts of the complex lie approximately 500 feet from the southern shoreline of Lake Superior, and 7.2 miles from the community of Hancock. This wetland complex is a Palustrine System and occupies predominantly wooded sites except for a non-wooded area in Sevenmile Creek Wetland #2 (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Topography

The Sevenmile Creek Wetland Complex has 20 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is a long steep grade with hills beyond (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which the Sevenmile Creek Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland complex lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

Four unnamed streams flow through the Sevenmile Creek Wetland Complex (U.S.G.S. quadrangle map, Hancock, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Sevenmile Creek Wetland Complex is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly

precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost ($28^{o}F$) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

BIOTIC SETTING LS 209-210

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Sevenmile Creek Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Sevenmile Creek Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Sevenmile Creek Wetland Complex.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Sevenmile Creek Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Sevenmile Creek Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the two wetlands comprising the Sevenmile Creek Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Sevenmile Creek Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING

LS 209-210

Population

The Sevenmile Creek Wetland Complex is located in Hancock Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 6-14 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, and growth in Hancock Township was moderate. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 6-14. Population Data for the Vicinity of the Sevenmile Creek Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Hancock Township	4,977	3.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Sevenmile Creek Wetland Complex and the surrounding area is rural open space. A medium-duty highway runs northwest and south of Sevenmile Creek Wetland #1, and north of Sevenmile Creek Wetland #2. Unimproved dirt roads run north of Wetland #1 and west of Wetland #2. A light-duty road crosses Wetland #2; two buildings are located at the intersection of this road with another light-duty road at the eastern point of this wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Sevenmile Creek Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Sevenmile Creek Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Sevenmile Creek Wetland Complex (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Sevenmile Creek Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Sevenmile Creek Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 209-210

The literature search identified no on-going or impending research projects pertaining to the Sevenmile Creek Wetland Complex.

BEAR LAKE WETLAND

PHYSIOGRAPHIC SETTING

LS 211

Setting

Bear Lake Wetland is located along the southern coast of Lake Superior in Hancock Township of Houghton County, Michigan. The wetland lies approximately 0.2 mile from the shoreline of Lake Superior and 5.8 miles from the community of Hancock. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Topography

Bear Lake Wetland has seven feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Bear Lake Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Bear Lake Wetland (U.S.G.S. quadrangle map, Hancock, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Bear Lake Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

BIOTIC SETTING LS 211

Vegetation

According to Riha (1977), bulrush (Scirpus sp.) dominates the emergent community of Bear Lake Wetland, but cattail (Typha sp.) also occurs. Wetter areas support bullhead-lily (Nuphar sp.) and water-lily (Nymphaea sp.) while drier areas support a bog-like flora including blueberry (Vaccinium sp.) and leatherleaf (Chamaedaphne sp.). Submersed vegetation is sparse. To the north of the wetland is a hardwood forest, to the south is a birch (Betula sp.) forest, and on the eastern and western sides are shrub communities.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of Bear Lake Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Bear Lake Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Bear Lake Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bear Lake Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Bear Lake Wetland.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are present on Bear Lake Wetland (Riha, 1977).

The literature search provided no site-specific data pertaining to other major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Bear Lake Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Bear Lake Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 211

Population

Bear Lake Wetland is located in Hancock Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 6-15 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, and growth in Hancock Township was moderate. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 6-15. Population Data for the Vicinity of Bear Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Hancock Township	4,977	3.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Bear Lake Wetland and the surrounding area is rural open space. A medium-duty highway is adjacent to the northern and southwestern points of this wetland, a light-duty road crosses the central section, and unimproved dirt roads are adjacent to the northern and southwestern boundaries. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Recreation

The northern portion of Bear Lake Wetland is located in McLain State Park, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are located in the vicinity of Bear Lake Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Bear Lake Wetland (U.S.G.S. quadrangle map, Hancock, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Bear Lake Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Bear Lake Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

The literature search identified no on-going or impending research projects pertaining to Bear Lake Wetland.

SALMON TROUT RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 212

Setting

Salmon Trout River Wetland is located approximately 400 feet from the southern shoreline of Lake Superior, in Stanton Township of Houghton County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a non-wooded site (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975).

Topography

Salmon Trout River Wetland has little relief and lies at an elevation of 605 feet above mean sea level (three feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Salmon Trout River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Houghton County.

Hydrology

No streams flow through Salmon Trout River Wetland although the Salmon Trout River passes very near it (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Salmon Trout River Wetland is located in Houghton, Michigan. The average annual temperature is 41.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 16.7°F and the mean monthly high for July is 69.2°F. The average annual precipitation is 39.19 inches, with a mean monthly precipitation of 6.57 inches in January and 1.46 inches in July. The growing season is approximately five and one-fourth months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975).

BIOTIC SETTING LS 212

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Salmon Trout River Wetland.

Fish

Collections between 1950 and 1965 revealed the presence of sea lamprey (Petromyzon marinus), ammocetes of silver lamprey (Ichthyomyzon unicuspis) or northern brook lamprey (Ichthyomyzon fossor), and brook trout (Salvelinus fontinalis) in the Salmon Trout River (Moore and Braem, 1965). None of these species is generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Species known to be associated with coastal wetland habitats in Michigan are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Salmon Trout River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Salmon Trout River Wetland.

Reptiles and Amphibians

A record of the herpetofauna of Houghton County, according to Ruthven et al. (1928), appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Salmon Trout River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Salmon Trout River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Salmon Trout River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Salmon Trout River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 212

Population

Salmon Trout River Wetland is located in Stanton Township of Houghton County, Michigan. Houghton County is sparsely populated, having a density of 34 persons per square mile. Table 6-16 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid population growth is expected to continue in Houghton County.

Table 6-16. Population Data for the Vicinity of Salmon Trout River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Houghton County	36,960	6.7	43,324
Stanton Township	1,168	20.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Salmon Trout River Wetland and the surrounding area is rural open space. An unimproved dirt road runs southeast of Salmon Trout River Wetland, and two buildings are located there. The wetland is under private

ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Salmon Trout River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Salmon Trout River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

A transmission line runs to the south and southwest of Salmon Trout River Wetland (U.S.G.S. quadrangle map, Beacon Hill, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Salmon Trout River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Salmon Trout River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 212

The literature search identified no on-going or impending research projects pertaining to Salmon Trout River Wetland.

LITTLE ELM RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 213

Setting

Little Elm River Wetland is located approximately 0.1 mile from the southern shoreline of Lake Superior in Bohemia Township of Ontonagon County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975).

Topography

Little Elm River Wetland has little relief and lies at an elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is composed of a long upward grade with hills beyond (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975).

Surficial Geology

The surficial geology of the area in which Little Elm River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Ontonagon County.

Hydrology

One unnamed stream, a tributary to the Little Elm River, flows through Little Elm River Wetland (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Little Elm River Wetland is located in Ontonagon, Michigan. The average annual temperature is 40.7^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{o}F and the mean monthly high for July is 66.2^{o}F. The average annual precipitation is 29.95 inches, with a mean monthly precipitation of 1.26 inches in January and 3.47 inches in July. The growing season is approximately

four months long, with the last killing frost (28°F) in 1975 occurring on June 8 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975).

BIOTIC SETTING LS 213

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Little Elm River Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Little Elm River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Little Elm River Wetland.

Reptiles and Amphibians

The lists of reptiles and amphibians of Ontonagon County prepared by Ruthven (1904)and Ruthven et al. (1928) appear in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Little Elm River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Little Elm River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Little Elm River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Little Elm River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 213

Population

Little Elm River Wetland is located in Bohemia Township of Ontonagon County, Michigan. Ontonagon County is sparsely populated, having a density of 8 persons per square mile. Table 6-17 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but population in Bohemia Township declined sharply. Projections for 1990 indicate that rapid population growth is expected to continue in Ontonagon County.

Table 6-17. Population Data for the Vicinity of Little Elm River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ontonagon County	11,357	7.7	14,795
Bohemia Township	83	-16.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Little Elm River Wetland and the surrounding area is rural open space. The wetland is under private ownership, and its location suggests

that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Little Elm River Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Little Elm River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Little Elm River Wetland (U.S.G.S. quadrangle map, Rockhouse Point, Michigan, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Little Elm River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Little Elm River Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 213

The literature search identified no on-going or impending research projects pertaining to Little Elm River Wetland.

EAST SLEEPING RIVER WETLAND

PHYSIOGRAPHIC SETTING LS 214

Setting

East Sleeping River Wetland is located approximately 90 feet from the shoreline of Sleeping Bay, which is directly connected to Lake Superior, in Ontonagon Township of Ontonagon County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Topography

East Sleeping River Wetland has five feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding area is composed of a river valley with low hills (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Surficial Geology

The surficial geology of the area in which East Sleeping River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Ontonagon County.

Hydrology

The East Sleeping River flows through East Sleeping River Wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for East Sleeping River Wetland is located in Ontonagon, Michigan. The average annual temperature is 40.7°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.0°F and the mean monthly high for July is 66.2°F. The average annual precipitation is 29.95 inches, with a mean monthly precipitation of 1.26 inches in January and 3.47 inches in July. The growing season is approximately four months long, with the last killing frost (28°F) in 1975 occurring on June 8

and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

BIOTIC SETTING LS 214

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of East Sleeping River Wetland.

Fish

Fish species collected between 1950 and 1965 in the East Sleeping River included sea lamprey (Petromyzon marinus), ammocetes of silver lamprey (Ichthyomyzon unicuspis) or northern brook lamprey (Ichthyomyzon fossor), creek chub (Semotilus atromaculatus), blacknose dace (Rhinichthys atratulus), longnose dace (Rhinichthys cataractae), common shiner (Notropis cornutus), white sucker (Catostomus commersoni), johnny darter (Etheostoma nigrum), and mottled sculpin (Cottus bairdi) (Moore and Braem, 1965). Of these the white sucker, johnny darter, and mottled sculpin are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Species known to be associated with coastal wetlands in Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in East Sleeping River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in East Sleeping River Wetland.

Reptiles and Amphibians

The lists of reptiles and amphibians of Ontonagon County prepared by Ruthven (1904)and Ruthven et al. (1928) appear in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in East Sleeping River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing East Sleeping River Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting East Sleeping River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in East Sleeping River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 214

Population

East Sleeping River Wetland is located in Ontonagon Township of Ontonagon County, Michigan. Ontonagon County is sparsely populated, having a density of 8 persons per square mile. Table 6-18 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but population in Ontonagon Township experienced a moderate rate of population growth. Projections for 1990 indicate that rapid population growth is expected to continue in Ontonagon County.

Table 6-18. Population Data for the Vicinity of East Sleeping River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ontonagon County	11,357	7.7	14,795
Ontonagon Township	3,884	3.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within East Sleeping River Wetland and the surrounding area is rural open space. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Recreation

East Sleeping River Wetland is located in Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near East Sleeping River Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of East Sleeping River Wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Pollution Sources

There are no NPDES permit holders adjacent to East Sleeping River Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of East Sleeping River Wetland. However, the Michigan Coastal Zone Inventory indicates that one archaeological site (20-ON-6, an historic Indian cemetery) is present in the

vicinity of the wetland (Peebles and Black, 1976). Further information regarding the field research and exact location of this site can be obtained from the Michigan History Division.

RESEARCH PROJECTS LS 214

The literature search identified no on-going or impending research projects pertaining to East Sleeping River Wetland.

FOURTEENMILE POINT WETLAND

PHYSIOGRAPHIC SETTING

LS 215

Setting

Fourteenmile Point Wetland is located approximately 50 feet from the southern shoreline of Lake Superior in Ontonagon Township of Ontonagon County, Michigan. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Topography

Fourteenmile Point Wetland has six feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding area is composed of a long upward grade, with a river valley, and irregular inland hills (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Surficial Geology

The surficial geology of the area in which Fourteenmile Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Ontonagon County.

Hydrology

No streams flow through Fourteenmile Point Wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Fourteenmile Point Wetland is located in Ontonagon, Michigan. The average annual temperature is 40.7°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.0°F and the mean monthly high for July is 66.2°F. The average annual precipitation is 29.95 inches, with a mean monthly precipitation of 1.26 inches in January and 3.47 inches in July. The growing season is approximately four months long, with the last killing frost (28°F) in 1975 occurring on June 8 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

BIOTIC SETTING LS 215

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Fourteenmile Point Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Fourteenmile Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Fourteenmile Point Wetland.

Reptiles and Amphibians

The lists of reptiles and amphibians of Ontonagon County prepared by Ruthven (1904)and Ruthven et al. (1928) appear in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Fourteenmile Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Fourteenmile Point Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Fourteenmile Point Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in Fourteenmile Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 215

Population

Fourteenmile Point Wetland is located in Ontonagon Township of Ontonagon County, Michigan. Ontonagon County is sparsely populated, having a density of 8 persons per square mile. Table 6-19 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but population in Ontonagon Township experienced moderate population growth. Projections for 1990 indicate that rapid population growth is expected to continue in Ontonagon County.

Table 6-19. Population Data for the Vicinity of Fourteenmile Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ontonagon County	11,357	7.7	14,795
Ontonagon Township	3,884	3.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within Fourteenmile Point Wetland and the surrounding area is rural open space. A trail is adjacent to the western boundary of the wetland, and a lighthouse and several buildings are located to the northwest. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Recreation

A portion of Fourteenmile Point Wetland is in the Baraga State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near Fourteenmile Point Wetland, but the wetland and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Fourteenmile Point Wetland (U.S.G.S. quadrangle map, Greenland, Michigan, 1950).

Pollution Sources

There are no NPDES permit holders adjacent to Fourteenmile Point Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Fourteenmile Point Wetland, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS LS 215

The literature search identified no on-going or impending research projects pertaining to Fourteenmile Point Wetland.

FLINTSTEEL RIVER AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 216-219

Setting

The Flintsteel River Area Wetland Complex is located on the southern coast of Lake Superior in Ontonagon Township of Ontonagon County, Michigan. The component parts of the complex extend from the shoreline to approximately 0.2 mile inland. Paddys Creek Wetland is located 1.5 miles from the community of Ontonagon. This wetland complex is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Greenland,Michigan, 1950; Ontonagon, Michigan, 1955).

Topography

The Flintsteel River Area Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as wetland. The surrounding area is irregular and hilly, with river valleys (U.S.G.S. quadrangle map, Greenland, Michigan, 1950; Ontonagon, Michigan, 1955).

Surficial Geology

The surficial geology of the area in which the Flintsteel River Area Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Cambrian period and the Jacobsville formation. The wetland lies in an area formerly covered by Glacial Lake Nipissing (Martin, 1957).

Soils

No soil survey is currently available for Ontonagon County.

Hydrology

The Flintsteel River flows through Flintsteel River Wetland, Paddys Creek flows through Paddys Creek Wetland, and the Firesteel River flows through Firesteel River Wetland. No streams flow through the fourth wetland of the Flintsteel River Area Wetland Complex (U.S.G.S. quadrangle maps, Ontonagon, Michigan, 1955; Greenland, Michigan, 1950). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Flintsteel River Area Wetland Complex is located in Ontonagon, Michigan. The average

annual temperature is 40.7°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.0°F and the mean monthly high for July is 66.2°F. The average annual precipitation is 29.95 inches, with a mean monthly precipitation of 1.26 inches in January and 3.47 inches in July. The growing season is approximately four months long, with the last killing frost (28°F) in 1975 occurring on June 8 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Ontonagon, Michigan, 1955; Greenland, Michigan, 1950).

BIOTIC SETTING LS 216-219

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Flintsteel River Area Wetland Complex.

Fish

Fish species found in the Firesteel and Flintsteel Rivers are listed in Tables 6-20 and 6-21. Collections between 1950 and 1965 revealed the presence of creek chub (Semotilus atromaculatus), blacknose dace (Rhinichthys atratulus) northern redbelly dace (Phoxinus eos), common shiner (Notropis cornutus), white sucker (Catostomus commersoni), johnny darter (Etheostoma nigrum), and mottled sculpin (Cottus bairdi) in Paddys Creek (Moore and Braem, 1965). Of these, the white sucker, johnny darter, and mottled sculpin are generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). Other species often associated with coastal wetland habitats of Michigan are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Flintsteel River Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Flintsteel River Area Wetland Complex.

Table 6-20. Fish Species Found in Firesteel River, Ontonagon County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	silver redhorse*
sea lamprey	Ictaluridae
Salmonidae	brown bullhead*
brown trout	Gadidae
rainbow trout	burbot
brook trout	Gasterosteidae
Osmeridae	brook stickleback*
rainbow smelt	ninespine stickleback
Umbridae	Percopsidae
central mudminnow*	trout-perch
Esocidae	Centrarchidae
northern pike*	smallmouth bass*
Cyprinidae	pumpkinseed*
creek chub	bluegill*
blacknose dace	rock bass
longnose dace	Percidae
finescale dace	yellow perch*
northern redbelly dace	walleye*
goldenshiner*	logperch*
common shiner	johnny darter*
spottail shiner	Cottidae
sand shiner	mottled sculpin*
mimic shiner	
brassy minnow	
fathead minnow*	

[a]Moore and Braem (1965)
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Table 6-21. Fish Species Found in Flintsteel River, Ontonagon County, Michigan[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	Ictaluridae
sea lamprey	brown bullhead*
Salmonidae	Gadidae
brown trout	burbot
rainbow trout	Gasterosteidae
brook trout	brook stickleback*
Osmeridae	ninespine stickleback
rainbow smelt	Percopsidae
Umbridae	trout-perch
central mudminnow*	Centrarchidae
Esocidae	pumpkinseed*
northern pike*	rock bass
Cyprinidae	Percidae
creek chub	yellow perch*
lake chub	logperch*
blacknose dace	johnny darter*
longnose dace	Cottidae
finescale dace	mottled sculpin*
northern redbelly dace	
goldenshiner*	
common shiner	
spottail shiner	
brassy minnow	

[a]Moore and Braem, 1965
*species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Reptiles and Amphibians

The lists of reptiles and amphibians of Ontonagon County prepared by Ruthven (1904)and Ruthven et al. (1928) appear in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Flintsteel River Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Flintsteel River Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Flintsteel River Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Flintsteel River Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, they are likely to be utilized by some of the fish species present in the rivers flowing through them.

CULTURAL SETTING LS 216-219

Population

The Flintsteel River Area Wetland Complex is located in Ontonagon Township of Ontonagon County, Michigan. Ontonagon County is sparsely populated, having a density of 8 persons per square mile. Table 6-22 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but population in Ontonagon Township experienced moderate population growth. Projections for 1990 indicate that rapid population growth is expected to continue in Ontonagon County.

Table 6-22. Population Data for the Vicinity of the Flintsteel River Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ontonagon County	11,357	7.7	14,795
Ontonagon Township	3,884	3.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Office of Management and Budget (1975)

Land Use and Ownership

Land use within the Flintsteel River Area Wetland Complex and the surrounding area is rural open space. Unimproved dirt roads are adjacent to the southeastern borders of Firesteel River Wetland, Flintsteel River Wetland, and Paddys Creek Wetland. A light-duty road runs north of the latter wetland, which also has two buildings in its southeastern section. An old railroad grade runs through Flintsteel River Area Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Ontonagon, Michigan, 1955; Greenland, Michigan, 1950).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Flintsteel River Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are present in or near the Flintsteel River Area Wetland Complex, but the wetlands and the surrounding area are wooded and represent potential forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Flintsteel River Area Wetland Complex (U.S.G.S. quadrangle maps, Ontonagon, Michigan, 1955; Greenland, Michigan, 1950).

Pollution Sources

There are no NPDES permit holders adjacent to the Flintsteel River Area Wetland Complex (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Flintsteel River Area Wetland Complex, nor are there any known archaeological sites in the vicinity (Peebles and Black, 1976).

RESEARCH PROJECTS

LS 216-219

The literature search identified no on-going or impending research projects pertaining to the Flintsteel River Area Wetland Complex.

GRAVEYARD CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 220

Setting

Graveyard Creek Wetland is located on the southern shoreline of Lake Superior in Saxon Township of Iron County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956).

Topography

Graveyard Creek Wetland has 98 feet of relief and a maximum elevation of 700 feet above mean sea level (98 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is composed of a high bluff at the waters edge with a long upward sloping area inland (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956).

Surficial Geology

The surficial geology of the area in which Graveyard Creek Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Iron County.

Hydrology

Graveyard Creek flows through Graveyard Creek Wetland (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Graveyard Creek Wetland is located in Gurney, Wisconsin. The average annual temperature is 42.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 15.9°F and the mean monthly high for July is 68.7°F. The average annual precipitation is 32.30 inches, with a mean monthly precipitation of 2.84 inches in January and 1.86 inches in July. The growing season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956).

BIOTIC SETTING LS 220

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Graveyard Creek Wetland.

Fish

Fish species recorded in Graveyard Creek (Moore and Braem, 1965; Wisconsin Department of Natural Resources, 1970) include rainbow trout (Salmo gairdneri), brook trout (Salvelinus fontinalis), longnose dace (Rhinichthys cataractae), trout perch (Percopsis omiscomaycus), and mottled sculpin (Cottus bairdi). Of these only the mottled sculpin is generally associated with wetland habitats (Trautman, 1957). Fish species known to utilize the coastal wetlands of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Graveyard Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Graveyard Creek Wetland.

Reptiles and Amphibians

The list of herpetofauna of Iron County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Graveyard Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Graveyard Creek Wetland.

Mammals

Some beaver (Castor canadensis) activity has been noted along Graveyard Creek (Wisconsin Department of Natural Resources, 1970).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Graveyard Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Graveyard Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 220

Population

Graveyard Creek Wetland is located in Saxon Township of Iron County, Wisconsin. Iron County is sparsely populated, having a density of 9 persons per square mile. Table 6-23 indicates that the county experienced a slow rate of population growth between 1970 and 1975, while population in Saxon Township declined rapidly. Projections for 1990 indicate that Iron County is expected to undergo a slow population decline in the future.

Table 6-23. Population Data for the Vicinity of Graveyard Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Iron County	6,627	1.4	6,370
Saxon Township	346	-6.7	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin, State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Graveyard Creek Wetland and the surrounding area is rural open space. A trail runs along the southeastern boundary. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956).

Recreation

No known state or federal recreational facilities are present in the vicinity of Graveyard Creek Wetland.

Mineral, Energy, and Forest Resources

Graveyard Creek Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Graveyard Creek Wetland (U.S.G.S. quadrangle map, Little Girls Point, Wisconsin-Michigan, 1956).

Pollution Sources

There are no NPDES permit holders adjacent to Graveyard Creek Wetland (Michigan Water Quality Division, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Graveyard Creek Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 220

The literature search identified no on-going or impending research projects pertaining to Graveyard Creek Wetland.

Table 6-14. Data Gaps-Lake Section 6

Data Gap*		Wetland Number	183	184	185–188	189–191	192–196	197–199	200	201	202	203–205	206–208	209–210	211	212	213	214	215	216–219	220
Physiographic Setting		Setting																			
		Topography																			
		Surficial Geology																			
		Soils	*	*	*	*	*	**	*	*	**	*	**	**	*	**	*	*	**	*	*
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
		Climate																			
		Special Features																			
Biotic Setting	Vegetation	Major Species Distribution	*	*	*		*	*	*	*	*	*	*	*	*		*	*	*	*	*
		Major Species Composition	*	*	*		*	*	*	*	*	*	*	*	*		*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species			*			*	*			*	*	*	*		*		*		
		Species Composition						*	*			*	*	*	*		*		*		
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species										*									
		Health	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*
Cultural Setting		Population																			
		Land Use and Ownership																			
		Recreation																			
		Mineral, Energy, Forest Resource																			
		Public Utilities/Facilities																			
		Point Pollution Sources																			
		Non-Point Pollution Sources																			
		Historic Features																			
		Archaeologic Features																			

LAKE SECTION 7

INTRODUCTION

Lake Section 7 extends from the Michigan-Wisconsin border to Van Tassells Point. The region features irregular upward sloping grades in the vicinity of the wetlands. The predominant shore types along this 45 mile stretch of shoreline are erodible bluff and plaine.

Figure 7-1 shows the approximate location of the 8 coastal wetlands of Lake Section 7. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 7-1. The wetlands of Lake Section 7 are located at elevations between 610 and 640 feet above sea level, 8 feet to 38 feet above mean elevation of Lake Superior. The Section 7 wetlands are all classified as Palustrine and Riverine.

Available information related to physiographic and cultural features of these 8 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

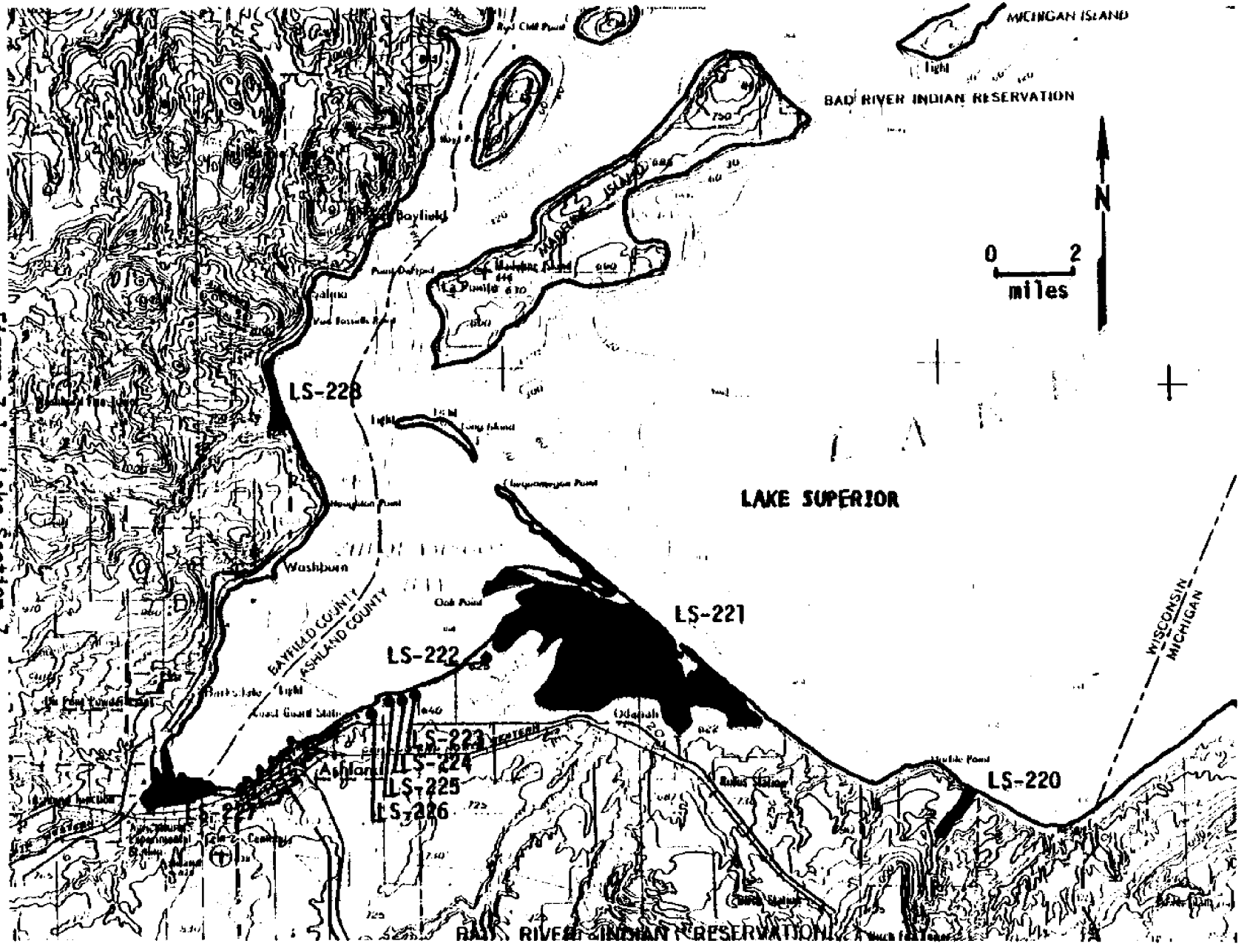


Figure 7-1. Lake Section 7

Table 7-1. Location, Acreage, and Classification of Wetlands in Lake Section 7

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 221	Chequamegon Wetland	46°38'10"	90°41'42"	9510	P-R
	SOUTHEAST CHEQUAMEGON BAY AREA WETLAND COMPLEX				
LS 222	Southeast Chequamegon Bay Area Wetland #1	46°38'07"	90°45'58"	5	P
LS 223	Southeast Chequamegon Bay Area Wetland #2	46°37'26"	90°47'23"	10	P
LS 224	Southeast Chequamegon Bay Area Wetland #3	46°37'24"	90°47'49"	5	P
LS 225	Southeast Chequamegon Bay Area Wetland #4	46°37'16"	90°48'10"	2	P
LS 226	Southeast Chequamegon Bay Area Wetland #5	46°36'46"	90°48'49"	15	P
LS 227	Fish Creek Wetland	46°35'14"	90°56'07"	780	P-R
LS 228	Sioux River Wetland	46°44'43"	90°53'19"	202	P-R

[a]P=palustrine

CHEQUAMEGON WETLAND

PHYSIOGRAPHIC SETTING LS 221

Setting

Chequamegon Wetland lies partly on the shoreline of Chequamegon Bay, which is directly connected to Lake Superior, but the majority of the wetland lies on the shoreline of Lake Superior. The wetland is located in Sanborn Township of Ashland County, Wisconsin. There are no major population centers in the area. This large wetland is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Odanah, Wisconsin, 1975; 1975; Cedar, Wisconsin, 1975; Long Island, Wisconsin, 1964; Chequamegon Point, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

Topography

Chequamegon Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as erodible low bluff and wetland. The surrounding area is an irregular, upward sloping grade, with river valleys (U.S.G.S. quadrangle maps, Cedar, Wisconsin, 1975; Ashland East, Wisconsin, 1975; Odanah, Wisconsin, 1975; Long Island, Wisconsin, 1964; Chequamegon Point, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Chequamegon Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

Denomic Creek, the Bad River, the Kakagon River, Bear Trap Creek, Wood Creek, and two unnamed streams flow through Chequemegon Wetland (U.S.G.S. quadrangle maps, Odanah, Wisconsin, 1975; Chequamegon Point, Wisconsin, 1964; Ashland East, Wisconsin, 1975; Long Island, Wisconsin, 1964; Odanah, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Bad River may be found in Schneiderwent (1974), Dickas (1975), U.S. Army, Corps of Engineers (1977), Sather and Threinen (1966), U.S. Geological Survey (1976), Wisconsin Department of Natural Resources (1975), and Bedford, et al. (1976); information on the Kakagon River may be found in Sather and Threinen (1966).

Climate

The closest weather station providing climatic data for Chequamegon Wetland is located in Ashland, Wisconsin. The average annual temperature is 39.7°F, based on the normal period from 1941-1970. The mean monthly low for January is 12.1°F and the mean monthly high for July is 66.9°F. The average annual precipitation is 30.12 inches, with a mean monthly precipitation of 0.94 inches in January and 4.20 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on September 25 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of this wetland (U.S.G.S. quadrangle maps, Odanah, Wisconsin, 1975; Cedar, Wisconsin, 1975; Long Island, Wisconsin, 1964; Chequamegon Point, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

BIOTIC SETTING

LS 221

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Chequamegon Wetland.

Fish

Fish species reported from the Bad River are listed in Table 7-2, and those which probably utilize the Chequamegon Wetland surrounding the Bad River are indicated. At least seven species have been reported from the Kakagon River, including spottail shiner (Notropis hudsonius), northern pike (Esox lucius), blacknose shiner (Notropis heterolepis), black bullhead (Ictalurus melas), johnny darter (Etheostoma nigrum), walleye (Stizostedion vitreum), largemouth bass (Micropterus salmoides), and miscellaneous unidentified suckers (Catostomidae), panfish (Centrarchidae), and minnows (Cyprinidae) (Moore and Braem, 1965; Wisconsin Department of Natural Resources, 1966). Of the game fish included above and in Table 7-2, walleye is evidently the most abundant. Honest John Lake, which is a part of this large wetland area, contains northern pike, yellow perch (Perca flavescens), pumpkinseed (Lepomis gibbosus), and unidentified suckers (Catostomidae). This lake probably suffers occasional winterkill (Wisconsin Department of Natural Resources, (1966).

Fish species found in Bear Trap Creek, (Moore and Braem, 1965) include primarily creek chubs (Semotilus atromaculatus), and trout-perch (Percopsis omiscomaycus), but northern pike have also been recorded there (Wisconsin Department of Natural Resources, 1966). Of these, only the northern pike is generally associated with wetland habitats (Trautman, 1957; Jaworski and Raphael, 1978). A warmwater fish community of unspecified composition is

Table 7-2 . Fish Species Found in the Bad River, Ashland County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	silver redhorse*
sea lamprey	shorthead redhorse*
Acipenseridae	Ictaluridae
lake sturgeon	black bullhead*
Salmonidae	brown bullhead*
brown trout	yellow bullhead*
rainbow trout	tadpole madtom*
brook trout	Gadidae
Osmeridae	burbot
rainbow smelt	Gasterosteidae
Umbridae	brook stickleback*
central mudminnow*	Percopsidae
Esocidae	trout-perch
northern pike*	Centrarchidae
muskellunge*	smallmouth bass*
Cyprinidae	largemouth bass*
creek chub	pumpkinseed*
hornyhead chub	bluegill*
blacknose dace	rock bass
longnose dace	black crappie*
goldenshiner*	Percidae
common shiner	yellow perch*
sand shiner	walleye*
mimic shiner	logperch*
blacknose shiner*	johnny darter*
fathead minnow*	Iowa darter*
	Cottidae
	mottled sculpin*

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

present in Wood Creek and includes a few northern pike. Species generally associated with coastal wetland habitats of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Chequamegon Wetland.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of Chequamegon Wetland is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes have been the major taxa collected at the four sample sites. A list of the taxa collected, in order of abundance, appears in Table 7-3. These species may or may not be found in the wetland today.

Table 7-3. Invertebrate Taxa Collected in Chequamegon Wetland on August 5, 1970[a]

Turbellaria	Insecta
Tricladida	Ephemeroptera
Dugesia	*Caenis*
Oligochaeta	Odonata
Polychaeta	*Tetragoneuria*
Manayunkia ariensis	*Enallagma*
Hirudinea	Trichoptera
Gastropoda	Limnephilidae
Pulmonata	*Oxyethira*
Ferrisia	Coleoptera
Pelecypoda	*Donacia*
Crustacea	Diptera
Isopoda	Tipulidae
Asellus	Tendipedidae
Amphipoda	Ephydridae
Hyalella azteca	
Hydracarina	
Neumania	

[a] Wisconsin Department of Natural Resources, open files, 1970

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Chequamegon Wetland.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Chequamegon Wetland.

Avifauna

Table 7-4 lists the bird species and numbers observed in different parts of Chequamegon Wetland in spring, summer, and fall, 1970 by Wisconsin Department of Natural Resources personnel (1970). A bald eagle (Haliaeetus leucocephalus) nest with two adults and one young present was also reported in the area (Wisconsin Department of Natural Resources, 1970).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Chequamegon Wetland.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are found along the rivers and creeks associated with Chequamegon Wetland (Johannes et al., 1970) and may occur in this wetland.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Chequamegon Wetland.

Endangered Species

Ospreys (Pandion haliaetus) and nesting bald eagles, both species endangered in Wisconsin, were observed in Chequamegon Wetland in 1970 (Wisconsin Department of Natural Resources, 1970).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Chequamegon Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Chequamegon Wetland is likely to be utilized by many of the fish species present in the rivers, and bird life is abundant.

Table 7-4 . Bird Species and Numbers Observed in Chequamegon Wetland[ab]

Species	Beartrap Creek - Kakagon May 5, 1970	Kakagon Slough June 4, 1970	Kakagon River July 10, 1970	Chequamegon Wetland September 28, 1970
Canada goose				
mallard	8	8	17	
black duck	2	3	7	
pintail				6
green-winged teal	18	4		8
blue-winged teal	10	8	1	14
American wigeon	40			
northern shoveler	2			
wood duck		1	5	1
ring-necked duck	6			18
scaup	4,200	11		
pied-billed grebe				3
belted kingfisher			4	
long-billed marsh wren			4	
short-billed marsh wren			1	
great blue heron	3	4	27	1
black-crowned night heron	1			
American bittern			3	
American coot		1		1,100
herring gull			16	3
Forster's tern				1
common tern		6	6	
Caspian tern			1	
black tern		3	10	
red-winged blackbird	40	35	150	
rusty blackbird				1
killdeer			1	
black-bellied plover				1
greater yellowlegs	4			
lesser yellowlegs	4			
veery			1	
common yellow warbler			2	
yellowthroat		3		
cliff swallow		1	1	
tree swallow		1	40	
barn swallow			2	
eastern kingbird			2	

-continued-

Table 7-4 . (concluded)

Species	Beartrap Creek - Kakagon May 5, 1970	Kakagon Slough June 4, 1970	Kakagon River July 10, 1970	Chequamegon Wetland September 28, 1970
swamp sparrow			75	
song sparrow			30	
broad-winged hawk		2		
bald eagle	2			1
marsh hawk				
osprey			1	

[a]Taken from Wisconsin Dept. of Natural Resources, 1970

[b]Includes Wood Creek, Dead Slough, Kakagon River from lake to entrance of Beartrap Creek, and Lake Superior shoreline from Kakagon River southwest to edge of marsh.

Population

Chequamegon Wetland is located in Sanborn Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. Table 7-5 indicates that the population of the county remained stable between 1970 and 1975, while population declined rapidly in Sanborn Township. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 7-5. Population Data for the Vicinity of Chequamegon Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
Sanborn Township	626	-5.4	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Chequamegon Wetland and the surrounding area is rural open space. Chequamegon Wetland covers a large area. U.S. Route 2 runs along the southern boundary of this wetland, and two light-duty roads run through and among the southern and southwestern sections. An unimproved dirt road and a trail border the western sections. Several buildings are located within the wetland, but they are widely scattered. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Cedar, Wisconsin, 1975; Odanah, Wisconsin, 1975; Chequamegon Point, Wisconsin, 1964; Long Island, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Chequamegon Wetland.

Mineral, Energy, and Forest Resources

Chequamegon Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is

limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Chequamegon Wetland (U.S.G.S. quadrangle maps, Cedar, Wisconsin, 1975; Odanah, Wisconsin, 1975; Chequamegon Point, Wisconsin, 1964; Long Island, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Chequamegon Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Chequamegon Wetland, but an archaeological village site exists to the north of Odanah Wetland. Details of the site are not available, but the village probably belonged to historic Chippewa Indians (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 221

The literature search identified no on-going or impending research projects pertaining to Chequamegon Wetland.

SOUTHEAST CHEQUAMEGON BAY AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 222-226

Setting

The Southeast Chequamegon Bay Area Wetland Complex lies along Chequamegon Bay, which is directly connected to Lake Superior, in Sanborn Township of Ashland County, Wisconsin. The parts of the wetland lie approximately 0.2 mile from the Chequamegon Bay shoreline. Southeast Chequamegon Bay Area Wetland #1 lies 1.8 miles from the town of Ashland, Wisconsin; #2, #3, and #4 lie 3.5 miles from Ashland, and #5 lies 5.1 miles from Ashland. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Ashland East, Wisconsin, 1975; Long Island, Wisconsin, 1964).

Topography

The Southeast Chequamegon Bay Area Wetland complex has 25 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is a gently rising upward slope, with lower areas around creeks (U.S.G.S. quadrangle maps, Ashland East, Wisconsin, 1975; Long Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which the Southeast Chequamegon Bay Area Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

No streams flow through the Southeast Chequamegon Bay Area Wetland Complex (U.S.G.S. quadrangle maps, Ashland East, Wisconsin, 1975; Long Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Southeast Chequamegon Bay Area Wetland Complex is located in Ashland, Wisconsin. The average annual temperature is 39.7^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 12.1^{o}F and the mean monthly high for July is 66.9^{o}F. The average annual precipitation is 30.12 inches, with a mean monthly

precipitation of 0.94 inches in January and 4.20 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on September 25 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are located in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Long Island, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

BIOTIC SETTING LS 222-226

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Southeast Chequamegon Bay Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Southeast Chequamegon Bay Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Southeast Chequamegon Bay Area Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Southeast Chequamegon Bay Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Southeast Chequamegon Bay Area Wetland Complex.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the five wetlands of the Southeast Chequamegon Bay Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Southeast Chequamegon Bay Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 222-226

Population

The Southeast Chequamegon Bay Area Wetland Complex is located in Sanborn Township of Ashland County, Michigan. Ashland County is sparsely populated, having a density of 16 persons per square mile. Table 7-6 indicates that the population of the county remained stable between 1970 and 1975, while population declined rapidly in Sanborn Township. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 7-6. Population Data for the Vicinity of the Southeast Chequamegon Bay Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
Sanborn Township	626	-5.4	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin, State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Southeast Chequamegon Bay Area Wetland Complex and the surrounding area is rural open space. Light-duty roads pass north of Southeast Chequamegon Bay Area Wetlands #2 and #5, and east of Wetland #4. Unimproved dirt roads run along the eastern boundary of Wetland #5, and through Wetland #3. Buildings are located north and east of Wetland #5 and north of Wetland #3. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Long Island, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Southeast Chequamegon Bay Area Wetland Complex.

Mineral, Energy, and Forest Resources

The Southeast Chequamegon Bay Area Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Southeast Chequamegon Bay Area Wetland Complex (U.S.G.S. quadrangle maps, Long Island, Wisconsin, 1964; Ashland East, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to the Southeast Chequamegon Bay Area Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Southeast Chequamegon Bay Area Wetland Complex, but an Indian village site of uncertain culture and time period may have once stoon on the east bank of southeast Chaquamegon Bay Area Wetland #5 (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 222-226

The literature search identified no on-going or impending research projects pertaining to the Southeast Chequamegon Bay Area Wetland Complex.

FISH CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 227

Setting

Fish Creek Wetland lies along the shoreline of Chequamegon Bay, which is directly connected to Lake Superior, in Barksdale Township of Bayfield County and within the Ashland City limits in Ashland County, Wisconsin. This wetland is a Palustrine-Riverine System and occupies a partially wooded site (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975).

Topography

Fish Creek Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as wetland, erodible low bluff and erodible plain. The surrounding area is hilly, with a valley formed by North Fish Creek (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in whcih Fish Creek Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

The soils of Fish Creek Wetland are classified as alluvial land, marsh, made land, Pickford-Bergland association, and Rifle peat association (Ableiter, 1939).

Hydrology

Fish Creek and three unnamed streams flow through Fish Creek Wetland (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding Fish Creek may be found in Schneiderwent (1974), Dickas (1975), Johannes et al. (1970), and Bedford, et al. (1976).

Climate

The closest weather station providing climatic data for Fish Creek Wetland is located in Ashland, Wisconsin. The average annual temperature is 39.7°F, based on the normal period from 1941-1970. The mean monthly low for January is 12.1°F and the mean monthly high for July is 66.9°F. The average annual

precipitation is 30.12 inches, with a mean monthly precipitation of 0.94 inches in January and 4.20 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on September 25 (National Oceanic and Atmospheric Administration, 1975).

Special Features

Fish Creek, which flows into Chequamegon Bay, has a rather small entrance, which affords some protection to the wetland (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975).

BIOTIC SETTING LS 227

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Fish Creek Wetland.

Fish

Fish species found in Fish Creek are listed in Table 7-7. The Fish Creek area is extensively utilized for recreational fishing. Whittlesey Creek, which enters this wetland at its far northwestern edge, contains brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and brook trout (Salvelinus fontinalis) (Wisconsin Department of Natural Resources, 1970), but none of these are generally associated with wetlands (Trautman, 1957). Fish species known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, commercial use, or food sources of the fish populations in Fish Creek Wetland.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of Fish Creek Wetland is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes have been the major taxa collected at four sample sites. A list of the taxa collected, in order of abundance, appears in Table 7-8. These species may or may not be found in the wetland today.

Table 7-7 . Fish Species Found in Fish Creek, Bayfield County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
ammocetes (northern brook or silver lamprey)	longnose sucker
sea lamprey	Ictaluridae
Salmonidae	black bullhead*
brown trout	brown bullhead*
rainbow trout	Gadidae
brook trout	burbot
Osmeridae	Gasterosteidae
rainbow smelt	brook stickleback*
Umbridae	Percopsidae
central mudminnow*	trout-perch
Cyprinidae	Centrarchidae
creek chub	largemouth bass*
lake chub	rock bass
hornyhead chub	Percidae
blacknose dace	yellow perch*
longnose dace	logperch*
goldenshiner*	johnny darter*
common shiner	
bluntnose minnow	

[a]Moore and Braem (1965); Wisconsin Department of Natural Resources (1970)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Table 7-8. Invertebrate Taxa Collected in Fish Creek Marsh on August 5,1970[a]

Oligochaeta	Insecta
Hirudinea	Odonata
Gastropoda	*Lestes*
Pulmonata	Hemiptera
Ferrisia	*Plea striola*
Promenetus exacuous	Coroxidae
Pelecypoda	Trichoptera
Crustacea	*Agrypnia vestitis*
Isopoda	Leptoceridae
Asellus	Coleoptera
Amphipoda	*Conacia*
Hyalella azteca	*Haliplus*
Hydracarina	Dytiscidae
Hygrobates	Diptera
Insecta	Tipulidae
Collembola	Tendipedidae
Isotoma	Ephydridae
Ephemeroptera	Lepidoptera
Caenis	*Nymphula*
Hexagenia	

[a] Wisconsin Department of Natural Resources, open files, 1970

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Fish Creek Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Fish Creek Wetland.

Avifauna

Table 7-9 lists bird species observed in different parts of this wetland (Wisconsin Department of Natural Resources, 1970) during nine observation periods between March 30 and August 8, 1970. The bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*) and double-crested cormorant (*Phalacrocorax auritus*) were observed here and are currently on the Wisconsin State Endangered Species List. Other noteworthy sightings for the area include

Table 7-9 . Birds Observed in Fish Creek Wetland[a]

Common name	Common name
whistling swan	Caspian tern
mallard	black tern
black duck	yellow-shafted flicker
gadwall	downy woodpecker
pintail	yellow-headed blackbird
green-winged teal	brown-headed cowbird
blue-winged teal	red-winged blackbird
American wigeon	common grackle
northern shoveler	semipalmated plover
wood duck	killdeer
redhead	black-bellied plover
ring-necked duck	common snipe
canvasback	spotted sandpiper
greater scaup	willet
lesser scaup	greater yellowlegs
common goldeneye	lesser yellowlegs
bufflehead	dunlin
hooded merganser	Wilson's phalarope
common merganser	common yellowthroat
red-breasted merganser	yellow warbler
horned grebe	myrtle warbler
pied-billed grebe	eastern phoebe
double-crested cormorant	tree swallow
belted kingfisher	barn swallow
long-billed marsh wren	bank swallow
short-billed marsh wren	cliff swallow
great blue heron	purple martin
green heron	chimney swift
black-crowned night heron	crested flycatcher
least bittern	eastern kingbird
American bittern	swamp sparrow
sora	veery
American coot	broad-winged hawk
glaucous gull	bald eagle
herring gull	marsh hawk
ring-billed gull	osprey
Bonaparte's gull	merlin
common tern	

[a]Wisconsin Department of Natural Resources, 1970.

the glaucous gull (Larus hyperboreus), black-crowned night heron (Nycticorax nycticorax) and the yellow-headed blackbird (Xanthocephalus xanthocephalus).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Fish Creek Wetland.

Mammals

Muskrat (Ondatra zibethicus) have been observed on Fish Creek Wetland, where bulrush (Scirpus rigida) is an important food item for them (Wisconsin Department of Natural Resources, 1970, open file report).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Fish Creek Wetland.

Endangered Species

Ospreys, bald eagles, double-crested cormorants, and common terns have been observed in Fish Creek Wetland (Wisconsin Department of Nautral Resources, 1976).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in this wetland by the literature search.

Health

Fish Creek Wetland provides habitat for fish and a variety of avifauna. Its environmental quality appears to be good.

CULTURAL SETTING LS 227

Population

Fish Creek Wetland is located in Barksdale Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of 8 persons per square mile. Table 7-10 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Bayfield and Ashland Counties are expected to undergo a moderate rate of population decline in the future.

Table 7-10. Population Data for the Vicinity of Fish Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Barksdale Township	606	5.6	--
Ashland County	16,616	-0.8	14,130
City of Ashland	9,297	-3.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Fish Creek Wetland and the surrounding area is rural open space. U.S. Route 63 (a heavy-duty highway) is adjacent to much of the northern boundary of the wetland, and crosses through its western section. Light-duty roads are present in the eastern and northwestern sections; the latter section also contains a medium-duty highway which intersects U.S. Route 63. A power line crosses the southwestern section and several buildings lie along the northern boundary. A park is located north of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975).

Recreation

Prentice Park is in Fish Creek Wetland, and Maslowski Park is adjacent to the wetland, but no specific recreational facilities are known for either park.

Mineral, Energy, and Forest Resources

Fish Creek Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

The Bay Front Electric Generating Plant, owned by the Lake Superior District Power Company, is located east of the wetland. Primarily coal-burning,

the plant has an installed generating capacity of 82 megawatts and utilizes Lake Superior for its condensing water supply (Federal Energy Administration, 1977). There is a sewage disposal plant approximately 1.8 miles northeast of the wetland. Power lines cross the southern edge of the wetland (U.S.G.S. quadrangle map, Ashland West, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Fish Creek Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

An historical marker near Fish Creek Wetland commemorates the first house built by white men in Wisconsin. The house was built by Radisson and Groseilliers in 1658. There are no known archaeological sites in the vicinity of Fish Creek Wetland (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 227

The literature search identified no on-going or impending research projects pertaining to Fish Creek Wetland.

SIOUX RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 228

Setting

Sioux River Wetland is located on the southern shoreline of Lake Superior in Bayview Township of Bayfield County, Wisconsin, approximately 3.5 miles from the community of Washburn. This wetland is a Palustrine-Riverine System and is partially wooded (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975).

Topography

Sioux River Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and wetland. The surrounding area is composed of hills with valleys carved by the Sioux and Onion Rivers (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in which Sioux River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes and organic deposits (Hadley and Pelham, 1976).

Soils

The soils of Sioux River Wetland are classified as marsh, alluvial land and orienta-ogemaw association, nearly level (Ableiter, 1939).

Hydrology

Sioux River Wetland is adjacent to the Sioux River (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Sioux River may be found in Schneiderwent (1974), Dickas (1975) and Johannes et al. (1970).

Climate

The closest weather station providing climatic data for Sioux River Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 67.4°F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14

inches in January and 3.87 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975).

BIOTIC SETTING LS 228

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sioux River Wetland.

Fish

Fish species found in the Sioux River include ammocetes of northern brook lamprey (Ichthyomyzon fossor) or silver lamprey (Ichthyomyzon unicuspis), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), brook trout (Salvelinus fontinalis), and rainbow smelt (Osmerus mordax) (Moore and Braem, 1965; Wisconsin Department of Natural Resources, 1970. None of these species is generally associated with wetlands (Trautman, 1957). Fish species known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Sioux River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sioux River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sioux River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sioux River Wetland.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are common along the Sioux River (Johannes et al., 1970) and may occur on Sioux River Wetland.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sioux River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Sioux River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 228

Population

Sioux River Wetland is located in Bayview Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Table 7-11 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, and growth in Bayview Township was moderate. Projections for 1990 indicate that Bayfield County is expected to undergo slow population growth in the future.

Table 7-11. Population Data for the Vicinity of Sioux River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Bayview Township	584	4.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Sioux River Wetland and the surrounding area is rural open space. A medium-duty highway (State Route 13) is located west of the wetland, and crosses the wetland in three places. A railroad track runs parallel to this highway, and crosses two sections of the wetland. Three unimproved dirt roads cross the wetland, and several buildings are located along the periphery. The wetland is under private and state ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975).

Recreation

Bayview Campground is located in Sioux River Wetland, but other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Sioux River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sioux River Wetland (U.S.G.S. quadrangle maps, Washburn, Wisconsin, 1975; Mt. Ashwabay, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Sioux River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sioux River Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 228

The literature search identified no on-going or impending research projects pertaining to Sioux River Wetland.

Table 7-12. Data Gaps-Lake Section 7

	Data Gap*	Wetland Number	221	222-226	227	228
Physiographic Setting		Setting				
		Topography				
		Surficial Geology				
		Soils				
	Hydrology	Water Level Fluctuations	*	*	*	*
		Groundwater	*	*	*	*
		Water Quality	*	*	*	*
		Depth	*	*	*	*
		Seasonal Changes	*	*	*	*
		Climate				
		Special Features				
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*
		Major Species Composition	*	*	*	*
		Density/Productivity	*	*	*	*
		Relationship to Water Levels	*	*	*	*
	Fish	Major species	*	*		*
		Species Composition	*	*		
		Seasonal Distribution	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*
		Commercial/Recreational Use	*	*	*	*
		Life Histories	*	*	*	*
		Food Sources	*	*	*	*
	Invertebrates	Species Composition		*		*
		Seasonal Distribution		*		*
		Density/Productivity	*	*	*	*
		Food Sources	*	*	*	*
		Relationship to Water Levels	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*
		Seasonal Distribution	*	*	*	*
		Density/Productivity	*	*	*	*
		Recreational/Commercial Use	*	*	*	*
		Life Histories	*	*	*	*
		Food Sources	*	*	*	*
		Relationship to Water Levels	*	*	*	*
	Avifauna	Major Species		*		*
		Seasonal Distribution	*	*	*	*
		Density/Productivity	*	*	*	*
		Recreational/Commercial Use	*	*	*	*
		Life Histories	*	*	*	*
		Food Sources	*	*	*	*
		Relationship to Water Levels	*	*	*	*
	Mammals	Major Species		*		*
		Seasonal Distribution	*	*	*	*
		Density/Productivity	*	*	*	*
		Recreational/Commercial Use	*	*	*	*
		Life Histories	*	*	*	*
		Food Sources	*	*	*	*
		Relationship to Water Levels	*	*	*	*
		Endangered Species				
		Health	*	*	*	*
Cultural Setting		Population				
		Land Use and Ownership				
		Recreation				
		Mineral, Energy, Forest Resource				
		Public Utilities/Facilities				
		Point Pollution Sources				
		Non-Point Pollution Sources				
		Historic Features				
		Archaeologic Features				

LAKE SECTION 8

INTRODUCTION

Lake Section 8 extends from Van Tassells Point to Brule Point, Wisconsin, including the Apostle Islands, a distance of approximately 14 miles. The region features low hills and bluffs in the vicinity of the wetlands.

Figures 8-1 and 8-2 show the approximate loction of the 40 coastal wetlands in Lake Section 8. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 8-1. The wetlands of Lake Section 8 are located at elevations between 680 and 610 feet above sea level, 8 feet to 78 feet above the mean elevation of Lake Superior. The Section 8 wetlands are all classified as Palustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 40 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

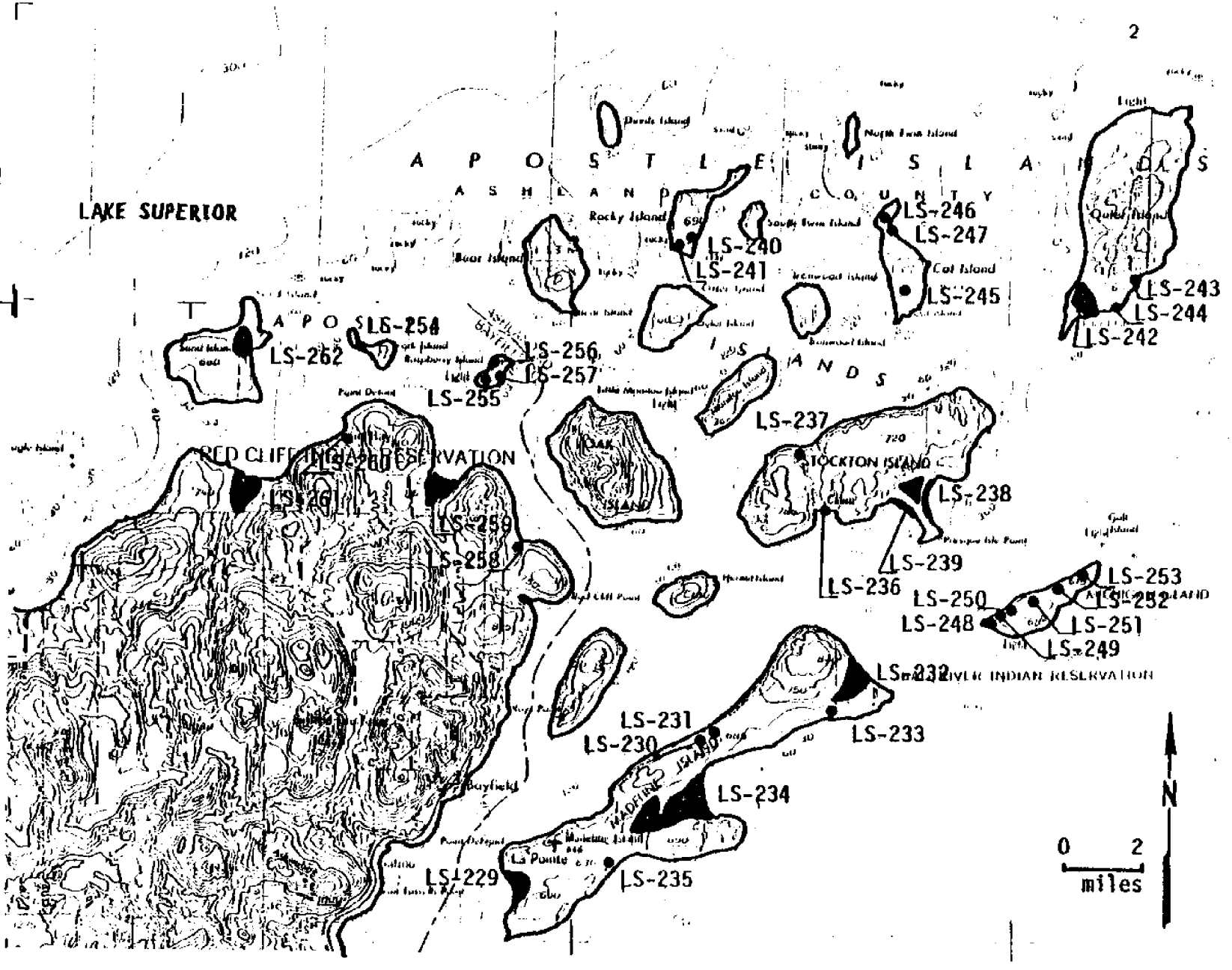


Figure 8-1. Lake Section 8 - Apostle Islands Area

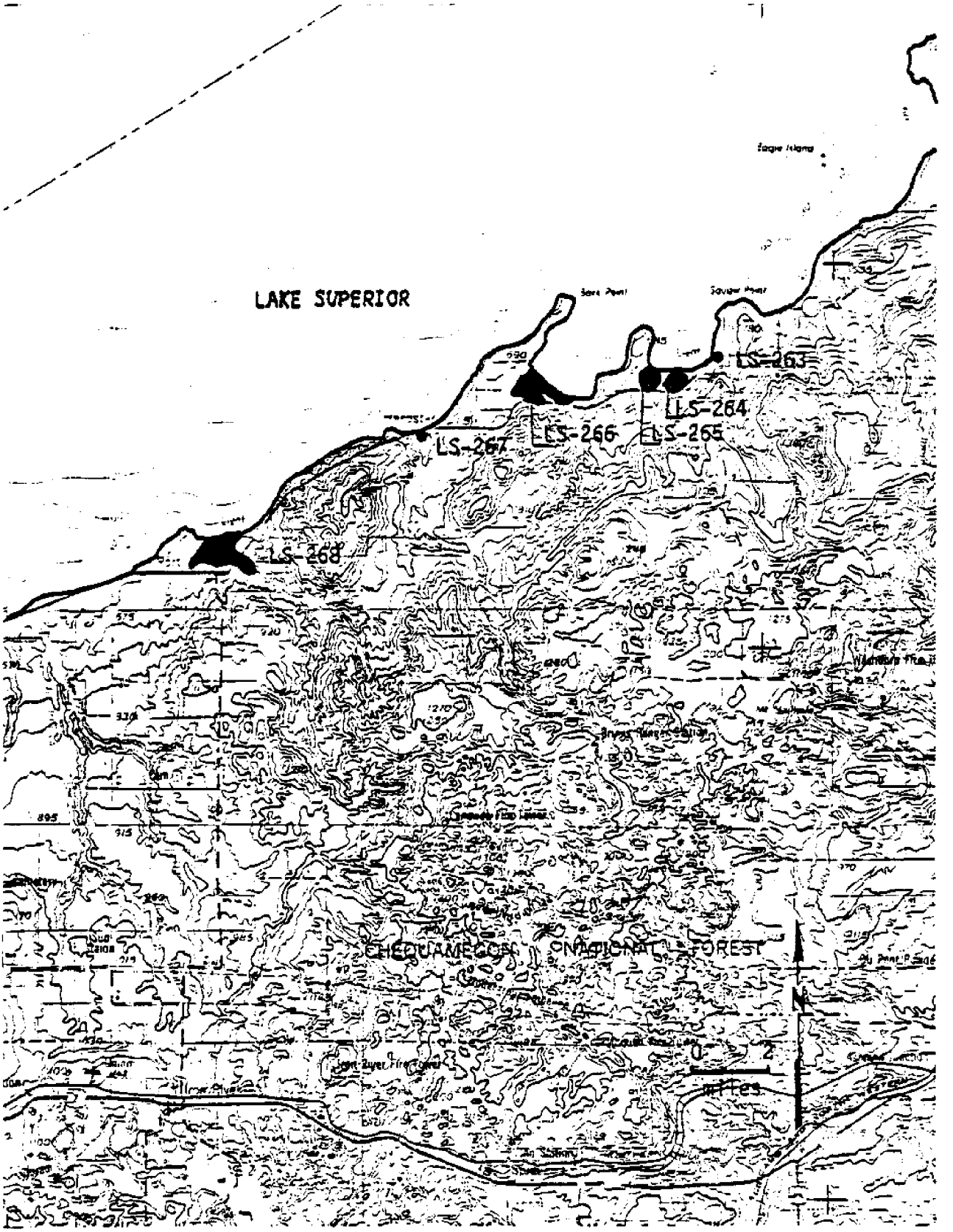


Figure 8-2. Lake Section 8 - Bark Bay Area

Table 8-1. Location, Acreage, and Classification of Wetlands in Lake Section 8

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	MADELINE ISLAND WETLAND COMPLEX				
LS 229	La Pointe Wetland	46°46'31"	90°46'49"	85	P
LS 230	Madeline Island Wetland #1	46°49'40"	90°40'41"	30	P
LS 231	Madeline Island Wetland #2	46°50'10"	90°39'57"	15	P
LS 232	Bog Lake Wetland	46°51'11"	90°35'11"	105	P
LS 233	Madeline Island Wetland #3	46°50'33"	90°35'50"	20	P
LS 234	Big Bay Lagoon Wetland	46°48'25"	90°41'19"	720	P
LS 235	Chebomnicon Bay Area Wetland	46°46'50"	90°43'35"	5	P
	STOCKTON ISLAND WETLAND COMPLEX				
LS 236	Quarry Bay Wetland	46°55'22"	90°36'12"	15	P
LS 237	Stockton Island Wetland	46°56'40"	90°36'39"	13	P
LS 238	Presque Isle Point Wetland	46°55'15"	90033'16"	285	P
LS 239	Presque Isle Bay Wetland	46°55'28"	90°33'41"	20	P
	ROCKY ISLAND WETLAND COMPLEX				
LS 240	Rocky Island Wetland #1	47°01'17"	90°40'48"	13	P
LS 241	Rocky Island Wetland #2	47°01'15"	90°41'10"	7	P
	OUTER ISLAND WETLAND COMPLEX				
LS 242	Sand Point Wetland	46°59'52"	90°27'36"	7	P
LS 243	Outer Island Wetland #1	47°00'49"	90°25'25"	8	P
LS 244	Outer Island Wetland #2	47°00'02"	90°26'31"	10	P
	CAT ISLAND WETLAND COMPLEX				
LS 245	Cat Island Wetland #1	47°00'31"	90°33'27"	40	P
LS 246	Cat Island Wetland #2	47°02'05"	90°34'14"	11	P
LS 247	Cat Island Wetland #3	47°01'58"	90°34'05"	2	P
	MICHIGAN ISLAND WETLAND COMPLEX				
LS 248	Michigan Island Wetland #1	46°52'37"	90°30'40"	20	P
LS 249	Michigan Island Wetland #2	46°52'41"	90°30'22"	7	P
LS 250	Michigan Island Wetland #3	46°52'49"	90°30'14"	2	P
LS 251	Michigan Island Wetland #4	46°53'07"	90°28'57"	75	P
LS 252	Michigan Island Wetland #5	46°53'26"	90°28'03"	57	P
LS 253	Michigan Island Wetland #6	46°53'35"	90°27'33"	32	P
LS 254	York Island Wetland	46°59'16"	90°52'06"	6	P
	RASPBERRY ISLAND WETLAND COMPLEX				
LS 255	Raspberry Island Wetland #1	46°58'21"	90°48'03"	2	P
LS 256	Raspberry Island Wetland #2	46°58'42"	90°47'40"	2.5	P
LS 257	Raspberry Island Wetland #3	46°58'15"	90°47'28"	2.5	P
LS 258	Frog Creek Wetland	46°54'27"	90°46'48"	10	P-R
LS 259	Raspberry Bay Wetland	46°55'49"	90°49'30"	140	P-R
LS 260	Little Sand Bay Wetland	46°56'49"	90°52'53"	15	P
LS 261	Sand River Wetland	46°55'50"	90°56'13"	235	P
LS 262	Sand Island Wetland	46°59'12"	90°56'20"	126	P
	SISKIWIT RIVER WETLAND				
LS 263	Siskiwit River Wetland	46°51'24"	90°05'56"	10	P
LS 264	Siskiwit Bay Area Wetland	46°51'09"	90°06'50"	40	P
LS 265	Lost Creek Wetland	46°51'14"	90°08'00"	200	P-R
LS 266	Bark Bay Wetland	46°50'54"	91°11'48"	680	P
LS 267	Cranberry River Wetland	46°49'36"	91°16'00"	85	P-R
LS 268	Bibon Lake - Flag River Wetland	46°47'10"	91°22'58"	930	P-R

[a] P=palustrine

MADELINE ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 229-235

Setting

The Madeline Island Wetland Complex is located on Madeline Island, off the southern coast of Lake Superior, within La Pointe Township of Ashland County, Wisconsin. The various parts of the wetland extend from the shoreline to approximately 1.7 miles inland. The largest population center in the area is Bayfield, Wisconsin. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Bayfield, Wisconsin, 1975; Madeline Island, Wisconsin, 1964; Amnicon Point, Wisconsin, 1964).

Topography

The Madeline Island Wetland Complex has 68 feet of relief and a maximum elevation of 670 feet above mean sea level (68 feet above the approximate mean elevation of Lake Superior). The island is generally composed of bluffs along the coast, with hills and some low plains. Some parts of the island slope up gradually from the beach rather than from beach bluffs (U.S.G.S. quadrangle maps, Amnicon Point, Wisconsin, 1964; Madeline Island, Wisconsin, 1964; Bayfield, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in which the Madeline Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

One intermittent stream flows into La Pointe Wetland. No streams flow through the other wetlands of the Madeline Island Wetland Complex (U.S.G.S. quadrangle maps, Bayfield, Wisconsin, 1975; Madeline Island, Wisconsin, 1964; Amnicon Point, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Madeline Island Wetland Complex is located in Madeline Island, Wisconsin. The average

annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1°F and the mean monthly high for July is 67.2°F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Bayfield, Wisconsin, 1975; Madeline Island, Wisconsin, 1964; Amnicon Point, Wisconsin, 1964).

BIOTIC SETTING LS 229-235

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Madeline Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Madeline Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Madeline Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Madeline Island Wetland Complex.

Avifauna

Table 8-2 lists the bird species which were observed in Big Bay Lagoon Wetland on May 6, June 5, June 18, and August 7, 1970 by Wisconsin Department of Natural Resources personnel. Ospreys (Pandion haliaetus) which are currently on the Wisconsin State Endangered List, were sighted here (Wisconsin Department of Natural Resources, 1970).

Table 8-2. Birds Observed at Big Bay, Madeline Island in 1970[a]

Common name	Common name
mallard	yellow warbler
black duck	common yellowthroat
green-winged teal	chimney swift
blue-winged teal	tree swallow
bufflehead	purple martin
common loon	ovenbird
red-breasted merganser	crested flycatcher
horned grebe	red-eyed vireo
pied-billed grebe	Traill's flycatcher
belted kingfisher	eastern kingbird
short-billed marsh wren	olive-sided flycatcher
great blue heron	swamp sparrow
black tern	veery
downy woodpecker	barred owl
red-winged blackbird	marsh hawk
common snipe	osprey

[a] Wisconsin Department of Natural Resources, 1970

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the seven wetlands of the Madeline Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the seven wetlands of the Madeline Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. A long-established herd of white-tailed deer (Odocoileus virginianus) is present on Madeline Island at a relatively high density (Beals et al., 1960), and browse pressure is very heavy.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Madeline Island Wetland Complex.

Endangered Species

Ospreys (Pandion haliaetus) were sighted in Big Bay Lagoon Wetland in 1970 (Wisconsin Department of Natural Resources, 1970). No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Madeline Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the complex is utilized by numerous species of avifauna.

CULTURAL SETTING LS 229-235

Population

The Madeline Island Wetland Complex is located on Madeline Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-3. Population Data for the Vicinity of the Madeline Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Madeline Island Wetland Complex is rural open space, with some residential development in the surrounding area. A medium-duty highway is located north and west of La Pointe Wetland, which also has an unimproved dirt road crossing its south-eastern section, docking facilities on the southwest and numerous buildings on the west. Light-duty roads run north of Madeline Island Wetlands #1 and #2 and Bog Lake Wetland, and southwest of Madeline Island Wetland #3. Big Bay Lagoon Wetland is characterized by a medium-duty highway north and west of the wetland, an unimproved dirt road leading to a picnic area northeast of the wetland, and several buildings along the northern boundary. A medium-duty highway runs along the south-eastern boundary of Chequamegon Bay Area Wetland; several buildings are also located in this area. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Bayfield Wisconsin, 1975; Madeline Island, Wisconsin, 1964; Amnicon Point, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Madeline Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Madeline Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Madeline Island Wetland Complex (U.S.G.S. quadrangle maps, Bayfield, Wisconsin, 1975; Amnicon Point, Wisconsin, 1964; Madeline Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Madeline Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

The area in and around the village of La Pointe, near La Pointe Wetland, contains several historical sites which indicate prehistoric habitation of the island by Chippewa and Huron Indians. The Madeline Island Cemetery contains Chippewa Spirit Horses and the grave of Great Buffalo, the Chippewa chief who, in 1954, signed the last treaty between the Chippewa of Lake Superior and the U.S. Government (Wisconsin Historic Preservation Division, 1977).

A privately-owned log barn with vertical log construction and shingles on its gabled roof is located south of Madeline Island Wetland #3. Also found near Madeline Island Wetland #3 is a log house with out-buildings and a squared-log house. North of Bog Lake Wetland is another historical log building, one of several on the northeast end of Madeline island (Wisconsin Historic Preservation Division, 1977).

There are also several archaeological sites in the wetland complex, including the Turrittin Site on the northwest corner of Bog Lake Wetland, where relics of a prehistoric campsite have been discovered (Salzer and Overstreet, 1974). An archaeological site is present near Big Bay Lagoon Wetland; it also consists of a prehistoric campsite located on a large peninsula extending into extensive marshlands to the west of Big Bay Lagoon Wetland (National Park Service, 1977). Three archaeological sites are located close to La Pointe Wetland. These are the Keith Trail Site, the Marina Site, and the La Pointe Cliffs Pictographs (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 229-235

The literature search identified no on-going or impending research projects pertaining to the Madeline Island Wetland Complex.

STOCKTON ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 236-239

Setting

The Stockton Island Wetland Complex is located on Stockton Island off the southern coast of Lake Superior, within La Pointe Township of Ashland County, Wisconsin. The component parts of the wetland extend from the shoreline to approximately 0.7 mile inland. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963).

Topography

The Stockton Island Wetland Complex has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The surrounding area is composed of low hills and some narrow creek valleys (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963).

Surficial Geology

The surficial geology of the area in which the Stockton Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

Seven unnamed streams flow through Presque Isle Point Wetland and one unnamed stream flows through Stockton Island Wetland. No streams flow through the other two wetlands of the Stockton Island Wetland Complex (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Stockton Island Wetland Complex is located in Madeline Island, Wisconsin. The average annual temperature is 40.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1^{o}F and the mean monthly high for July is 67.2^{o}F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing

season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963).

BIOTIC SETTING LS 236-239

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Stockton Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Stockton Island Wetland Complex.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of Quarry Bay Wetland, part of this complex, is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes were the major taxa collected at three sample sites. A list of the taxa collected, in order of abundance, appears in Table 8-4. These species may or may not be found in this wetland today.

Table 8-4. Invertebrate Taxa Collected in Quarry Bay Wetland, August 5, 1970[a]

Turbellaria	Insecta
Tricladida	Ondonata
Dugesia	Plathemis lydia
Oligochaeta	Hemiptera
Hirudinea	Corixidae
Gastropoda	Trichoptera
Pelecypoda	Psychomyia
Crustacea	Oecetis
Isopoda	Setodes
Asellus	Diptera
Amphipoda	Tendipedidae
Hyalella azteca	Lepidoptera
	Nymphula

[a] Wisconsin Department of Natural Resources, open files, 1970.

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Stockton Island Wetland Complex.

Reptiles and Amphibians

Collections of reptiles and amphibians were made on Stockton Island by Northland College (1974) and included American toad (Bufo americanus americanus), wood frog (Rana sylvatica), northern spring peeper (Hyla crucifer crucifer), mink frog (Rana septentrionalis), northern cricket frog (Acris crepitans crepitans), red-backed salamander (Plethodon cinereus cinereus), eastern garter snake (Thamnophis sirtalis sirtalis), and red-bellied snake (Storeria occiptomaculata occipitomaculata). Turtles were observed but not collected. The northern cricket frog was more likely Blanchard's cricket frog (A. crepitans blanchardi), since the range of the northern cricket frog does not include the Great lakes Region (Conant, 1975). All these species probably occur in the four coastal wetlands of Stockton Island on either a permanent or transient basis. The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Quarry Bay Wetland, Stockton Island Wetland, Presque Isle Point Wetland, or Presque Isle Bay Wetland.

Avifauna

Historical information on the summer birds of the Apostle Islands is available in Jackson (1941, 1942, 1943). A list of summer birds and their estimated densities on Stockton Island in 1974 is available in Stadnyk et al.

(1974). Table 8-5 lists the bird species that were observed in the spring of 1976 and 1977 in wetland habitat on Stockton Island. Pileated woodpeckers (Dryocopus pileatus), rough-winged swallows (Stelgidopteryx ruficollis) and swamp sparrows (Melospiza georgiana) were observed nesting at that time. Bald eagles (Haliaeetus leucocephalus) nested on the southeastern portion of this island, east of Presque Isle Point, in the late 1960's (Sprunt, 1968). Additional information on the 1976 and 1977 spring migration in the Apostle Islands is available in Harris (1977).

Table 8-5. Birds Observed in Stockton Island Wetland Habitat in Spring, 1976 and 1977[a]

Common name	Common name
lesser scaup	brown-headed cowbird
pied-billed grebe	common grackle
belted kingfisher	willet
sandhill crane	lesser yellowlegs
American bittern	least sandpiper
American coot	long-billed dowitcher
black tern	Wilson's phalarope
eastern meadowlark	rough-winged swallow
yellow-headed blackbird	yellow warbler
red-winged blackbird	swamp sparrow

[a] modified from Harris, 1977

The literature search provided no site-specific information pertaining to seasonal abundance, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Stockton Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the four wetlands of the Stockton Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. A recently-established herd of white-tailed deer (Odocoileus virginianus) is present on Stockton Island at a relatively high density (Beals et al., 1960), and browse pressure is very heavy.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Stockton Island Wetland Complex.

Endangered Species

Bald eagles nested on Stockton Island in the 1960's (Sprunt, 1968). No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Stockton Island Wetland Complex by the literature search.

Health

The environmental quality of the Stockton Island Wetland Complex appears to be good.

CULTURAL SETTING

LS 236-239

Population

The Stockton Island Wetland Complex is located on Stockton Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-6. Population Data for the Vicinity of the Stockton Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Stockton Island Wetland Complex and the surrounding area is rural open space. A few buildings and a trail lie southwest and southeast of Quarry Bay Wetland. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963).

Recreation

The Stockton Island Wetland Complex is located in Apostle Islands State Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

The Stockton Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Stockton Island Wetland Complex (U.S.G.S. quadrangle map, Stockton Island, Wisconsin, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to the Stockton Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the four wetlands of the Stockton Island Wetland Complex (Wisconsin Historic Preservation Division, 1977). Stockton Island contains ten known archaeological sites for which little specific information is available, but it is believed that Stockton Island may have served as a summer village site for Chippewas (National Park Service, 1977).

RESEARCH PROJECTS

LS 236-239

The literature search identified no on-going or impending research projects pertaining to the Stockton Island Wetland Complex.

ROCKY ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 240-241

Setting

The Rocky Island Wetland Complex is located on the shoreline of Rocky Island in Lake Superior, within La Pointe Township of Ashland County, Wisconsin. There are no major population centers in the area. This wetland complex is a Palustrine System, and occupies wooded sites (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963).

Topography

The Rocky Island Wetland Complex has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The surrounding area on the island is hilly (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963).

Surficial Geology

The surficial geology of the area in which the Rocky Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

No streams flow through the Rocky Island Wetland Complex (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Rocky Island Wetland Complex is located in Madeline Island, Wisconsin. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1°F and the mean monthly high for July is 67.2°F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963).

BIOTIC SETTING LS 240-241

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Rocky Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Rocky Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Rocky Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Rocky Island Wetland Complex.

Avifauna

Historical information on the summer birds of the Apostle Islands, which may be pertinent to the wetlands of this complex, is available in Jackson (1941, 1942, 1943). An annotated list of birds observed on the islands in spring 1976 and 1977 is available in Harris (1977). Additional information on the 1976 and 1977 spring migration is included.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Rocky Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the Rocky Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. A recently-established herd of white-tailed deer (Odocoileus virginianus) is present on Rocky Island at a relatively high density (Beals et al., 1960), and browse pressure is very heavy.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the two wetlands of the Rocky Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Rocky Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 240-241

Population

The Rocky Island Wetland Complex is located on Rocky Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-7. Population Data for the Vicinity of the Rocky Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Rocky Island Wetland Complex and the surrounding area is rural open space. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Rocky Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Rocky Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Rocky Island Wetland Complex (U.S.G.S. quadrangle map, Rocky Island, Wisconsin, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to Rocky Island Wetlands #1 and #2 (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Rocky Island possesses the Hadley Fishing Camp, the only fishing camp in the Apostle Islands still receiving regular use. This group of buildings contains two log structures and numerous frame outbuildings dating from 1928 (Wisconsin Historic Preservation Division, 1977).

There are no known archaeological sites in the vicinity of Rocky Island Wetlands #1 and #2 (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 240-241

The literature search identified no on-going or impending research projects pertaining to the Rocky Island Wetland Complex.

OUTER ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 242-244

Setting

The Outer Island Wetland Complex is located on Outer Island in the coastal zone of Lake Superior, within La Pointe Township of Ashland County, Wisconsin. The component parts of the wetland lie approximately 0.5 mile from the Lake Superior shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963).

Topography

The Outer Island Wetland Complex has 68 feet of relief and a maximum elevation of 670 feet above mean sea level (68 feet above the approximate mean elevation of Lake Superior). The surrounding area is hilly (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963).

Surficial Geology

The surficial geology of the area in which the Outer Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

No streams flow through the Outer Island Wetland Complex (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Outer Island Wetland Complex is located in Madeline Island, Wisconsin. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1°F and the mean monthly high for July is 67.2°F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963).

BIOTIC SETTING LS 242-244

Vegetation

According to Tans (1978) two wetland types occur on Outer Island, bogs and lagoon. Four small and isolated depressions occur within the conifer forest south of the large lagoon, in which the flora can be described as a type of bog-marsh. Major species occurring in these sites include bluejoint grass (Calamagrostis canadensis), leatherleaf (Chamaedapne calyculata var. angustifolia) and the sedge (Carex lasiocarpa var. americana). Other noteworthy species associated with this habitat include narrow-leaved sundew (Drosera intermedia), round-leaved sundew (D. rotundifolia), sweet gale (Myrica gale), marsh cinquefoil (Potentilla palustris), meadow-sweet (Spirea alba), and large cranberry (Vaccinium macrocarpon).

Lagoon vegetation consists of a thin line of emergent vegetation and brush (shrubs) along the lagoon periphery. Small, low sand flats nearly devoid of vegetation extend eastward into the lagoon. Major emergent species include twig rush (Cladium mariscoides), spike rush (Eleocharis smallii), and bulrush (Scirpus tarreyi). Major shrub species are leatherleaf and sweet gale. Other species common along the lagoon periphery include duck grass (Eriocaulon septengulare), mountain holly (Nemopanthus mucronata), reed grass (Phragmites communis), and blackberry (Rubus sp.). The pondweed (Potamogeton natans) occurs in the water of the lagoon (Tans, 1978).

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of the Outer Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Outer Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Outer Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Outer Island Wetland Complex.

Avifauna

Historical information on the summer birds of the Apostle Islands is available in Jackson (1941, 1942, 1943). Table 8-8 lists the bird species that were observed the spring of 1976 and 1977 in wetland habitat on Outer Island. Common loons (Gavia immer) and swamp sparrows (Melospiza georgiana) were observed nesting at that time. Additional information on the 1976 and 1977 spring migration in the Apostle Islands is available in Harris (1977).

Table 8-8. Birds Observed in Outer Island Wetland Habitat in Spring, 1976 and 1977

Common name	Common name
ring-necked duck	brown-headed cowbird
common loon	red-winged blackbird
belted kingfisher	common grackle
short-billed marsh wren	common snipe
American bittern	yellow warbler
sora	common yellowthroat
American coot	Wilson's warbler

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Outer Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the three wetlands of the Outer Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. No permanent herd of white-tailed deer (Odocoileus virginianus) is found on Outer Island (Beals et al., 1960).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity,

recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Outer Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Outer Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the wetland complex is utilized by numerous birds.

CULTURAL SETTING LS 242-244

Population

The Outer Island Wetland Complex is located in Outer Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-9. Population Data for the Vicinity of the Outer Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Outer Island Wetland Complex and the surrounding area is rural open space. Trails run south of Outer Island Wetland #2, and northeast and south of Sand Point Wetland. An unimproved dirt road also crosses the

southern section of Sand Point Wetland. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Outer Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Outer Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Outer Island Wetland Complex (U.S.G.S. quadrangle map, Outer Island, Wisconsin, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to the Outer Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Outer Island Light is a conical brick tower connected to a two and one-half story keepers dwelling. The windows and brackets at the top of the tower give the structure an Italianate appearance. The lighthouse is under public ownership and is included in the National Register of Historic Places.

Also located near the Outer Island Wetland Complex is an old hunting and fishing cabin that provides a good example of simple solid vertical log construction. The fishing cabin is presently under private ownership (Wisconsin Division of Historic Preservation, 1977).

No systematic archaeological survey has been completed for Outer Island. However, the history of the Apostle Islands area would suggest that archaeological sites may be present.

The literature search identified no on-going or impending research projects pertaining to the Outer Island Wetland Complex.

CAT ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 245-247

Setting

The Cat Island Wetland Complex is located on Cat Island, in the coastal zone of Lake Superior, within La Pointe Township of Ashland County, Wisconsin. The various parts of the complex lie approximately 0.1 mile from the Lake Superior shoreline. There are no population centers in the area. This wetland complex is a Palustrine System and occupies wooded sites (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963).

Topography

The Cat Island Wetland Complex has 50 feet of relief and a maximum elevation of 680 feet above mean sea level (78 feet above the approximate mean elevation of Lake Superior). The surrounding area is a rolling plain above bluffs that rise from the shore (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963).

Surficial Geology

The surficial geology of the area in which the Cat Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

No streams flow through the Cat Island Wetland Complex (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Cat Island Wetland Complex is located in Madeline Island, Wisconsin. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1°F and the mean monthly high for July is 67.2°F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing

season is approximately four and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963).

BIOTIC SETTING LS 244-247

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Cat Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Cat Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Cat Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Cat Island Wetland Complex.

Avifauna

Historical information on the summer birds of the Apostle Islands, which may be pertinent to the wetlands of this complex, is available in Jackson (1941, 1942, 1943). An annotated list of birds observed on the islands in spring 1976 and 1977 is available in Harris (1977). Additional information on the 1976 and 1977 spring migration is included.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Cat Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the three wetlands of the Cat Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. A herd of white-tailed deer (Odocoileus virginianus) is present on Cat Island at a relatively light density (Beals et al., 1960), and browse pressure is not heavy.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Cat Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Cat Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 245-247

Population

The Cat Island Wetland Complex is located on Cat Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-10. Population Data for the Vicinity of the Cat Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Cat Island Wetland Complex and the surrounding area is rural open space. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Cat Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Cat Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Cat Island Wetland Complex (U.S.G.S. quadrangle map, Cat Island, Wisconsin, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to the Cat Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Cat Island Wetlands #1-#3, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 245-247

The literature search identified no on-going or impending research projects pertaining to the Cat Island Wetland Complex.

MICHIGAN ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 248-253

Setting

The Michigan Island Wetland Complex is located on Michigan Island in the coastal zone of Lake Superior, within La Pointe Township of Ashland County, Wisconsin. The various parts of the complex lie approximately 50 feet to 0.1 mile from the Lake Superior shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963).

Topography

The Michigan Island Wetland Complex has 40 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The island has a steep grade up to a rolling plateau. Some wetlands are located on the plateau and others are below it (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963).

Surficial Geology

The surficial geology of the area in which the Michigan Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Ashland County.

Hydrology

No streams flow through the Michigan Island Wetland Complex (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Michigan Island Wetland Complex is located in Madeline Island, Wisconsin. The average annual temperature is 40.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 17.1°F and the mean monthly high for July is 67.2°F. The average annual precipitation is 28.13 inches, with a mean monthly precipitation of 4.01 inches in January and 1.93 inches in July. The growing season is approximately four and three-fourths months long, with the last

killing frost (28°F) in 1975 occurring on May 12 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963).

BIOTIC SETTING LS 248-253

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Michigan Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Michigan Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Michigan Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Ashland County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Michigan Island Wetland Complex.

Avifauna

Historical information on the summer birds of the Apostle Islands is available in Jackson (1941, 1942, 1943). Table 8-11 lists the bird species that were observed in the spring of 1976 and 1977 in wetland habitat on Michigan Island. The swamp sparrow (Melospiza georgiana) was observed nesting at that time. Additional information on the 1976 and 1977 spring migrations in the Apostle Islands is available in Harris (1977).

Table 8-11. Birds Observed in Michigan Island Wetland Habitat in Spring 1976 and 1977[a]

Common name	Common name
northern shoveler	brown-headed cowbird
wood duck	red-winged blackbird
pied-billed grebe	common grackle
belted kingfisher	common snipe
green heron	swamp sparrow

[a] Harris, 1977

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Michigan Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the Michigan Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. A herd of white-tailed deer (Odocoileus virginianus) is present on Michigan Island at a relatively light density (Beals et al., 1960), and browse pressure is not heavy.

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the six wetlands comprising the Michigan Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Michigan Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

Population

The Michigan Island Wetland Complex is located on Michigan Island, which is part of the Apostle Islands National Lakeshore and is situated in La Pointe Township of Ashland County, Wisconsin. Ashland County is sparsely populated, having a density of 16 persons per square mile. The population of the county remained stable between 1970 and 1975, but La Pointe Township experienced a rapid decline in population during the same time period. Projections for 1990 indicate that Ashland County is expected to undergo a moderate rate of population decline in the future.

Table 8-12. Population Data for the Vicinity of the Michigan Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Ashland County	16,616	-0.8	14,130
La Pointe Township	183	-15.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Michigan Island Wetland Complex and the surrounding area is rural open space. Several trails are located in the vicinity. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Michigan Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Michigan Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Michigan Island Wetland Complex (U.S.G.S. quadrangle map, Michigan Island, Wisconsin, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to the Michigan Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Michigan Island Wetland Complex. However, several archaeological sites have been identified in the vicinity of the wetlands, including the Red Clay Bluff site and a site which has provided a large amount of flake and historical material related to prehistoric fishing (National Park Service, 1977).

RESEARCH PROJECTS LS 248-253

The literature search identified no on-going or impending research projects pertaining to the Michigan Island Wetland Complex.

YORK ISLAND WETLAND

PHYSIOGRAPHIC SETTING LS 254

Setting

York Island Wetland is located on York Island, approximately 100 feet from the shoreline of Lake Superior, within Russell Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine System and occupies a partially wooded site (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Topography

York Island Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The surrounding area on the island includes a low hill with an elevation of 645 feet above mean sea level (U.S.G.S. quadrangle map, York Island,, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which York Island Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

The soils of York Island Wetland are classified as Superior-Ogemaw association, undulating (Ableiter and Hole, 1958).

Hydrology

No streams flow through York Island Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for York Island Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6^{o}F and the mean monthly high for July is 67.4^{o}F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately five months long, with the last killing frost (28^{o}F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

BIOTIC SETTING LS 254

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of York Island Wetland.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in York Island Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in York Island Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in York Island Wetland.

Avifauna

Historical information on the summer birds of the Apostle Islands, which may be pertinent to this wetland, is available in Jackson (1941, 1942, 1943). An annotated list of birds observed on the islands in the spring of 1976 and 1977 is available in Harris (1977). Additional information on the 1976 and 1977 spring migrations is included.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing York Island Wetland.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to York Island Wetland. Mammalian species which may utilize this wetland are listed in Appendix C-5. No permanent herd of white-tailed deer (Odocoileus virginianus) is found on York Island (Beals et al., 1960).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting York Island Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in York Island Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 254

Population

York Island Wetland is located in Russell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Russell Township experienced a slow rate of population growth between 1970 and 1975, but the population of Bayfield County grew rapidly during the same time period. Bayfield County is expected to undergo a slow rate of growth in the future.

Table 8-13. Population Data for the Vicinity of York Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Russell Township	485	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within York Island Wetland and the surrounding area is rural open space. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of York Island Wetland.

Mineral, Energy, and Forest Resources

York Island Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of York Island Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to York Island Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of York Island Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 254

The literature search identified no on-going or impending research projects pertaining to York Island Wetland.

RASPBERRY ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 255-257

Setting

The Raspberry Island Wetland Complex is located on Raspberry Island, in the coastal zone of Lake Superior, within Russell Township of Bayfield County, Wisconsin. The various parts of the complex lie approximately 0.5 mile from the Lake Superior shoreline. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies predominantly wooded sites except for Raspberry Island Wetland #3 (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Topography

The Raspberry Island Wetland Complex has 78 feet of relief and a maximum elevation of 680 feet above mean sea level (78 feet above the approximate mean elevation of Lake Superior). The island rises steeply to a summit of 700 feet above mean sea level. Wetlands #1 and #2 are located at upper elevations on the island, but #3 is located on the only flat beach area (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which the Raspberry Island Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soil types present in the Raspberry Island Wetland Complex include the Superior-Ogemaw association, undulating (Ableiter and Hole, 1958).

Hydrology

No streams flow through the Raspberry Island Wetland Complex (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Raspberry Island Wetland Complex is located in Bayfield, Wisconsin. The average annual temperature is 39.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 67.4°F. The average annual precipitation is 30.20 inches, with a mean monthly

precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

BIOTIC SETTING LS 255-257

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Raspberry Island Wetland Complex.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Raspberry Island Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Raspberry Island Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Raspberry Island Wetland Complex.

Avifauna

Historical information on the summer birds of the Apostle Islands, which may be pertinent to the wetlands of this complex, is available in Jackson (1941, 1942, 1943). An annotated list of birds observed on the islands in the spring of 1976 and 1977 is available in Harris (1977). Additional information on the 1976 and 1977 spring migrations is included.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Raspberry Island Wetland Complex.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to the three wetlands of the Raspberry Island Wetland Complex. Mammalian species which may utilize these wetlands are listed in Appendix C-5. No permanent herd of white-tailed deer (Odocoileus virginianus) is found on Raspberry Island (Beals et al., 1960).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Raspberry Island Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Raspberry Island Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 255-257

Population

The Raspberry Island Wetland Complex is located in Russell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Raspberry Island is small and has no permanent residents. Russell Township experienced a slow rate of population growth between 1970 and 1975, but the population of Bayfield County grew rapidly during the same time period. Bayfield County is expected to undergo a slow rate of growth in the future.

Table 8-14. Population Data for the Vicinity of the Raspberry Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Russell Township	485	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Raspberry Island Wetland Complex and the surrounding area is rural open space. A trail is located west of Raspberry Island Wetland #3. The wetlands are under federal ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Raspberry Island Wetland Complex.

Mineral, Energy, and Forest Resources

The Raspberry Island Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Raspberry Island Wetland Complex (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Raspberry Island Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific

information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Raspberry Island Wetland Complex, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 255-257

The literature search identified no on-going or impending research projects pertaining to the Raspberry Island Wetland Complex.

FROG CREEK WETLAND

PHYSIOGRAPHIC SETTING LS 258

Setting

Frog Creek Wetland is located approximately 400 feet from the southern shoreline of Lake Superior, within Russell Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and occupies a non-wooded site(U.S.G.S.quadrangle map, York Island, Wisconsin, 1964).

Topography

Frog Creek Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The wetland lies between two steep hills (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Frog Creek Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Frog Creek Wetland are classified as Tahquamenon peat association and Lake beach (Ableiter and Hole, 1958).

Hydrology

Frog Creek flows through Frog Creek Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Frog Creek Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6^{o}F and the mean monthly high for July is 67.4^{o}F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately five months long, with the last killing frost (28^{o}F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

BIOTIC SETTING LS 258

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Frog Creek Wetland.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Frog Creek Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Frog Creek Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Frog Creek Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Frog Creek Wetland.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Frog Creek Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Frog Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 258

Population

Frog Creek Wetland is located in Russell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Russell Township experienced a slow rate of population growth betwee 1970 and 1975, but the population of Bayfield County grew rapidly during the same time period. Bayfield County is expected to undergo a slow rate of growth in the future.

Table 8-15. Population Data for the Vicinity of Frog Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Russell Township	485	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Frog Creek Wetland and the surrounding area is rural open space. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Frog Creek Wetland.

Mineral, Energy, and Forest Resources

Frog Creek Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Frog Creek Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Frog Creek Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Frog Creek Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 258

The literature search identified no on-going or impending research projects pertaining to Frog Creek Wetland.

RASPBERRY BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 259

Setting

Raspberry Bay Wetland is located on the shoreline of Raspberry Bay, which is directly connected to Lake Superior, within Russell Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and is partially wooded (U.S.G.S.quadrangle map, York Island, Wisconsin, 1964).

Topography

Raspberry Bay Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The wetland lies in a river valley between two steep hills which have elevations of 965 feet above mean sea level (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Raspberry Bay Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Raspberry Bay Wetland are classified as Tahquamenon peat association, Lake beach, and Saugatuck association (Ableiter and Hole, 1958).

Hydrology

The Raspberry River flows through Raspberry Bay Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Raspberry River may be found in Schneiderwent (1974) and Dickas (1975).

Climate

The closest weather station providing climatic data for Raspberry Bay Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 67.4°F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately

five months long, with the last killing frost (28°F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

BIOTIC SETTING LS 259

Vegetation

A northern sedge meadow dominated by the sedge (Carex lasiocarpa) has developed behind the barrier beach. Dominant woody plants of the beach include alder (Alnus rugosa), willow (Salix spp.) and paper birch (Betula papyrifera). Recent breaches of the barrier have allowed for deposition of sand in the sedge meadow.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of Raspberry Bay Wetland.

Fish

Fish species recorded in the Raspberry River include ammocetes of northern brook lamprey (Ichthyomyzon fossor) or silver lamprey (Ichthyomyzon unicuspis), sea lamprey (Petromyzon marinus), creek chub (Semotilus atromaculatus), northern redbelly dace (Phoxinus eos), common shiner (Notropis conutus), white sucker (Catostomus commersoni), brook stickleback (Culea inconstans), johnny darter (Etheostoma nigrum), and mottled sculpin (Cottus bairdi) (Moore and Braem, 1965). Of these, the white sucker, brook stickleback, johnny darter, and mottled sculpin are generally associated with wetland habitats (Trautman, 1957). Fish species known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Raspberry Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Raspberry Bay Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Raspberry Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Raspberry Bay Wetland.

Mammals

Raspberry Bay Wetland has been classified as most desirable habitat for black bear (Ursus americanus) and white-tailed deer (Odocoileus virginanus) and as supplemental habitat for squirrels (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Raspberry Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Raspberry Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 259

Population

Raspberry Bay Wetland is located in Russell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Russell Township experienced a slow rate of population growth between 1970 and 1975, but the population of Bayfield County grew rapidly during the same time period. Bayfield County is expected to undergo a slow rate of growth in the future.

Table 8-16. Population Data for the Vicinity of Raspberry Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Russell Township	485	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Raspberry Bay Wetland and the surrounding area is rural open space. A light-duty road is located south of the wetland. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Raspberry Bay Wetland.

Mineral, Energy, and Forest Resources

Raspberry Bay Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Raspberry Bay Wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Raspberry Bay Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Raspberry Bay Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 259

The literature search identified no on-going or impending research projects pertaining to Raspberry Bay Wetland.

LITTLE SAND BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 260

Setting

Little Sand Bay Wetland is located approximately 150 feet from the shoreline of Little Sand Bay, which is directly connected to Lake Superior, within Russell Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Topography

Little Sand Bay Wetland has 18 feet of relief and a maximum elevation of 620 feet above mean sea level (18 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The wetland lies between two large steep hills with elevations of 1,030 feet above mean sea level (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Little Sand Bay Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Little Sand Bay Wetland are classified as Tahquamenon peat association and Lake beach (Ableiter and Hole, 1958).

Hydrology

Two intermittent streams flow through Little Sand Bay Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Little Sand Bay Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 67.4°F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately five months long, with the last killing frost (28°F) in 1975 occurring on May 4

and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, York Island, Wisconsin, 1964).

BIOTIC SETTING LS 260

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Little Sand Bay Wetland.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Little Sand Bay Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Little Sand Bay Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Little Sand Bay Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Little Sand Bay Wetland.

Mammals

Little Sand Bay Wetland is classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Little Sand Bay Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Little Sand Bay Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING

LS 260

Population

Little Sand Bay Wetland is located in Russell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Russell Township experienced a slow rate of population growth betwee 1970 and 1975, but the population of Bayfield County grew rapidly during the same time period. Bayfield County is expected to undergo a slow rate of growth in the future.

Table 8-17. Population Data for the Vicinity of Little Sand Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Russell Township	485	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Little Sand Bay Wetland and the surrounding area is rural open space. A light-duty road passes through the eastern section of Little Sand Bay Wetland. The wetland is under mixed private and federal ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Little Sand Bay Wetland.

Mineral, Energy, and Forest Resources

Little Sand Bay Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Little Sand Bay Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Little Sand Bay Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Little Sand Bay Wetland, nor are there any known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS

LS 260

The literature search identified no on-going or impending research projects pertaining to Little Sand Bay Wetland.

SAND RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 261

Setting

Sand River Wetland lies on the shoreline of Sand Bay, which is directly connected to Lake Superior, at the mouth of the Sand River. The wetland is located in Bayfield Township of Bayfield County, Wisconsin, but there are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Topography

Sand River Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is hilly and the wetland is located in a valley between two hills with elevations of 1,010 feet above mean sea level (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Sand River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sedimennts in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Sand River Wetland are classified as Lake beach, Tahquamenon peat association and Pickford-Bergland association (Ableiter and Hole, 1958).

Hydrology

The Sand River and three unnamed streams flow through Sand River Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Sand River may be found in Schneiderwent (1974) and Dickas (1975).

Climate

The closest weather station providing climatic data for Sand River Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6^{o}F and the mean monthly high for July is 67.4^{o}F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately five

months long, with the last killing frost (28°F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

BIOTIC SETTING LS 261

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sand River Wetland.

Fish

Fish species found in the Sand River are listed in Table 8-18. Other fishes known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

Table 8-18. Fish Species Found in the Sand River, Bayfield County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Gasterosteidae
ammocetes (northern brook or silver lamprey)	brook stickleback*
sea lamprey	Centrarchidae
Salmonidae	rock bass
rainbow trout	Percidae
brook trout	logperch*
Cyprinidae	johnny darter*
longnose dace	Cottidae
common shiner	mottled sculpin*
Catostomidae	
white sucker*	

[a] Moore and Braem (1965)
* Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Sand River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sand River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sand River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sand River Wetland.

Mammals

Beaver (Castor canadensis) are common to the Sand River (Johannes et al., 1970) and may occur in Sand River Wetland. This wetland is classified as desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sand River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Sand River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

Population

Sand River Wetland is located in Bayfield Township of Bayfield County, Wisconsin. The county is sparsely populated, having a density of eight persons per square mile. Table 8-19 indicates that Bayfield County experienced a rapid rate of population growth between 1970 and 1975, but growth in Bayfield Township was slower during the same time period. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-19. Population Data for the Vicinity of Sand River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Bayfield Township	485	3.6	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Sand River Wetland and the surrounding area is rural open space. Unimproved dirt roads are located both west and northeast of Sand River Wetland. The wetland is under local government ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Sand River Wetland.

Mineral, Energy, and Forest Resources

Sand River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sand River Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Sand River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Sand River Wetland, but there is a Chippewa village site on the Sand Bay Shore east of the mouth of the Sand River (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 261

The literature search identified no on-going or impending research projects pertaining to Sand River Wetland.

SAND ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LS 262

Setting

Sand Island Wetland is located on Sand Island, approximately 300 feet from the Lake Superior shoreline, within Bayfield Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Topography

Sand Island Wetland has little relief and lies at an elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The surrounding area is composed of rolling hills with elevations up to 650 feet above sea level (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Sand Island Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Sand Island Wetland are classified as Bruce association and Ontonagon-Pickford association, which are nearly level, and Superior-Orgmaw association, which is undulating (Ableiter and Hole, 1958).

Hydrology

No streams flow through Sand Island Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Sand Island Wetland is located in Bayfield, Wisconsin. The average annual temperature is 39.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 67.4°F. The average annual precipitation is 30.20 inches, with a mean monthly precipitation of 1.14 inches in January and 3.87 inches in July. The growing season is approximately

five months long, with the last killing frost (28°F) in 1975 occurring on May 4 and the first killing frost on October 2 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

BIOTIC SETTING LS 262

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Sand Island Wetland.

Fish

Fish species generally associated with wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Sand Island Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Sand Island Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sand Island Wetland.

Avifauna

Historical information on the summer birds of the Apostle Islands, which may be pertinent to this wetland, is available in Jackson (1941, 1942, 1943). An annotated list of birds observed on the islands in the spring of 1976 and 1977 is available in Harris (1977). Additional information on the 1976 and 1977 spring migration is included.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Sand Island Wetland.

Mammals

General studies of the Apostle Islands (Jackson, 1920; Beals et al., 1960) provide information which may apply to Sand Island Wetland. Mammalian species which may utilize these wetlands are listed in Appendix C-5. No permanent herd of white-tailed deer (Odocoileus virginianus) is found on Sand Island (Beals et al., 1960).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Sand Island Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Sand Island Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 262

Population

Sand Island Wetland is located on Sand Island, which is part of the Apostle Islands National Lakeshore; it is the only one of the Apostle Islands that maintains a permanent population. The island is part of Bayfield Township of Bayfield County. Table 8-20 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, while the population of Bayfield Township increased moderately during the same time period. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-20. Population Data for the Vicinity of Sand Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Bayfield Township	485	3.6	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Sand Island Wetland and the surrounding area is rural open space. An unimproved dirt road and two buildings are adjacent to the southeastern border of Sand Island Wetland. The wetland is under local government ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Sand Island Wetland.

Mineral, Energy, and Forest Resources

Sand Island Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sand Island Wetland (U.S.G.S. quadrangle map, Sand Island, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Sand Island Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

The Sevona Cabin (1905-06) and the Shaw Farm commemorate early settlements on Sand Island near Sand Island Wetland. These structures have recently been added to the National Register of Historical Places.

RESEARCH PROJECTS LS 262

The literature search identified no on-going or impending research projects pertaining to Sand Island Wetland.

SISKIWIT BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 263-265

Setting

The Siskiwit Bay Wetland Complex is located along Siskiwit Bay, which is directly connected to Lake Superior, in Bell Township of Bayfield County, Wisconsin. The various parts of the complex lie approximately 0.2 mile from the Siskiwit Bay shoreline. There are no major population centers in the area. This wetland complex is a Palustrine-Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Cornucopia, Wisconsin, 1964; Bark Bay, Wisconsin, 1964).

Topography

The Siskiwit Bay Wetland Complex has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly; the greatest local elevation is 1100 feet above mean sea level (U.S.G.S. quadrangle maps, Bark Bay, Wisconsin, 1964; Cornucopia, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which the Siskiwit Bay Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soil types present in the Siskiwit Bay Wetland Complex include the Ontonagon association (rolling) in Siskiwit River Wetland, and Tahquamenon peat association, Lake beach, and Rifle peat associations in Siskiwit Bay Area Wetland (Ableiter and Hole, 1958).

Hydrology

Lost Creek No. 1, Lost Creek No. 2, Lost Creek No. 3, and one unnamed stream flow through Lost Creek Wetland. One intermittent stream flows through Siskiwit Bay Area Wetland, and the Siskiwit River flows through Siskiwit River Wetland (U.S.G.S. quadrangle maps, Bark Bay, Wisconsin, 1964; Cornucopia, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands. However, additional information regarding the Siskiwit River may be found in Schneiderwent (1974), Dickas (1975), and Johannes et al. (1970).

Climate

The closest weather station providing climatic data for the Siskiwit Bay Wetland Complex is located in Port Wing, Wisconsin. The average annual temperature based on the normal period from 1941-1970 is not available. The mean monthly low for January is 10.2°F and the mean monthly high for July is 69.0°F. The average annual precipitation is 23.08 inches, with a mean monthly precipitation of 0.88 inches in January and 3.50 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1974 occurring on May 9. The first killing frost was not recorded (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle maps, Bark Bay, Wisconsin, 1964; Cornucopia, Wisconsin, 1964).

BIOTIC SETTING

LS 263-265

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Siskiwit Bay Wetland Complex.

Fish

Fish species found in the Siskiwit River are listed in Table 8-21. Cornucopia Harbor provides mooring and docking facilities for pleasure boats, but the recreational fishery and commercial fishery of the Cornucopia area is apparently largely based on offshore salmonid stocks (Wisconsin Department of Natural Resources, 1970; U.S. Army Corps of Engineers, 1975).

Table 8-21. Fish Species Found in the Siskiwit River and Cornucopia Harbor, Bayfield County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
sea lamprey	white sucker*
Salmonidae	Percidae
brown trout	walleye*
rainbow trout	johnny darter*
brook trout (seasonal)	
coho salmon (seasonal)	Cottidae
	mottled sculpin*
Esocidae	
northern pike*	
Cyprinidae	
creek chub	
emerald shiner (possibly)	
spottail shiner	

[a] Moore and Braem (1965); U.S. Army Corps of Engineers (1975); Wisconsin Department of Natural Resources (1970)

* Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Fish species found in Lost Creek (1, 2, or 3 not specified; Moore and Braem, 1965) include brook trout (Salvelinus fontinalis), white sucker (Catostomus commersoni), brook stickleback (Culea inconstans), and mottled sculpin (Cottus bairdi). Of these the latter three are usually associated with wetland habitats or submersed stream vegetation (Trautman, 1957). Other fishes known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Siskiwit Bay Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Siskiwit Bay Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Siskiwit Bay Wetland Complex.

Avifauna

Mallards (Anas platyrhynchos), red-breasted mergansers (Mergus serrator), herring gulls (Larus argentatus), long-billed marsh wrens (Cistothorus palustris), yellow warblers (Dendroica petechia), red-winged blackbirds (Agelaius phoeniceus) and song sparrows (Melospiza melodia) were observed on May 7, 1970 in the vicinity of Siskiwit River Wetland (Wisconsin Department of Natural Resources, 1970). These species may also occur in Siskiwit Bay Area Wetland and Lost Creek Wetland owing to their proximity.

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Siskiwit Bay Wetland Complex.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are common to the Siskiwit River (Johannes et al., 1970) and may occur in Siskiwit River Wetland.

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Siskiwit Bay Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Siskiwit Bay Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

Population

The Siskiwit Bay Wetland Complex is located in Bell Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Table 8-22 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-22. Population Data for the Vicinity of the Siskiwit Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,565	7.5	13,490
Bell Township	272	32.7	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Siskiwit Bay Wetland Complex is rural open space, with some residential development in the surrounding area. A medium-duty highway runs along the northwestern border of Siskiwit River Wetland, southeast of Siskiwit Bay Area Wetland, and south of Lost Creek Wetland. There are light-duty roads southwest of Siskiwit River Wetland and adjacent to the northern boundaries of Siskiwit Bay Area Wetland and Lost Creek Wetland. Buildings are located north of the latter two wetlands and west of Siskiwit River Wetland. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Cornucopia, Wisconsin, 1964; Bark Bay, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Siskiwit Bay Wetland Complex.

Mineral, Energy, and Forest Resources

The Siskiwit Bay Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have

minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Siskiwit Bay Wetland Complex (U.S.G.S. quadrangle maps, Cornucopia, Wisconsin, 1964; Bark Bay, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Siskiwit Bay Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

An historical marker in Wayside Park, adjacent to Siskiwit River Wetland, presents an account of the Tragedy of the Siskiwit, a Chippewa Indian legend concerning the bloody hostage exchange between the Chippewas and the Foxes (Wisconsin Historic Preservation Division, 1977). There are no known archaeological sites in the vicinity (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS LS 263-265

The literature search identified no on-going or impending research projects pertaining to the Siskiwit Bay Wetland Complex.

BARK BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 266

Setting

Bark Bay Wetland is located on the shoreline of Bark Bay, which is directly connected to Lake Superior, within Clover Township of Bayfield County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine System and is partially wooded (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964).

Topography

Bark Bay Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible high bluff. The surrounding area is hilly; the greatest local elevation is about 1,000 feet above mean sea level (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964).

Surficial Geology

The surficial geology of the area in which Bark Bay Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Bark Bay Wetland are classified as Tahquamenon peat association, Spaulding peat association, and Pickford-Bergland association (Ableiter and Hole, 1958).

Hydrology

Three unnamed streams and the Bark River flow through Bark Bay Wetland (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Bark Bay Wetland is located in Port Wing, Wisconsin. The average annual temperature based on the normal period from 1941-1970 is not available. The mean monthly low for January is 10.2^{o}F and the mean monthly high for July is 69.0^{o}F. The average annual precipitation is 23.08 inches, with a mean monthly precipitation of 0.88 inches in January and 3.50 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28^{o}F) in 1974 occurring

on May 9. The first killing frost was not recorded (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964).

BIOTIC SETTING LS 266

Vegetation

According to Bedford et al. (1976), the lagoon associated with Bark Bay Wetland has some submersed aquatic species and numerous small islands supporting bog shrubs. A floating sedge mat dominated by the sedge (Carex lasiocarpa) is located on the eastern edge of the lagoon. Portions of the barrier beach are well established as evidenced by the presence of large white pines (Pinus strobus). Other portions have been breached, allowing deposition of sand in the sedge meadow.

The literature search yielded no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Fish species found in the Bark River include brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), brook trout (Salvelinus fontinalis), and mottled sculpin (Cottus bairdi) (Moore and Braem, 1965; Wisconsin Department of Natural Resources, 1970). Of these only the mottled sculpin is generally associated with wetland habitats (Trautman, 1957). Other fishes known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Bark Bay Wetland.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of Bark Bay Wetland is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes were the major taxa collected at four sample sites. A list of the taxa collected, in order of abundance, appears in Table 8-23. These organisms may or may not be found in this wetland today.

Table 8-23. Invertebrate Taxa Collected[a] in Bark Bay Wetland, August 5, 1970

Oligochaeta	Insecta
Gastropoda	Ephemeroptera
Pulmonata	*Caenis*
Ferrisia	Odonata
Pelecypoda	*Celithemis*
Crustacea	*Plathemis lydia*
Isopoda	Hemiptera
Asellus	Gerridae
Amphipoda	Corixidae
Hyalella azteca	Megaloptera
Hydracarina	*Chauliodes*
Unionicola	Diptera
Neumania	Tendipedidae
	Tabanidae

[a] Wisconsin Department of Natural Resources, open files, 1970.

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in this wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bark Bay Wetland.

Avifauna

Table 8-24 presents a list of birds observed in Bark Bay Wetland from May to September, 1970, by Wisconsin Department of Natural Resources personnel. However, the literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Bark Bay Wetland.

Mammals

Muskrat (*Ondatra zibethicus*) are scarce in Bark Bay Wetland (Wisconsin Department of Natural Resources, 1970, open file report). Beaver (*Castor canadensis*) occur in the lower stretches of the Bark River (Johannes et al., 1970) and may utilize this wetland.

Table 8-24 . A List of Birds Observed in Bark Bay Wetland, May to September, 1970[a]

Common name	Common name
mallard	spotted sandpiper
green-winged teal	greater yellowlegs
blue-winged teal	lesser yellowlegs
ring-necked duck	least sandpiper
lesser scaup	tree swallow
bufflehead	bank swallow
hooded merganser	barn swallow
horned grebe	cliff swallow
pied-billed grebe	chimney swift
belted kingfisher	ovenbird
short-billed marsh wren	common yellowthroat
great blue heron	yellow warbler
American bittern	crested flycatcher
American coot	eastern kingbird
herring gull	veery
yellow-shafted flicker	swamp sparrow
downy woodpecker	sharp-shinned hawk
brown-headed cowbird	red-tailed hawk
red-winged blackbird	bald eagle
common grackle	marsh hawk
killdeer	American kestrel
common snipe	

[a]Taken from Wisconsin Department of Natural Resources, 1970

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Bark Bay Wetland.

Endangered Species

Bald eagles (Haliaeetus leucocephalus) were recorded in Bark Bay Wetland in 1970 (Wisconsin Department of Natural Resources, 1970).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in this wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Bark Bay Wetland is extensively utilized by avifauna.

CULTURAL SETTING LS 266

Population

Bark Bay Wetland is located in Clover Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Table 8-25 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-25. Population Data for the Vicinity of Bark Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Clover Township	338	22.0	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Bark Bay Wetland and the surrounding area is rural open space. State Route 13 runs along the southern border of the wetland, and light-duty roads are located southwest of the wetland, between the two lower sections of the wetland, and cross a northern section. An unimproved dirt road lies to the northeast, and some buildings are located to the northeast and the south. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bark Bay Wetland.

Mineral, Energy, and Forest Resources

Bark Bay Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Bark Bay Wetland (U.S.G.S. quadrangle map, Bark Bay, Wisconsin, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Bark Bay Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Bark Bay Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS

LS 266

The literature search identified no on-going or impending research projects pertaining to Bark Bay Wetland.

PHYSIOGRAPHIC SETTING LS 267

Setting

Cranberry River Wetland lies approximately 80 feet from the southern shoreline of Lake Superior within Clover Township of Bayfield County, Wisconsin, at Herbster. This wetland is a Palustrine-Riverine System and is partially wooded (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Topography

Cranberry River Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Surficial Geology

The surficial geology of the area in which Cranberry River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Cranberry River Wetland are classified as Lake beach and Tahquamenon peat association (Ableiter and Hole, 1958).

Hydrology

One intermittent stream, two unnamed streams, and the Cranberry River flow through Cranberry River Wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Cranberry River may be found in Schneiderwent (1974), Dickas (1975), and Johannes et al. (1970).

Climate

The closest weather station providing climatic data for Cranberry River Wetland is located in Port Wing, Wisconsin. The average annual temperature based on the normal period from 1941-1970 is not available. The mean monthly low for January is 10.2°F and the mean monthly high for July is 69.0°F. The average annual precipitation is 23.08 inches, with a mean monthly precipitation of 0.88 inches in January and 3.50 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F)

Table 8-26. Fish Species Found in Cranberry River, Bayfield County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
ammocetes (northern brook or silver lamprey)	longnose sucker
Salmonidae	Ictaluridae
brown trout	stonecat
rainbow trout	Gadidae
brook trout	burbot
Osmeridae	Gasterosteidae
rainbow smelt	brook stickleback*
Umbridae	Percopsidae
central mudminnow*	trout-perch
Esocidae	Percidae
northern pike*	yellow perch*
Cyprinidae	logperch*
creek chub	johnny darter*
lake chub	Cottidae
blacknose dace	mottled sculpin*
longnose dace	slimy sculpin
goldenshiner*	
spottail shiner	
fathead minnow*	

[a]Moore and Braem (1965); Wisconsin Department of Natural Resources (1970)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

in 1974 occurring on May 9. The first killing frost was not recorded (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

BIOTIC SETTING LS 267

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Cranberry River Wetland.

Fish

Fish species found in the Cranberry River are listed in Table 8-26. Northern pike (Esox lucius) and yellow perch (Perca flavescens) are two wetland related species which are generally common at the mouth of the Cranberry River (Wisconsin Department of Natural Resources, 1970). Other fishes species known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Cranberry River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Cranberry River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Cranberry River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Cranberry River Wetland.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are present along most of the Cranberry River (Johannes et al., 1970) and may be found in Cranberry River Wetland. This wetland has been classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Cranberry River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Cranberry River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, this wetland is likely to be utilized by several of the fish species present in the Cranberry River.

CULTURAL SETTING

LS 267

Population

Cranberry River Wetland is located in Clover Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Table 8-27 indicates that the county and township both experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-27. Population Data for the Vicinity of Cranberry River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Clover Township	338	22.0	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Cranberry River Wetland and the surrounding area is rural open space and residential. State Route 13 and an unimproved dirt road cross northern and central sections of Cranberry River Wetland, respectively. Several buildings and light-duty roads are located east of this wetland; one building is located within the northern section. The wetland is under private ownership, and its location suggests that it is subject to high development pressure (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Recreation

No known state or federal recreational facilities are present in the vicinity of Cranberry River Wetland.

Mineral, Energy, and Forest Resources

Cranberry River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Cranberry River Wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Pollution Sources

There are no NPDES permit holders adjacent to Cranberry River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Cranberry River Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 267

The literature search identified no on-going or impending research projects pertaining to Cranberry River Wetland.

BIBON LAKE-FLAG RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 268

Setting

Bibon Lake-Flag River Wetland is located on the southern shoreline of Lake Superior within Port Wing Township of Bayfield County, Wisconsin, at Port Wing. The wetland is a Palustrine-Riverine System and is partially wooded (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Topography

Bibon Lake-Flag River Wetland has 30 feet of relief and a maximum elevation of 632 feet above mean sea level (30 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is hilly (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Surficial Geology

The surficial geology of the area in which Bibon Lake-Flag River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

Soils in Bibon Lake-Flag River Wetland are classified as Lake beach, Tahquamenon peat association, Vilas association-undulating, Made land, Rifle peat association, and Pickford-Bergland association (Ableiter and Hole, 1958).

Hydrology

Larson Creek, the Flag River, four intermittent streams, and one unnamed stream flow through Bibon Lake-Flag River Wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Flag River may be found in Dickas (1975), U.S. Army Corps of Engineers (1976), and U.S. Army, Corps of Engineers (1977).

Climate

The closest weather station providing climatic data for Bibon Lake-Flag River Wetland is located in Port Wing, Wisconsin. The average annual temperature based on the normal period from 1941-1970 is not available. The mean monthly low for January is 10.2^{0}F and the mean monthly high for July is 69.0^{0}F. The average annual precipitation is 23.08 inches, with a mean monthly

precipitation of 0.88 inches in January and 3.50 inches in July. The growing season is approximately four and one-half months long, with the last killing frost (28°F) in 1974 occurring on May 9. The first killing frost is not recorded (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

BIOTIC SETTING LS 268

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Bibon Lake-Flag River Wetland.

Fish

The Flag River, which drains the eastern area of this wetland, has been reported to contain brook trout (Salvelinus fontinalis), rainbow trout (Salmo gairdneri), brown trout (Salmo trutta), lake chub (Couesius plumbeus), johnny darter (Etheostoma nigrum), and mottled sculpin (Cottus bairdi) (Moore and Braem, 1965; Wisconsin Department of Natural Resources, 1970). The docking area of Port Wing Harbor provides habitat for northern pike (Esox lucius), walleye (Stizostedion vitreum), and yellow perch (Perca flavescens) (U.S. Army Corps of Engineers, 1975). Other fishes known to utilize the wetlands of Lake Superior are listed in Appendix A-1.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Bibon Lake-Flag River Wetland.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of Bibon Lake-Flag River Wetland is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes were the major taxa collected at two sample sites. A list of the taxa collected appears in Table 8-28. Sphaerium may be included in the list of taxa in this area (U.S. Department of the Army, 1975).

Table 8-28. Invertebrate Taxa Collected in Bibon Lake Wetland (Port Wing), August 5, 1970[a]

Oligochaeta	Insecta
Hirudinea	Trichoptera
Gastropoda	*Agrypnia vestita*
Pelecypoda	Coleoptera
Crustacea	*Donacia*
Isopoda	Diptera
Asellus	Tendipedidae
Amphipoda	Ceratopogonidae
Hyalella azteca	
Gammarus	
Hydracarina	
Unionicola	
Piona	

[a] Wisconsin Department of Natural Resources, open files, 1970

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in this wetland.

Reptiles and Amphibians

The list of herpetofauna of Bayfield County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bibon Lake-Flag River Wetland.

Avifauna

Table 8-29 presents a list of bird species observed in Bibon Lake-Flag River Wetland from May to September, 1970, by Wisconsin Department of Natural Resources personnel (1970).

Table 8-29. An Incomplete List of Birds Observed in Bibon Lake-Flag River Wetland, May to September, 1970[a]

Common name	Common name
mallard	common grackle
blue-winged teal	killdeer
American wigeon	black-bellied plover
northern shoveler	common snipe
wood duck	spotted sandpiper
ring-necked duck	sanderling
greater scaup	ovenbird
lesser scaup	eastern kingbird
horned grebe	least flycatcher
pied-billed grebe	olive-sided flycatcher
belted kingfisher	Traill's flycatcher
long-billed marsh wren	common yellowthroat
great blue heron	tree swallow
American bittern	barn swallow
American coot	cliff swallow
herring gull	purple martin
Caspian tern	chimney swift
red-winged blackbird	veery
yellow-shafted flicker	

[a] Wisconsin Department of Natural Resources, 1970

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing this wetland.

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are common along the Flag River (Johannes et al., 1970) and may be found in Bibon Lake-Flag River Wetland. This wetland is classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Bibon Lake-Flag River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, this wetland is extensively utilized by avifauna.

CULTURAL SETTING

LS 268

Population

Bibon Lake-Flag River Wetland is located in Port Wing Township of Bayfield County, Wisconsin. Bayfield County is sparsely populated, having a density of eight persons per square mile. Table 8-30 indicates that the county experienced a rapid rate of population growth between 1970 and 1975, but population growth in Port Wing Township was moderate. Projections for 1990 indicate that Bayfield County is expected to undergo a slow rate of population growth in the future.

Table 8-30. Population Data for the Vicinity of Port Wing Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bayfield County	12,576	7.5	13,490
Port Wing Township	403	4.7	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Bibon Lake-Flag River Wetland is rural open space, but the surrounding area is residential. Several light-duty roads and unimproved dirt roads cross through northern and central sections of Bibon Lake-Flag River Wetland. A medium duty road (State Route 13) intersects the southeastern section of the wetland. Numerous light-duty roads and buildings are located south of the wetland (in Port Wing); buildings are also located north of the wetland and in several places within the wetland. The wetland is under private ownership, and its location suggests that it is subject to high development pressure (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bibon Lake-Flag River Wetland.

Mineral, Energy, and Forest Resources

Bibon Lake-Flag River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Bibon Lake-Flag River Wetland (U.S.G.S. quadrangle map, Port Wing, Wisconsin-Minnesota, 1961).

Pollution Sources

There are no NPDES permit holders adjacent to Bibon Lake-Flag River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of Bibon Lake-Flag River Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS

LS 268

The literature search identified no on-going or impending research projects pertaining to Bibon Lake-Flag River Wetland.

Table 8-31. Data Gaps-Lake Section 8

Data Gap*		Wetland Number	229–235	236–239	240–241	242–244	245–247	248–253	255–257	258	259	260	261	262	263–265	266	267	268
Physiographic Setting		Setting																
		Topography																
		Surficial Geology																
		Soils	*	*	*	*	*	*										
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Climate																
		Special Features																
Biotic Setting	Vegetation	Major Species Distribution	*	*	*		*	*	*	*		*	*	*	*		*	*
		Major Species Composition	*	*	*		*	*	*	*	*	*	*	*	*		*	*
		Density/Productivity	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Species Composition	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*		*	*	*	*	*	*	*	*	*	*	*	*	*	
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species																
		Health	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cultural Setting		Population																
		Land Use and Ownership																
		Recreation																
		Mineral, Energy, Forest Resource																
		Public Utilities/Facilities																
		Point Pollution Sources																
		Non-Point Pollution Sources																
		Historic Features																
		Archaeologic Features																

LAKE SECTION 9

INTRODUCTION

Lake Section 9 extends from Brule Point, Wisconsin, to Two Harbors, Minnesota and lies within Douglas and Ashland Counties of Wisconsin and St. Louis, Cook, and Lake Counties of Minnesota. The region features flat plain and river valleys in the vicinity of the wetlands. The predominant shore type along this 33 mile stretch of shoreline is erodible high bluff.

Figure 9-1 shows the approximate location of the 51 coastal wetlands in Lake Section 9. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 9-1. The wetlands of Lake Section 9 are located at elevations between 605 and 655 feet above sea level, 3 to 53 feet above the mean elevation of Lake Superior. The Section 9 wetlands are all classified as Palustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 51 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of the wetlands.

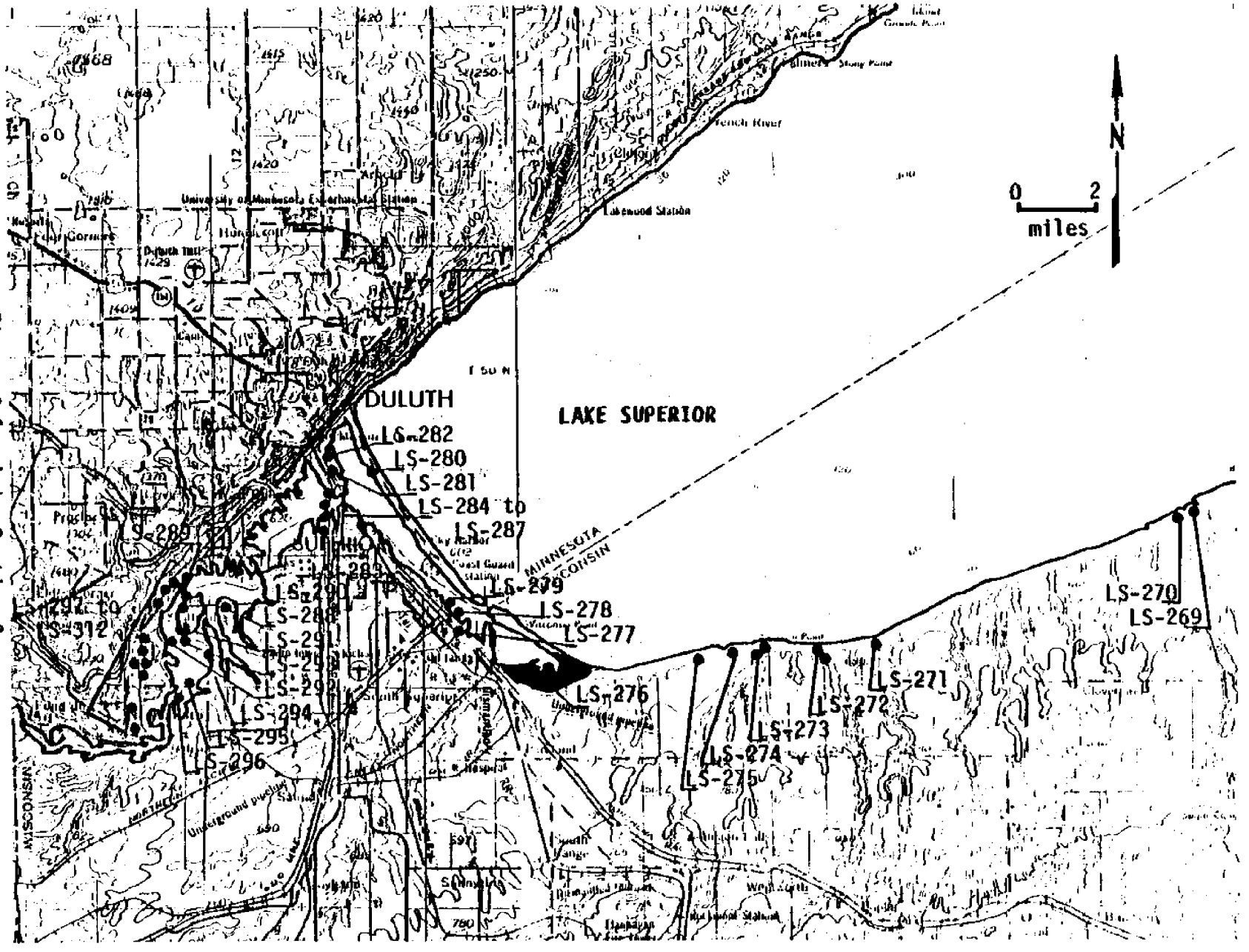


Figure 9-1. Lake Section 9

Table 9-1. Location, Acreage, and Classification of Wetlands in Lake Section 9

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	BOIS BRULE RIVER AREA WETLAND COMPLEX				
LS 269	Bois Brule River Wetland	46°44'50"	91°36'40"	70	P-R
LS 270	Bois Brule River Area Wetland	46°44'25"	91°37'33"	2	P
LS 271	Poplar River Wetland	46°41'30"	91°47'41"	10	P-R
LS 272	Middle River Wetland	46°41'16"	91°49'36"	10	P-R
LS 273	Amicon River Wetland	46°41'21"	91°51'42"	30	P-R
LS 274	Amicon River Area Wetland #1	46°41'19"	91°52'56"	2.5	P
LS 275	Amicon River Area Wetland #2	46°41'10"	91°54'03"	1	P
LS 276	Allouez Bay Wetland	46°40'52"	91°58'57"	365	P-R
	NEMADJI RIVER WETLAND COMPLEX				
LS 277	Nemadji River Wetland #1	46°41'38"	92°01'57"	55	P
LS 278	Nemadji River Wetland #2	46°41'55"	92°01'50"	22	P
LS 279	Hog Island Area Wetland	46°42'06"	92°02'11"	20	P
LS 280	Minnesota Point Wetland	46°44'20"	92°03'38"	18	P
	SUPERIOR CITY WETLAND COMPLEX				
LS 281	Superior City Wetland #1	46°44'08"	92°04'56"	2	P
LS 282	Connors Point Wetland	46°44'47"	92°06'01"	2	P
LS 283	Superior City Wetland #2	46°44'12"	92°05'42"	18	P
LS 284	Superior City Wetland #3	46°44'10"	92°06'27"	1	P
LS 285	Superior City Wetland #4	46°44'02"	92°06'43"	2.5	P
LS 286	Superior City Wetland #5	46°44'11"	92°06'40"	2	P
LS 287	Superior City Wetland #6	46°44'20"	92°06'42"	2.5	P
	ST. LOUIS RIVER WETLAND COMPLEX				
LS 288	Dwights Point Wetland	46°42'34"	92°09'51"	35	P-R
LS 289	Clough Island Wetland #1	46°42'35"	92°11'07"	30	P-R
LS 290	Clough Island Area Wetland #1	46°42'52"	92°10'36"	1	P-R
LS 291	Clough Island Wetland #2	46°41'50"	92°12'21"	5	P-R
LS 292	Spirit Lake Wetland #1	46°41'39"	92°11'40"	2.5	P
LS 293	Spirit Lake Wetland #2	46°42'39"	92°11'32"	2	P
LS 294	Kilchlis Meadow Wetland	46°41'04"	92°10'39"	15	P
LS 295	Little Pokegama Bay Wetland #1	46°40'22"	92°11'20"	7	P
LS 296	Oliver Wetland	46°39'57"	92°11'35"	170	P-R
LS 297	Bear Island Wetland	46°39'04"	92°12'40"	12	P-R
LS 298	Mud Lake Wetland	46°39'42"	92°12'30"	290	P-R
LS 299	Spirit Lake Wetland #3	46°40'29"	92°11'56"	40	P-R
LS 300	Spirit Lake Wetland #4	46°41'07"	92°12'20"	33	P-R
LS 301	Spirit Lake Wetland #5	46°41'10"	92°11'53"	10	P-R
LS 302	Spirit Lake Wetland #6	46°41'56"	92°11'39"	30	P-R
LS 303	Clough Island Area Wetland #2	46°42'06"	92°12'11"	20	P-R
LS 304	Tallas Island Wetland	46°42'50"	92°11'08"	32	P-R
LS 305	Indian Point Park Wetland #1	46°43'09"	92°10'53"	15	P-R
LS 306	Indian Point Park Wetland #2	46°43'13"	92°10'33"	17	P-R
LS 307	Keene Creek Wetland	46°43'29"	92°09'54"	2	P
LS 308	Billings Park Area Wetland	46°42'21"	92°08'38"	20	P
LS 309	Kimballs Bay Wetland	46°41'21"	92°08'23"	25	P-R
LS 310	Pokegama River Wetland	46°40'33"	92°08'41"	235	P-R
LS 311	Pokegama Bay Wetland	46°40'41"	96°09'51"	10	P
LS 312	Little Pokegama Bay Wetland #2	46°40'21"	92°10'32"	26	P
	Little Pokegama River Wetland				

[a]P=palustrine

BOIS BRULE RIVER AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 269-270

Setting

The Bois Brule River Area Wetland Complex lies on the southern shoreline of Lake Superior within Cloverland Township of Douglas County, Wisconsin, at the mouth of the Bois Brule River. There are no major population centers in the area. This complex is a Palustrine-Riverine System and occupies non-wooded sites (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961).

Topography

The Bois Brule River Area Wetland Complex has 38 feet of relief and a maximum elevation of 640 feet above mean sea level (38 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shorelines as erodible and non-erodible low bluffs. The surrounding area is a steadily rising slope and contains river valleys (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961).

Surficial Geology

The surficial geology of the area in which the Bois Brule River Area Wetland Complex lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

The Bois Brule River is adjacent to Bois Brule River Wetland. No streams flow through Bois Brule River Area Wetland (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands. However, additional information regarding the Bois Brule River may be found in Schneiderwent (1974), Dickas (1975), U.S. Geological Survey (1976); Wisconsin Department of Natural Resources (1975); and Bahnick (1977).

Climate

The closest weather station providing climatic data for the Bois Brule River Area Wetland Complex is located in Port Wing, Wisconsin. The average annual temperature based on the normal period from 1941-1970 is not available. The mean monthly low for January is 10.2°F and the mean monthly high for July is 69.0°F. The average annual precipitation is 23.08 inches, with a mean monthly

precipitation of 0.88 inches in January and 3.50 inches in July. The growing season is approximately four and one-half months long, with the last killing frost ($28^{o}F$) in 1974 occurring on May 9. The first killing frost was not recorded (National Oceanic and Atmospheric Administration, 1974).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961).

BIOTIC SETTING LS 269-270

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Bois Brule River Area Wetland Complex.

Fish

Fish species found in the Bois Brule River are listed in Table 9-2. Other fishes known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1. The Bois Brule River is reported to be the most famous and scenic trout stream in Wisconsin, as well as a major spawning stream for the sea lamprey (Petromyzon marinus), but salmonids and lampreys are not closely associated with wetlands (Trautman, 1957). The diversity of species in the river is an indication of good water quality and habitat diversity, and the wetland may be an important spawning, feeding, and nursery area for many of the game and non-game wetland related fishes indicated in Table 9-2.

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Bois Brule River Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Bois Brule River Area Wetland Complex.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Bois Brule River Area Wetland Complex.

Table 9-2 . Fish Species Found in Bois Brule River, Douglas County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	silver redhorse*
sea lamprey	shorthead redhorse*
Lepisosteidae	Ictaluridae
longnose gar	black bullhead*
Salmonidae	brown bullhead*
brown trout	yellow bullhead*
rainbow trout	stonecat
brook trout	Gadidae
lake herring	burbot
round whitefish	Gasterosteidae
Osmeridae	brook stickleback*
rainbow smelt	ninespine stickleback
Umbridae	Percopsidae
central mudminnow*	trout-perch
Esocidae	Centrarchidae
northern pike*	smallmouth bass*
Cyprinidae	largemouth bass*
creek chub	pumpkinseed*
pearl dace	bluegill*
lake chub	rock bass
hornyhead chub	black crappie*
blacknose dace	Percidae
longnose dace	yellow perch*
finescale dace	walleye*
northern redbelly dace	logperch*
goldenshiner	johnny darter*
emerald shiner	Iowa darter*
common shiner	Cottidae
spottail shiner	mottled sculpin*
blacknose shiner*	slimy sculpin
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Bois Brule River Area Wetland Complex.

Mammals

The Bois Brule River Area Wetland Complex has been classified as most desirable habitat for furbearers and white-tailed deer (Odocoileus virginianus) and as supplemental habitat for squirrels (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to other species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the two wetlands of the Bois Brule River Area Wetland Complex.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Bois Brule River Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, the complex is likely to be extensively utilized by several of the fish species present in the river.

CULTURAL SETTING LS 269-270

Population

The Bois Brule River Area Wetland Complex is located in Cloverland Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-3 indicates that the population of Douglas County remained stable between 1970 and 1975, but Cloverland Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-3. Population Data for the Vicinity of the Bois Brule River Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Cloverland Township	338	22.0	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Bois Brule River Area Wetland Complex and the surrounding area is rural open space. A light-duty road is adjacent to the eastern border of Bois Brule River Wetland. There are several buildings in this area, and one building is located in the southwestern section of the wetland. The wetlands are under state ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Bois Brule River Area Wetland Complex.

Mineral, Energy, and Forest Resources

The Bois Brule River Area Wetland Complex lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Bois Brule River Area Wetland Complex (U.S.G.S. quadrangle map, Brule, Wisconsin, 1961).

Pollution Sources

There are no NPDES permit holders adjacent to the Bois Brule River Area Wetland Complex (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical sites are located within 500 feet of the Bois Brule River Area Wetland Complex, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS

LS 269-270

The literature search identified no on-going or impending research projects pertaining to the Bois Brule River Area Wetland Complex.

POPLAR RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 271

Setting

Poplar River Wetland is located on the shoreline of the Poplar River, which is directly connected to Lake Superior, within Lakeside Township of Douglas County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and occupies a nonwooded site (U.S. G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Topography

Poplar River Wetland has little relief and lies at an elevation of 605 feet above mean sea level (three feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is relatively flat plain with deep narrow valleys formed by rivers (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in which Poplar River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

Poplar River Wetland is adjacent to the Poplar River (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Poplar River may be found in Schneiderwent (1974), U.S. Army, Corps of Engineers (1977), Dickas (1975), Sather and Johannes (1972), and Bahnick et al. (1970).

Climate

The closest weather station providing climatic data for Poplar River Wetland is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Poplar River Wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

BIOTIC SETTING LS 271

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Poplar River Wetland.

Fish

Fish species found in the Poplar River are listed in Table 9-4, and other fishes known to utilize the coastal wetlands of Lake Superior appear in Appendix A-1. A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Poplar River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Poplar River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Poplar River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Poplar River Wetland.

Table 9-4 . Fish Species Found in the Poplar River, Douglas County Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Ictaluridae
silver lamprey	black bullhead*
northern brook lamprey	stonecat
ammocetes (northern brook or silver lamprey)	tadpole madtom*
sea lamprey	Gadidae
Salmonidae	burbot
brown trout	Gasterosteidae
rainbow trout	brook stickleback*
brook trout	ninespine stickleback
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	rock bass
Esocidae	Percidae
northern pike*	yellow perch*
Cyprinidae	walleye*
creek chub	logperch*
pearl dace	johnny darter*
lake chub	Cottidae
hornyhead chub	mottled sculpin*
blacknose dace	
longnose dace	
goldenshiner*	
common shiner	
spottail shiner	
sand shiner	
blacknose shiner*	
fathead minnow*	
Catostomidae	
white sucker*	
longnose sucker	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

Muskrat (Ondatra zibethicus) are common on Poplar River Wetland (Wisconsin Department of Natural Resources, 1973). This wetland has been classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Poplar River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Poplar River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, this wetland is likely to be extensively utilized by several of the fishspecies present in the Poplar River.

CULTURAL SETTING

LS 271

Population

Poplar River Wetland is located in Lakeside Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-5 indicates that the population of Douglas County remained stable between 1970 and 1975, but Lakeside Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-5. Population Data for the Vicinity of Poplar River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Lakeside Township	572	11.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Poplar River Wetland and the surrounding area is rural open space. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Poplar River Wetland.

Mineral, Energy, and Forest Resources

Poplar River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is only sparsely wooded, representing minimal potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Poplar River Wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Poplar River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, non-point pollution in the general area which includes Poplar River Wetland is discussed in Andrews et al. (1976).

Historical and Archaeological Features

No known historical sites are located within 500 feet of Poplar River Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 271

The literature search identified no on-going or impending research projects pertaining to Poplar River Wetland.

MIDDLE RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 272

Setting

Middle River Wetland is located on the shoreline of Middle River, which is directly connected to Lake Superior, within Lakeside Township of Douglas County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and occupies a non-wooded (U. S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1954).

Topography

Middle River Wetland has little relief and lies at an elevation of 605 feet above mean sea level (three feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is a relatively flat plain above coastal bluffs, cut by deep river valleys or gorges (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in which Middle River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

Middle River Wetland is adjacent to the Middle River (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Middle River may be found in Schneiderwent (1974) and Dickas (1975).

Climate

The closest weather station providing climatic data for Middle River Wetland is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April

21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

BIOTIC SETTING LS 272

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Middle River Wetland.

Fish

Fish species found in the Middle River are listed in Table 9-6, and other fishes known to utilize the coastal wetlands of Lake Superior appear in Appendix A-1. A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Middle River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Middle River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Middle River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Middle River Wetland.

Table 9-6. Fish Species Found in the Middle River, Douglas County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	shorthead redhorse*
sea lamprey	Ictaluridae
Amiidae	black bullhead*
bowfin*	stonecat
Salmonidae	Gadidae
brown trout	burbot
rainbow trout	Gasterosteidae
brook trout	brook stickleback*
round whitefish	ninespine stickleback
Osmeridae	Percopsidae
rainbow smelt	trout-perch
Umbridae	Centrarchidae
central mudminnow*	smallmouth bass*
Esocidae	bluegill*
northern pike*	rock bass
Cyprinidae	black crappie*
creek chub	Percidae
lake chub	yellow perch*
hornyhead chub	walleye*
blacknose dace	logperch*
longnose dace	johnny darter*
goldenshiner*	Cottidae
common shiner	mottled sculpin*
spottail shiner	slimy sculpin
sand shiner	
blacknose shiner	
brassy minnow	
fathead minnow*	
bluntnose minnow	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

Muskrat (Ondatra zibethicus) are usually found on Middle River Wetland (Wisconsin Department of Natural Resources, 1973). This wetland has been classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, life histories, food sources, or relationship to water levels of the mammals inhabiting Middle River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Middle River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, this wetland is likely to be extensively utilized by several of the fish species present in the Middle River.

CULTURAL SETTING

LS 272

Population

Middle River Wetland is located in Lakeside Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-7 indicates that the population of Douglas County remained stable between 1970 and 1975, but Lakeside Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-7. Population Data for the Vicinity of Middle River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Lakeside Township	572	11.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Middle River Wetland and the surrounding area is rural open space. There are two buildings north of the wetland and a light-duty road west of it. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Middle River Wetland.

Mineral, Energy, and Forest Resources

Middle River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Middle River Wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Middle River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, non-point pollution in the general area which includes Middle River Wetland is discussed in Andrews et al. (1976).

Historical and Archaeological Features

No known historical sites are located within 500 feet of Middle River Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 272

The literature search identified no on-going or impending research projects pertaining to Middle River Wetland.

AMNICON RIVER WETLAND

PHYSIOGRAPHIC SETTING

LS 273

Setting

Amnicon River Wetland is located on the shoreline of the Amnicon River, which is directly connected to Lake Superior, within Lakeside Township of Douglas County, Wisconsin. There are no major population centers in the area. This wetland is a Palustrine-Riverine System and occupies a wooded site (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975, 1975).

Topography

Amnicon River Wetland has little relief and lies at an elevation of 605 feet above mean sea level (three feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is a high plain cut by deep river gorges or valleys (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Surficial Geology

The surficial geology of the area in which Amnicon River Wetland lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

Amnicon River Wetland is adjacent to the Amnicon River (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the Amnicon River may be found in Schneiderwent (1974), Dickas (1975), Bahnick (1977), and Sather and Johannes (1972).

Climate

The closest weather station providing climatic data for Amnicon River Wetland is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately

six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

BIOTIC SETTING LS 273

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Amnicon River Wetland.

Fish

Fish species found in the Amnicon River are listed in Table 9-8, and a list of other fishes known to utilize the coastal wetlands of Lake Superior appears in Appendix A-1. A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Amnicon River Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Amnicon River Wetland.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Amnicon River Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Amnicon River Wetland.

Table 9-8 . Fish Species Found in the Amnicon River, Douglas County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker*
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	silver redhorse*
sea lamprey	shorthead redhorse*
Salmonidae	Ictaluridae
brown trout	black bullhead*
rainbow trout	stonecat
brook trout	tadpole madtom*
round whitefish	Gadidae
Osmeridae	burbot
rainbow smelt	Gasterosteidae
Umbridae	brook stickleback*
central mudminnow*	Percopsidae
Esocidae	trout-perch
northern pike*	Centrarchidae
muskellunge*	pumpkinseed*
Cyprinidae	bluegill*
creek chub	rock bass
pearl dace	black crappie*
lake chub	Percidae
hornyhead chub	yellow perch*
blacknose dace	walleye*
longnose dace	logperch*
finescale dace	johnny darter*
northern redbelly dace	Cottidae
goldenshiner*	mottled sculpin*
commin shiner	
spottail shiner	
sand shiner	
mimic shiner	
blacknose shiner	
brassy minnow	
fathead minnow*	

[a]Moore and Braem (1965)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Mammals

Beaver (Castor canadensis) and muskrat (Ondatra zibethicus) are common along the Amnicon River (Wisconsin Department of Natural Resources, 1973) and may be found on Amnicon River Wetland. This wetland has been classified as most desirable habitat for furbearers (Thompson et al., 1976; Wisconsin Department of Natural Resources, open file report).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational use, life histories, food sources, or relationship to water levels of the mammals inhabiting Amnicon River Wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Amnicon River Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, this wetland is extensively utilized by fish and is classified as most desirable habitat for furbearers.

CULTURAL SETTING LS 273

Population

Amnicon River Wetland is located in Lakeside Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-9 indicates that the population of Douglas County remained stable between 1970 and 1975, but Lakeside Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-9. Population Data for the Vicinity of Amnicon River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Lakeside Township	572	11.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Amnicon River Wetland and the surrounding area is rural open space. A light-duty road and several buildings lie east of the wetland, and an unimproved dirt road lies to the southwest. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Amnicon River Wetland.

Mineral, Energy, and Forest Resources

Amnicon River Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Amnicon River Wetland (U.S.G.S. quadrangle map, Poplar Northeast, Wisconsin, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Amnicon River Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, non-point pollution in the general area which includes Amnicon River Wetland is discussed in Andrews et al. (1976).

Historical and Archaeological Features

No known historical sites are located within 500 feet of Amnicon River Wetland, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS

LS 273

The literature search identified no on-going or impending research projects pertaining to Amnicon River Wetland.

AMNICON RIVER AREA WETLAND #1

PHYSIOGRAPHIC SETTING

LS 274

Setting

Amnicon River Area Wetland #1 lies 450 feet from the southern shoreline of Lake Superior, within Lakeside Township of Douglas County, Wisconsin. The wetland is a Palustrine System within a wooded area (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Topography

Amnicon River Area Wetland #1 has little relief and lies at an elevation of 655 feet above mean sea level (53 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is a gradually sloping plateau with deep river valleys (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Surficial Geology

The surficial geology of the area in which Amnicon River Area Wetland #1 lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

No streams flow through Amnicon River Area Wetland #1 (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Amnicon River Area Wetland #1 is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

BIOTIC SETTING LS 274

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Amnicon River Area Wetland #1.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Amnicon River Area Wetland #1.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Amnicon River Area Wetland #1.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Amnicon River Area Wetland #1.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Amnicon River Area Wetland #1.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Amnicon River Area Wetland #1.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Amnicon River Area Wetland #1 by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING

LS 274

Population

Amnicon River Area Wetland #1 is located in Lakeside Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-10 indicates that the population of Douglas County remained stable between 1970 and 1975, but Lakeside Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-10. Population Data for the Vicinity of Amnicon River Area Wetland #1

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Lakeside Township	572	11.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Amnicon River Area Wetland #1 and the surrounding area is rural open space. An unimproved dirt road lies south of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Amnicon River Area Wetland #1.

Mineral, Energy, and Forest Resources

Amnicon River Area Wetland #1 lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Amnicon River Area Wetland #1 (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Amnicon River Area Wetland #1 (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, non-point pollution in the general area which includes Amnicon River Area Wetland #1 is discussed in Andrews et al. (1976).

Historical and Archaeological Features

No known historical sites are located within 500 feet of Amnicon River Area Wetland #1, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS LS 274

The literature search identified no on-going or impending research projects pertaining to Amnicon River Area Wetland #1.

AMNICON RIVER AREA WETLAND #2

PHYSIOGRAPHIC SETTING

LS 275

Setting

Amnicon River Area Wetland #2 lies 400 feet from the southern shoreline of Lake Superior, within Lakeside Township of Douglas County, Wisconsin. The wetland is a Palustrine-Riverine System within a wooded area (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Topography

Amnicon River Area Wetland #2 has little relief and lies at an elevation of 655 feet above mean sea level (53 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible high bluff. The surrounding area is a gradually sloping plateau with deep river and creek gorges and valleys (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Surficial Geology

The surficial geology of the area in which Amnicon River Area Wetland #2 lies is characterized by glaciolacustrine deposits, mainly of sand, silt, and clay. Features associated with lake sediments in this region include deltas, sand dunes, and organic deposits (Hadley and Pelham, 1976).

Soils

No soil survey is currently available for Douglas County.

Hydrology

No streams flow through Amnicon River Area Wetland #2 (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Amnicon River Area Wetland #2 is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

BIOTIC SETTING

LS 275

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Amnicon River Area Wetland #2.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Amnicon River Area Wetland #2.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Amnicon River Area Wetland #2.

Reptiles and Amphibians

The list of herpetofauna of Douglas County prepared by Pope and Dickinson (1928) appears in Appendix B-1. The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Amnicon River Area Wetland #2.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Amnicon River Area Wetland #2.

Mammals

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Amnicon River Area Wetland #2.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Amnicon River Area Wetland #2 by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 275

Population

Amnicon River Area Wetland #2 is located in Lakeside Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-11 indicates that the population of Douglas County remained stable between 1970 and 1975, but Lakeside Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-11. Population Data for the Vicinity of Amnicon River Area Wetland #2

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Lakeside Township	572	11.3	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Amnicon River Area Wetland #2 and the surrounding area is rural open space. An unimproved dirt road lies south of the wetland. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Amnicon River Area Wetland #2.

Mineral, Energy, and Forest Resources

Amnicon River Area Wetland #2 lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Amnicon River Area Wetland #2 (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Amnicon River Area Wetland #2 (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, non-point pollution in the general area which includes Amnicon River Area Wetland #2 is discussed in Andrews et al. (1976).

Historical and Archaeological Features

No known historical sites are located within 500 feet of Amnicon River Area Wetland #2, nor are there any known archaeological sites in the vicinity.

RESEARCH PROJECTS

LS 275

The literature search identified no on-going or impending research projects pertaining to Amnicon River Area Wetland #2.

ALLOUEZ BAY WETLAND

PHYSIOGRAPHIC SETTING

LS 276

Setting

Allouez Bay Wetland lies on the shoreline of Allouez Bay and Lake Superior in Douglas County at Superior, Wisconsin. The wetland is a Palustrine System occupying both wooded and non-wooded areas (U.S.G.S. quadrangle maps, Superior, Wisconsin-Minnesota, 1975; Parkland, Wisconsin-Minnesota, 1975).

Topography

Allouez Bay Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dune, erodible low plain, and wetland. The surrounding area consists of bluffs with a gradually sloping plateau above them (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975; Superior, Wisconsin-Minnesota, 1975).

Surficial Geology

Allouez Bay Wetland lies in the Glacial Lake Duluth area, which is a partly dissected clay plain. The plain is deeply dissected by the St. Louis River; deep river and highway cuts show great landslides of homogenous red clay down even relatively gently slopes. The clay is sufficiently widespread in some places to favor different forest cover, but elsewhere the terrain is bedrock, sand plains, or stony till (Wright, 1972).

Soils

No soil survey is currently available for Douglas County.

Hydrology

Bear Creek and one unnamed stream flow through Allouez Bay Wetland (U.S.G.S. quadrangle maps, Superior, Wisconsin-Minnesota, 1975; Parkland Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding Bear Creek may be found in Bedford, et al. (1976).

Climate

The closest weather station providing climatic data for Allouez Bay Wetland is located in Superior, Wisconsin. The average annual temperature is 40.4^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3^{o}F and the mean monthly high for July is 66.1^{o}F. The average

annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle maps, Superior, Wisconsin-Minnesota, 1975; Parkland, Wisconsin-Minnesota, 1975).

BIOTIC SETTING

LS 276

Vegetation

According to Bedford et al. (1976), Allouez Bay and adjacent Wisconsin Point support a diverse flora which includes boreal forest, low-lying swamp and dune communities. Despite red clay turbidity, diversity and interspersion of wetland vegetation is high. Burreed (Sparganium eurycarpum) dominates open water areas. In water depths of one to four feet, shallow water marsh species occur. At least seven species of pondweed (Potamogeton) occur in Allouez Bay, and a northern sedge meadow thrives along the eastern and southern sides of the bay. Owing to recent high water episodes, scattered tamaracks (Larix sp.) and shrubs have been drowned. Wetland expansion is limited by a steep gradient on the south and a road embankment on the east. The literature search yielded no site-specific information pertaining to density or productivity of the vegetation of Allouez Bay Wetland.

Fish

Fish species found in Allouez Bay (U.S. Army Corps of Engineers, 1975; DeVore, 1977) are listed in Table 9-12. Although not specifically reported from Allouez Bay, most of the species listed for the Nemadji River Wetland Complex (LS 277-279), the St. Louis River Wetland Complex (LS 288-312) and Minnesota Point Wetland (LS 280) probably also occur in Allouez Bay. Yellow perch (Perca flavescens) are abundant in Allouez Bay (DeVore, 1977) and probably utilize Allouez Bay Wetland for spawning and cover. Northern pike (Esox lucius) are also common in Allouez Bay and spawn in shallow vegetated areas in early spring. During the summer pike apparently seek deeper water, such as that in the Superior Entry, where recreational fishing for the species is observed. The shallow wetland area of Allouez Bay also appears to be an important nursery area for juvenile pike (DeVore, 1977). Since no major tributaries except Bear Creek enter Allouez Bay, seasonal abundance of such stream spawning species as walleye (Stizostedion vitreum), suckers (Catostomidae), and salmonids in the bay is limited; the U.S. Army Corps of Engineers (1975) noted a preponderance of juvenile fishes to adults in sampling Allouez Bay, compared to a somewhat lower ratio of subadult to adult stages in Superior Bay. This observation suggests the importance of Allouez Bay Wetland as a spawning and nursery area for Duluth-Superior area fish populations.

Table 9-12. Fish Species Found in Allouez Bay, Douglas County, Wisconsin[a]

Family and Species	Family and Species
Clupeidae	Ictaluridae
alewife	black bullhead*
Esocidae	Percopsidae
northern pike*	trout-perch
Cyprinidae	Centrarchidae
emerald shiner	black crappie*
spottail shiner	Percidae
Catostomidae	yellow perch*
white sucker*	logperch*
longnose sucker	
shorthead redhorse*	

[a] U.S. Army Corps of Engineers, 1975; DeVore, 1977
* Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

A list of fish species known to utilize coastal wetlands of Lake Superior appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, commercial use, or food sources of the fish populations in Allouez Bay Wetland.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna in Allouez Bay Wetland is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes were the major taxa collected at four sample sites. A list of the taxa collected, in order of abundance, appears in Table 9-13. These species may or may not be found in this wetland today.

Table 9-13. Invertebrate Taxa Collected in Allouez Bay Wetland Complex on August 5,1970[a]

Oligochaeta	Insecta
Hirudinea	Collembola
Gastropoda	*Isotomurus palustris*
Pulmonata	Ephemeroptera
Ferrisia	*Caenis*
Promenetus exacuous	Hemiptera
Pelecypoda	*Merragata*
Crustacea	Trichoptera
Ilsopoda	*Psychomyia*
Asellus	*Oecetes*
Amphipoda	Coleoptera
Hyalella azteca	*Donacia*
Gammarus	Diptera
Decopoda	Tendipedidae
Hydracarina	Ceratopogonidae
Limnesia	Ephydridae
Unionicola	Lepidoptera
	Nymphula

[a] Wisconsin Department of Natural Resources, open files, 1970

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Allouez Bay Wetland.

Reptiles and Amphibians

The following reptiles and amphibians probably occur in the Duluth-Superior harbor area and may be found in Allouez Bay Wetland: northern leopard frog (*Rana pipiens*), green frog (*Rana clamitans melanota*), mink frog (*Rana septentrionales*), wood frog (*Rana sylvatica*), northern spring peeper (*Hyla crucifer crucifer*), treefrogs (*Hyla* spp.), American toad (*Bufo americanus americanus*), painted turtle (*Chrysemys picta* sp.), snapping turtle (*Chelydra serpentina*), eastern garter snake (*Thamnophis sirtalis sirtalis*), red-bellied snake (*Storeria occipitomaculata occipitomaculata*), red-backed salamander (*Plethodon cinereus cinereus*), and blue-spotted salamander (*Ambystoma laterale*) (Metropolitan Interstate Committee, 1977). The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Allouez Bay Wetland.

Table 9-14. Birds Observed in the Vicinity of Wisconsin Point During May, August, September 1970, June and July 1971 and July 1976[a]

Common name	Common name
mallard	northern oriole
green-winged teal	yellow-shafted flicker
blue-winged teal	Brewer's blackbird
American wigeon	common grackle
northern shoveler	semipalmated plover
redhead	killdeer
ring-necked duck	American golden plover
lesser scaup	black-bellied plover
bufflehead	common snipe
common loon	spotted sandpiper
hooded merganser	solitary sandpiper
horned grebe	greater yellowlegs
white pelican	lesser yellowlegs
double-crested cormorant	least sandpiper
belted kingfisher	short-billed dowitcher
long-billed marsh wren	stilt sandpiper
short-billed marsh wren	semipalmated sandpiper
great blue heron	northern waterthrush
green heron	eastern kingbird
least bittern	crested flycatcher
sora	Traill's flycatcher
American coot	least flycatcher
herring gull	tree swallow
ring-billed gull	bank swallow
Bonaparte's gull	cliff swallow
common tern	swamp sparrow
black tern	veery
downy woodpecker	yellow warbler
yellow-headed blackbird	common yellowthroat
red-winged blackbird	marsh hawk
brown-headed cowbird	

[a]Wisconsin Department of Natural Resources, 1970, 1971, and 1976

Avifauna

Bird surveys of Wisconsin Point, which includes Allouez Bay Wetland, were conducted during 1970, 1971, and 1976 by Wisconsin Department of Natural Resources personnel. The species which were observed are listed in Table 9-14. A new summer record was established here for the American coot (Fulica americana) on June 16, 1971. Mallards (Anas platyrhynchos), least bitterns (Ixobrychus exilis), black terns (Chlidonias niger), Virginia rails (Rallus limicola), soras (Porzana carolina), yellow-headed blackbirds (Xanthocephalus xanthocephalus), long-billed marsh wrens (Cistothorus palustris) and short-billed marsh wrens (Cistothorus platensis) have been observed nesting in this wetland (Wisconsin Department of Natural Resources, 1971; Niemi et al., 1977). The mute swan (Cygnus olor) and Franklin's gull (Larus pipixcan) were noteworthy sightings for the area (Niemi et al., 1977).

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Allouez Bay Wetland.

Mammals

The snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), Norway rat (Rattus norvegicus), weasel (Mustela sp.), and white-tailed deer (Odocoileus virginianus) are common in the Superior City area (U.S. Army Corps of Engineers, 1975) and may be found on Allouez Bay Wetland.

Muskrat, river otter (Lutra canadensis), beaver (Castor canadensis), and mink (Mustela vison) are trapped in the wetlands near Superior City (U.S. Army Corps of Engineers, 1975) which probably include Allouez Bay Wetland.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting Allouez Bay Wetland.

Endangered Species

The double-crested cormorant (Phalacrocorax auritus) and common tern (Sterna hirundo) were observed at Wisconsin Point between 1970 and 1975 (Wisconsin Department of Natural Resources, 1970, 1971, 1976).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in Allouez Bay Wetland by the literature search.

Health

The environmental quality of Allouez Bay Wetland appears to be good. However, shipping wastes, vessel discharges, and harbor dredging take place in the vicinity of the wetland. The effect of this pollution on the wetland is not known.

Population

Allouez Bay Wetland is located within the city of Superior in Superior Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-15 indicates that the population of Douglas County remained stable between 1970 and 1975. Superior Township experienced rapid growth during the same time period, while the city of Superior showed a rapid decline in population. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-15. Population Data for the Vicinity of Allouez Bay Wetland

	Estimated population 1975[a]	Estimated % Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Superior Township	2,014	15.5	--
City of Superior	30,038	-6.8	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within Allouez Bay Wetland and the surrounding area is rural open space. A light-duty road, a building, and two large pits are adjacent to the eastern boundary of the western section of the wetland, and one pit is adjacent to the western boundary of the eastern section. An unimproved dirt road lies southeast of the wetland; several light-duty roads and a trailer park are located to the southwest. The wetland is under local government ownership, and its location suggests that it is subject to high development pressure (U.S.G.S. quadrangle maps, Parkland, Wisconsin-Minnesota, 1975; Superior, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Allouez Bay Wetland.

Mineral, Energy, and Forest Resources

Allouez Bay Wetland lies in an area of glaciolacustrine deposits which are composed of lake sediments, including associated deltas, sand dunes, and organic deposits. Lake sediments and associated features have minimal

potential for containing commercial deposits of sand and gravel. Production is limited to deltaic deposits and to sand deposits in beaches, bars, and dune areas (Wisconsin Geological and Natural History Survey, 1976).

The surrounding area is wooded, representing potential forestry resources. No significant energy resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Allouez Bay Wetland (U.S.G.S. quadrangle map, Parkland, Wisconsin-Minnesota, 1975; Superior, Wisconsin-Minnesota, 1975).

Pollution Sources

There are no NPDES permit holders adjacent to Allouez Bay Wetland (Wisconsin Industrial Discharge Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution. However, shipping wastes, vessel discharges, and harbor dredging constitute a pollution problem in the Duluth-Superior Harbor (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior Sanitary District, 1976; U.S. Army Corps of Engineers, 1974). The effect of this pollution on Allouez Bay Wetland is not known. Further information on non-point pollution in this general area is available in Andrews et al. (1976).

Historical and Archaeological Features

The Duluth-Superior Cultural Resources study lists four cultural resources in the Allouez Bay Wetland vicinity. Two of these have already been destroyed, leaving only the Northwestern Coal Company Dock and the Burlington Northern Taconite Dock (Minnesota Historical Society). No known archaeological resources exist in the vicinity of Allouez Bay Wetland (Wisconsin Division of Historic Preservation).

RESEARCH PROJECTS LS 276

The literature search identified no on-going or impending research projects pertaining to Allouez Bay Wetland.

NEMADJI RIVER WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 277-279

Setting

The Nemadji River Wetland Complex lies along the coast of Superior Bay, which is adjacent to Lake Superior, within Douglas County, at Superior, Wisconsin. The various components of the wetland complex extend from the shoreline to 0.3 mile inland. This wetland complex is a Palustrine - Riverine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Topography

The Nemadji River Wetland Complex has 12 feet of relief and a maximum elevation of 614 feet above mean sea level (12 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as artifical fill. The surrounding area is primarily flat (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Surficial Geology

The Nemadji River Wetland Complex lies in the Glacial Lake Duluth area, which is a partly dissected clay plain. The plain is deeply dissected by the St. Louis River; deep river and highway cuts show great landslides or homogenous red clay down even relatively gently slopes. The clay is sufficiently widespread in some places to favor different forest cover, but elsewhere the terrain is bedrock, sand plains, or stony till (Wright, 1972).

Soils

No soil survey is currently available for Douglas County.

Hydrology

The Nemadji River Wetland Complex is adjacent to the Nemadji River (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands. However, additional information regarding the Nemadji River may be found in Center for Lake Superior Environmental Studies (1976); Andrews et al. (1976); Sather and Johannes (1972); U.S. Geological Survey (1976); Wisconsin Department of Natural Resources (1975); and Bahnick (1977).

Climate

The closest weather station providing climatic data for the Nemadji River Wetland Complex is located in Superior, Wisconsin. The average annual

temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

BIOTIC SETTING

LS 277-279

Vegetation

The literature search yielded no site-specific iinformation pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Nemadji River Wetland Complex.

Fish

Fish species found in the Nemadji River are listed in Table 9-16. The Nemadji River, being subject to red clay siltation, is not a good salmonid stream (Wisconsin Department of Natural Resources, 1973; Swenson et al., 1977, 1976), and its fish fauna, including both resident and seasonal lake migrants, is evidently composed mainly of warmwater species. The lower Nemadji River, from the mouth to approximately five miles upstream, exhibits relatively low species diversity, with a fauna consisting primarily of black bullheads (Ictalurus melas), white suckers (Catostomus commersoni), redhorses (Moxostoma spp.), rock bass (Ambloplites rupestris), and stonecats (Noturus flavus) (Swenson et al., 1976). In the vicinity of the Nemadji River mouth, northern pike (Esox lucius), muskellunge (Esox masquinongy), walleye (Stizostedion vitreum), black crappie (Pomoxis nigromaculatus), shorthead redhorse (Moxostoma macrolepidotum), other unidentified suckers (Catostomus spp.) and carp (Cyprinus carpio) have been collected (U.S. Army Corps of Engineers, 1975). Muskellunge are most common in the area of Hog Island, where sport fishermen sometimes pursue them (DeVore, 1977). In general, the shallow vegetated areas of the Duluth-Superior Harbor area, including Superior Bay and the mouth area of the Nemadji River, are utilized for spawning and cover by northern pike and yellow perch (DeVore, 1977). Owing to the siltation problem in the Nemadji River, the utilization of Nemadji River Wetland #1 by any of the wetland species listed in Table 9-16 is probably limited largely to carp, black bullhead, and white sucker. Further surveys of the Duluth Superior Harbor Fishery, including the mouth area of the Nemadji River, are being conducted by the University of Wisconsin at Superior, Center for Lake Superior Environmental Studies.

Table 9-16. Fish Species Found in the Nemadji River, Douglas County, Wisconsin[a]

Family and Species	Family and Species
Petromyzontidae	Catostomidae
silver lamprey	white sucker
northern brook lamprey	longnose sucker
ammocetes (northern brook or silver lamprey)	silver redhorse
sea lamprey	shorthead redhorse
Salmonidae	Ictaluridae
brown trout	black bullhead
rainbow trout	yellow bullhead
brook trout	stonecat
	tadpole madtom
Osmeridae	Gadidae
rainbow smelt	burbot
Umbridae	Gasterosteidae
central mudminnow	brook stickleback
Esocidae	Percopsidae
northern pike	trout-perch
muskellunge	
	Centrarchidae
Cyprinidae	bluegill
carp	rock bass
creek chub	black crappie
pearl dace	
lake chub	Percidae
hornyhead chub	yellow perch
blacknose dace	walleye
longnose dace	logperch
goldenshiner	johnny darter
emerald shiner	
common shiner	Cottidae
spottail shiner	mottled sculpin
blackchin shiner	
sand shiner	
blacknose shiner	
brassy minnow	
fathead minnow	

[a]Moore and Braem (1965); U.S. Army Corps of Engineers (1975); Wisconsin Department of Natural Resources (1973); Swenson et al. (1976a)

A list of fish species known to utilize the wetlands of Lake Superior appears in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, commercial use, or food sources of the fish populations in the Nemadji River Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to specific composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Nemadji River Wetland Complex.

Reptiles and Amphibians

The following reptiles and amphibians probably occur in the Duluth-Superior harbor area and may be found in the Nemadji River Wetland Complex: northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), mink frog (Rana septentrionales), wood frog (Rana sylvatica), northern spring peeper (Hyla crucifer crucifer), treefrogs (hyla spp.), American toad (Bufo americanus americanus), painted turtle (Chrysemys picta sp.), snapping turtle (Chelydra serpentina), eastern garter snake (Thamnophis sirtalis sirtalis), red-bellied snake (Storeria occipitomaculata occipitomaculata), red-backed salamander (Plethodon cinereus cinereus), and blue-spotted salamander (Ambystoma laterale) (Metropolitan Interstate Committee, 1977). The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in these wetlands.

Avifauna

High densities of soras (Porzana carolina), long-billed marsh wrens (Cistothorus palustris) and short-billed marsh wrens (Cistothorus platensis) were observed in Nemadji River Wetland #1 in 1977. Large numbers of mallards (Anas platyrhynchos), wood ducks (Aix sponsa), blue-winged teal (A. discors), northern shovelers (A. americana) and semipalmated sandpipers (Charadrius semipalmatus) were observed in Hog Island Area Wetland in the fall of 1977 (Niemi et al., 1977). Additional information on nesting colonial birds and the average densities and percent composition by individuals and species of the avifauna in the vicinity of the Duluth-Superior Harbor is available in Niemi et al. (1977).

The literature search provided no site-specific information pertaining to seasonal abundance, productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Nemadji River Wetland Complex.

Mammals

The masked shrew (Sorex cinereus), eastern cottontail (Sylvilagus floridanus), snowshoe hare (Lepus americanus), Norway rat (Rattus norvegicus), weasel (Mustela sp.), and striped skunk (Mephitis mephitis) have been noted on the three wetlands of the Nemadji River Wetland Complex (Roy F. Weston, Inc., 1974).

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Nemadji River Wetland Complex by the literature search.

Health

The environmental quality of Nemadji River Wetland Complex appears to be good. However, the Burlington Northern Railroad has an NPDES permit for its waste water treatment plant. The plant discharges waste water east of Nemadji River Wetlands #1 and #2, and the effect of this discharge is not known.

CULTURAL SETTING LS 277-279

Population

The Nemadji River Wetland Complex is located within the town of Allouez in Superior Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-17 indicates that the population of Douglas County remained stable between 1970 and 1975, but Superior Township experienced a rapid rate of population growth during the same time period. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-17. Population Data for the Vicinity of the Nemadji River Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Superior Township	2,014	15.5	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Nemadji River Wetland Complex and the surrounding area is commercial. The wetlands are located close to several metropolitan districts. A four-lane highway and a pipe line run through Nemadji River Wetland #1, while railroad tracks run through the western sections and between Nemadji River Wetland #2 and Hog Island Area Wetland. Ore docks are located east of these areas, and numerous buildings lie adjacent to several sections of these wetlands. The wetlands are under private ownership, and their location suggests that they are subject to high development pressure (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Nemadji River Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are known to be present in or near the Nemadji River Wetland Complex, but Nemadji River Wetland #1 is wooded and represents a potential forestry resource.

Public Utilities and Facilities

An above ground pipeline runs through Nemadji River Wetland #1 (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Pollution Sources

The Burlington Northern Railroad has an NPDES permit for its waste water treatment plant located at the Allouez Ore Docks. Treated waste water is discharged into Lake Superior at a point east of Nemadji River Wetlands #1 and

#2. The effect of this discharge on the wetlands is not known. There are no NPDES permit holders adjacent to Hog Island Area Wetland (Minnesota Pollution Control Agency, Permits Section, 1978).

No site-specific information was located through the literature search pertaining to non-point sources of pollution in these wetlands. However, shipping wastes, vessel discharges, and harbor dredging constitute a pollution problem in the Duluth-Superior Harbor (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior Sanitary District, 1973; Western Lake Superior Sanitary District, 1976; U.S. Army Corps of Engineers, 1974). The effect of this pollution on the Nemadji River Wetland Complex is not known. Further information on non-point pollution in this general area is available in Andrews et al. (1976).

Historical and Archaeological Features

The Northern Pacific Ore Dock located near Nemadji River Wetland #2 is listed as a cultural resource in the Duluth-Superior Cultural Resources Study. Nemadji River Wetland #2 is also the site of an historical Chippewa Indian village (Wisconsin Division of Historic Preservation). No known historical sites are located within 500 feet of Nemadji River Wetland #1 or Hog Island Area Wetland.

RESEARCH PROJECTS LS 277-279

The literature search identified no on-going or impending research projects pertaining to the Nemadji River Wetland Complex.

MINNESOTA POINT WETLAND

PHYSIOGRAPHIC SETTING LS 280

Setting

Minnesota Point Wetland is on the shoreline of Superior Bay in St. Louis County at Duluth, Minnesota. The wetland is a Palustrine System in a wooded area (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Topography

Minnesota Point Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as artifical fill. The surrounding area is primarily flat (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Surficial Geology

Minnesota Point Wetland lies in the Glacial Lake Duluth area, which is a partly dissected clay plain. The plain is deeply dissected by the St. Louis River; deep river and highway cuts show great landslides or homogenous red clay down even relatively gently slopes. The clay is sufficiently widespread in some places to favor different forest cover, but elsewhere the terrain is bedrock, sand plains, or stony till (Wright, 1972).

Soils

No soil survey is currently available for St. Louis County.

Hydrology

No streams flow through Minnesota Point Wetland (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Minnesota Point Wetland is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special feature are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

BIOTIC SETTING LS 280

Vegetation

Dated vegetational information is provided by Lakela (1939), regarding developing plant communities on Minnesota Point. However, information contained in this publication is not likely to be applicable to the current condition of the flora owing to its date, condition of the wetland at the time of study and the proximity of the city of Duluth, Minnesota.

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Minnesota Point Wetland.

Fish

Fish species found in Superior Bay are listed in Table 9-18, and other fishes known to utilize the coastal wetlands of Lake Superior are listed in Appendix A-1.

Table 9-18. Fish Species Found in Superior Bay[a]

Family and Species	Family and Species
Clupeidae	Catostomidae
alewife	white sucker*
	longnose sucker
Salmonidae	shorthead redhorse*
rainbow trout	lake chubsucker*
Osmeridae	Ictaluridae
rainbow smelt	black bullhead*
Esocidae	Gadidae
northern pike*	burbot
Cyprinidae	Percidae
carp*	yellow perch*
emerald shiner	walleye*
spottail shiner	

[a] U.S. Army Corps of Engineers, 1975; DeVore, 1977

* Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

Although no specific information regarding Minnesota Point Wetland was located, information concerning the fish fauna of Superior Bay is generally applicable. The most abundant game species in Superior Bay is the yellow perch (Perca flavescens), followed by northern pike (Esox lucius), and walleye (Stizostedion vitreum). Abundant spottail shiners (Notropis hudsonius), and emerald shiners (Notropis atherinoides) comprise a major forage base for the three major game species. Yellow perch and northern pike apparently remain in the bay throughout the year and spawn in shallow vegetated areas in early spring. Wetlands around Superior and Allouez Bays also serve as cover for adults and young of these species. During the winter, under ice cover, oxygen depletion occurs in the bay, and many species apparently retreat to the more oxic waters of Lake Superior. Although a small percentage of the walleyes which inhabit the bay in spring may be year-round residents, the majority probably winter in Lake Superior. Walleyes do not spawn in the bay, but ascend the Nemadji and St. Louis Rivers to spawn in riffles sometime in April. Whether young-of-the-year walleyes utilize wetlands as cover is not known for this area, since the habitat requirements of these young have not yet been determined. Adult walleyes utilize young-of-the-year yellow perch as a primary food source in the bay. No commerical fishery exits in Superior Bay, and recreational fishing is hampered by poor accessibility to many of the more productive areas, as well as by poor water quality. Yellow perch in particular are greatly underutilized. Additional boat launching facilities and shore fishing areas would benefit the recreational fishery of the bay (DeVore, 1977).

A search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, or food sources of the fish populations in Minnesota Point Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Minnesota Point Wetland.

Reptiles and Amphibians

The following reptiles and amphibians probably occur in the Duluth-Superior harbor area and may be found in Minnesota Point Wetland: northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), mink frog (Rana septentrionales), wood frog (Rana sylvatica), northern spring peeper (Hyla crucifer crucifer), treefrogs (hyla spp.), American toad (Bufo americanus americanus), painted turtle (Chrysemys picta sp.), snapping turtle (Chelydra serpentina), eastern garter snake (Thamnophis sirtalis sirtalis), red-bellied snake (Storeria occipitomaculata occipitomaculata), red-backed salamander (Plethodon cinereus cinereus), and blue-spotted salamander (Ambystoma laterale) (Metropolitan Interstate Committee, 1977). The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Minnesota Point Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Minnesota Point Wetland.

Mammals

The snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), Norway rat (Rattus norvegicus), weasel (Mustela sp.), and white-tailed deer (Odocoileus virginianus) are common in the Superior City area (U.S. Army Corps of Engineers, 1975) and may be found on Minnesota Point Wetland.

Muskrat, river otter (Lutra canadensis), beaver (Castor canadensis), and mink (Mustela vison) are trapped in the wetlands near Superior City (U.S. Army Corps of Engineers, 1975) which probably include Minnesota Point Wetland.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Wm. B. Nye, Minnesota Department of Natural Resources, personal communication, 1977) were documented in Minnesota Point Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Minnesota Point Wetland is likely to be utilized by several of the fish species present in Superior Bay.

CULTURAL SETTING LS 280

Population

Minnesota Point Wetland is located within the city of Duluth in St. Louis County, Minnesota. St. Louis County is sparsely populated, having a density of 36 persons per square mile. Table 9-19 indicates that the county experienced a moderate decrease in population between 1970 and 1975 and Duluth declined rapidly in population during the same time period. Projections for 1990 were not obtained for St. Louis County.

Table 9-19. Population Data for the Vicinity of Minnesota Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]
St. Louis County	216,220	-2.0
City of Duluth	93,971	-6.6

[a] U.S. Bureau of the Census (1977)

Land Use and Ownership

Land use within Minnesota Point Wetland is rural open space, but the surrounding area is residential and commercial. A medium-duty highway and several buildings are adjacent to the eastern boundary of the wetland. The wetland is under private ownership, and its location suggests that it is subject to high development pressure (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of Minnesota Point Wetland.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are known to be present in or near Minnesota Point Wetland, but the area is wooded and represents potential forestry resources.

Public Utilities and Facilities

The Superior Sewage Treatment Plant is 0.8 mile southwest of Minnesota Point Wetland (Western Lake Superior Sanitary District, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Minnesota Point Wetland (Minnesota Pollution Control Agency, Permits Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

The Duluth-Superior Cultural Harbors Cultural Resource Inventory indicates that no archaeological or historical resources are present near Minnesota Point Wetland (Walker and Hall, 1976).

The literature search identified no on-going or impending research projects pertaining to Minnesota Point Wetland.

SUPERIOR CITY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 281-287

Setting

The Superior City Wetland Complex lies along the coast of Saint Louis Bay, which is adjacent to Lake Superior, within Douglas County at Superior, Wisconsin. The various components of the wetland complex extend from the shoreline to 0.3 mile inland. This wetland complex is a Palustrine System in a non-wooded area (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Topography

The Superior City Wetland Complex has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as artificial fill. The surrounding area is primarily flat (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Surficial Geology

The Superior City Wetland Complex lies in the Glacial Lake Duluth area, which is a partly dissected clay plain. The plain is deeply dissected by the St. Louis River; deep river and highway cuts show great landslides or homogenous red clay down even relatively gently slopes. The clay is sufficiently widespread in some places to favor different forest cover, but elsewhere the terrain is bedrock, sand plains, or stony till (Wright, 1972).

Soils

No soil survey is currently available for Douglas County.

Hydrology

No streams flow through the Superior City Wetland Complex (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Superior City Wetland Complex is located in Superior, Wisconsin. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 11.3°F and the mean monthly high for July is 66.1°F. The average annual precipitation is 28.86 inches, with a mean monthly precipitation of 0.92 inches in January and 3.90 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in

1975 occurring on April 21 and the first killing frost on October 18 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

BIOTIC SETTING LS 281-287

Vegetation

The literature search yielded no site-specific iinformation pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Superior City Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, commercial use, or food sources of the fish populations in the Superior City Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to specific composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Superior City Wetland Complex.

Reptiles and Amphibians

The following reptiles and amphibians probably occur in the Duluth-Superior harbor area and may be found in the Superior City Wetland Complex: northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), mink frog (Rana septentrionales), wood frog (Rana sylvatica), northern spring peeper (Hyla crucifer crucifer), treefrogs (hyla spp.), American toad (Bufo americanus americanus), painted turtle (Chrysemys picta sp.), snapping turtle (Chelydra serpentina), eastern garter snake (Thamnophis sirtalis sirtalis), red-bellied snake (Storeria occipitomaculata occipitomaculata), red-backed salamander (Plethodon cinereus cinereus), and blue-spotted salamander (Ambystoma laterale) (Metropolitan Interstate Committee, 1977). The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in these wetlands.

Avifauna

A list of birds which were observed in the vicinity of Superior, Wisconsin in 1970 is presented in Table 9-20. Additional information on nesting colonial birds and the average densities and percent composition by individuals and species of the avifauna in the vicinity of the Duluth-Superior harbor is available in Niemi et al. (1977). These species may utilize the wetlands in this complex.

Table 9-20. Birds Observed in the Vicinity of Superior, Wisconsin during May and June, 1970[a]

Common name	Common name
mallard	herring gull
gadwall	ring-billed gull
blue-winged teal	Bonaparte's gull
surf scoter	common tern
horned grebe	black tern
double-crested cormorant	Brewer's blackbird
long-billed marsh wren	piping plover
short-billed marsh wren	killdeer
great blue heron	black-bellied plover
American bittern	ruddy turnstone
sora	spotted sandpiper
American coot	marsh hawk

[a] Wisconsin Department of Natural Resources, 1970

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Superior City Wetland Complex.

Mammals

The Norway rat (Rattus norvegicus) may be found on the seven wetlands of the Superior City Wetland Complex (U.S. Army Corps of Engineers, 1975). Although snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), weasel (Mustela sp.), and white-tailed deer (Odocoileus virginianus) are common in the Superior City Area, these species probably are not found on these wetlands owing to the highly developed character of the surrounding area.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and

commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting the Superior City Wetland Complex.

Endangered Species

Double crested cormorants (Phalacrocorax auritus) and common terns (Sterna hirundo) were recorded in the Superior vicinity in 1970 (Wisconsin Department of Natural Resources, 1970).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975) were documented in the Superior City Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, two NPDES permits are held by companies discharging cooling water. One company discharges east of Superior City Wetland #1 and the other discharges into Howard Bay west of Superior City Wetland #1. The effect of these discharges is not known. Shipping wastes, vessel dishcarges, and harbor dredging constitute a problem in the Duluth-Superior Harbor. The effect of this pollution on the Superior City Wetland Complex is not known.

CULTURAL SETTING LS 281-287

Population

The Superior City Wetland Complex is located within the city of Superior in Superior Township of Douglas County, Wisconsin. The county is sparsely populated, having a density of 34 persons per square mile. Table 9-21 indicates that the population of Douglas County remained stable between 1970 and 1975. Superior Township experienced rapid growth during the same time period, while the city of Superior showed a rapid decline in population. Projections for 1990 indicate that Douglas County is expected to undergo a slow rate of population growth in the future.

Table 9-21. Population Data for the Vicinity of the Superior City Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Douglas County	44,379	-0.6	42,430
Superior Township	2,014	15.5	--
City of Superior	30,038	-6.8	--

[a] U.S. Bureau of the Census (1977)
[b] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the Superior City Wetland Complex and the surrounding area is commercial. Much industrial development has arisen surrounding the wetlands. Interstate Highway 535 borders the western boundary of Wetland #2 and travels east of Connors Point Wetland. Numerous roads surround each of the wetlands in the complex; a light-duty road also crosses Wetland #2. Railroads run adjacent to each wetland, crossing Wetlands #2 and #4. Several oil and gas tanks are located near some of the wetlands, especially Wetland #1. There are numerous large piers near several wetlands, especially north of Wetland #6, which are used for commercial shipping. Buildings are located adjacent to most of the wetlands in this complex. The wetlands are under private ownership, and their location suggests that they are subject to severe development pressure (U.S.G.S. quadrangle map, Superior, Wisconsin-Minnesota, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Superior City Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral or energy resources are known to be present in or near the Superior City Wetland Complex, but Nemadji River Wetland #1 is wooded and represents a potential forestry resource.

Public Utilities and Facilities

The Winslow Electric Generating Plant is located east of Superior City Wetland #2 and south of Connors Point Wetland. The plant is owned by the Superior Water, Light, and Power Company and is rated at 25 megawatts. Fueled predominantly by fuel oil, it utilizes Howard Bay as its source of cooling water (Federal Energy Administration, 1977).

Pollution Sources

Superior Fiber Products holds an NPDES permit for the discharge of cooling water and process water into Lake Superior at locations east of Superior City Wetland #1. The effect of the discharge is not known. The Superior Water, Light, and Power Company holds an NPDES permit for the Winslow Steam Electric Station, from which condenser cooling water is discharged into Howards Bay. The discharge is located south of Connors Point Wetland, west of Superior City Wetland #2, and northeast of Superior City Wetland #3, and its effect on the wetland is not known. There are no NPDES permit holders adjacent to Superior City Wetlands #4-#6 (Wisconsin Department of Natural Resources, Industrial Discharge Section, 1978).

No site-specific information was located through the literature search pertaining to non-point sources of pollution in these wetlands. However, shipping wastes, vessel discharges, and harbor dredging constitute a pollution problem in the Duluth-Superior Harbor (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior Sanitary District, 1973, 1976; U.S. Army Corps of Engineers, 1974). The effect of this pollution on the Superior City Wetland Complex is not known, but further information on non-point pollution in this general area is available in Andrews et al. (1976).

Historical and Archaeological Features

The Soo Line Merchandise Wharf currently operated as a public historical site, is located to the west of Conners Point Wetland (Walker and Hall, 1976). Conners Point Wetland is the site of a pre-historic habitation, and two other archaeological sites are also present; one is a campsite and the other a burial ground. Further information concerning these sites can be obtained from the Wisconsin Division of Historic Preservation.

There are no known or historical or archaeological sites within 500 feet of Superior City Wetlands #1-#6 (Wisconsin Historic Preservation Division, 1977).

RESEARCH PROJECTS

LS 281-287

The literature search identified no on-going or impending research projects pertaining to the Superior City Wetland Complex.

ST. LOUIS RIVER WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 288-312

Setting

The St. Louis River Wetland Complex lies along the St. Louis River near its entrance to Lake Superior in Midway Township of St. Louis County, Minnesota and in Superior Township of Douglas Coutny, Wisconsin. The various components extend from the shoreline to 0.2 mile inland. The complex extends from within the city of Duluth to 2.5 miles south of the city. This wetland complex is a Palustrine-Riverine System and is predominantly non-wooded (U.S.G.S. quadrangle map, West Duluth, Minnesota-Wisconsin, 1975).

Topography

The St. Louis River Wetland Complex has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is composed of low plains, bluffs and hills (U.S.G.S. quadrangle map, West Duluth, Minnesota-Wisconsin, 1975).

Surfical Geology

The St. Louis River Wetland Complex lies in the Glacial Lake Duluth area, which is a partly dissected clay plain. The plain is deeply dissected by the St. Louis River; deep river and highway cuts show great landslides or homogenous red clay down even relatively gently slopes. The clay is sufficiently widespread in some places to favor different forest cover, but elsewhere the terrain is bedrock, sand plains, or stony till (Wright, 1972).

Soils

No soil surveys are currently available for St. Louis County, Minnesota or for Douglas County, Wisconsin.

Hydrology

The St. Louis River Wetland Complex is situated along the St. Louis River. Three unnamed streams flow through Oliver Wetland; three unnamed streams flow through Spirit Lake Wetland #4; two unnamed streams flow through Kimballs Bay Wetland; The Pokegama River and one unnamed stream flow through Pokegama River Wetland, and the Little Pokegama River flows through Little Pokegama River Wetland. The other wetlands in the complex have no streams running through them (U.S.G.S. quadrangle map, West Duluth, Minnesota-Wisconsin, 1975). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland. However, additional information regarding the St. Louis River may be found in U.S. Army Corps of Engineers

(1977); St. Paul District Corps of Engineers (1976); Center for Lake Superior Environmental Studies (1976); Minnesota Marine Advisory Service, et al. (1977); Minnesota Coastal Zone Management Program (1978); Green, Grant, Neubert (1974); Sather and Johannes (1972); Barr Engineering Co. (1974); Robert R. Wallace and Associates, Inc. (1974); and Western Lake Superior Sanitary District (1973, 1976).

Climate

The closest weather station providing climatic data for the St. Louis River Wetland Complex is located in Duluth (harbor), Minnesota. The average annual temperature is 40.4°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.6°F and the mean monthly high for July is 69.1°F. The average annual precipitation is 26.50 inches, with a mean monthly precipitation of 2.72 inches in January and 2.21 inches in July. The growing season is approximately six and three-fourths months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, West Duluth, Minnesota-Wisconsin, 1975).

BIOTIC SETTING LS 288-312

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the St. Louis River Wetland Complex.

Fish

Fish species found in the St. Louis River are listed in Table 9-22. As of 1973, red clay siltation and industrial pollution had greatly reduced the fishery value of the St. Louis River. Severe oxygen depletion and fish kills have occurred on several occasions. The river has historically supported a warmwater fishery, consisting primarily of northern pike (Esox lucius), walleye (Stizostedion vitreum), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), and longnose sucker (Catostomus catostomus). No commercial fishery exists in the lower St. Louis River, but there is some recreational fishing for the above species (Wisconsin Department of Natural Resources, 1973). The eating quality of fish from the river has deteriorated because of pollution, and fishermen have expressed reluctance to consume such fish. The backwaters and bays of the lower St. Louis River support abundant yellow perch, which probably utilize the numerous shallow vegetated areas for spawning and cover. Improved water quality and better access to the bays of the lower St. Louis River would probably greatly benefit the recreational fishery value of the area (DeVore, 1977). The St. Louis River Wetland Complex is

Table 9-22. Fish Species Found in the St. Louis River, Douglas County,[a] Wisconsin and St. Louis County, Minnesota

Family and Species	Family and Species
Acipenseridae	Catostomidae
lake sturgeon	white sucker*
	longnose sucker
Amiidae	silver redhorse*
bowfin*	shorthead redhorse*
Salmonidae	Ictaluridae
brown trout	channel catfish
	black bullhead*
Umbridae	yellow bullhead*
central mudminnow*	
	Gadidae
Esocidae	burbot
northern pike*	
muskellunge*	Gasterosteidae
	brook stickleback*
Cyprinidae	
carp*	Centrarchidae
creek chub	smallmouth bass*
lake chub	pumpkinseed*
hornyhead chub	rock bass
blacknose dace	
common shiner	Percidae
spottail shiner	yellow perch*
	walleye*
	logperch*
	Iowa darter*

[a]Moore and Braem (1965); Wisconsin Department of Natural Resources (1973)
*Species associated with wetland habitats, according to Trautman (1957) and Jaworski and Raphael (1978)

probably an important spawning, feeding, and nursery area for most of the species in the river, particularly the more abundant northern pike, yellow perch, and white sucker.

According to DeVore (1977), the bays and backwaters of the lower St. Louis River support abundant yellow perch, but no specific bays are mentioned and the species composition and other characteristics of the fish fauna of Kimballs Bay Wetland and Pokegoma Bay Wetland are probably very similar to those of the fish fauna of the Lower St. Louis River. A list of fish species known to utilize the coastal wetlands of Lake Superior appears in Appendix A-1.

A search of the literature provided no site-specific information pertaining to seasonal locations and abundance, life histories, or food sources of the fish populations in the St. Louis River Wetland Complex.

Invertebrates

Information on the composition and relative abundance of the invertebrate fauna of the St. Louis River Wetland Complex is available in Wisconsin Department of Natural Resources files (1970). The tendipedids (Diptera), pelecypods, isopods, and oligochaetes were the major taxa collected at the sample sites. A list of the taxa collected, in order of abundance, appears in Table 9-23. These species may or may not be found in these wetlands today.

Table 9-23. Invertebrate Taxa Collected in the St. Louis River, August 5, 1970[a]

Oligochaeta	Insecta
Hirudinea	Ephemeroptera
Gastropoda	*Caenis*
Pulmonata	Odonata
Promenetus exacuous	*Enallagma*
Pelecypoda	Hemiptera
Crustacea	*Merragata*
Isopoda	Corixidae
Asellus	Trichoptera
Amphipoda	*Psychomyia*
Hyalella azteca	Coleoptera
Gammarus	*Haliplus*
Decapoda	Diptera
Hydracarina	Tendipedidae
Limnesia	Ceratopogonidae
Unionicola	Hymenoptera
Piona	

[a] Wisconsin Department of Natural Resources, open files, 1970)

The literature search produced no site-specific data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the St. Louis River Wetland Complex.

Reptiles and Amphibians

The following reptiles and amphibians probably occur in the Duluth-Superior Harbor area and may be found in the St. Louis River Wetland Complex: northern leopard frog (Rana pipiens), green frog (Rana clamitans melanota), mink frog (Rana septentrionales), wood frog (Rana sylvatica), northern spring peeper (Hyla crucifer crucifer), treefrogs (hyla spp.), American toad (Bufo americanus americanus), painted turtle (Chrysemys picta sp.), snapping turtle (Chelydra serpentina), eastern garter snake (Thamnophis sirtalis sirtalis), red-bellied snake (Storeria occipitomaculata occipitomaculata), red-backed salamander (Plethodon cinereus cinereus), and blue-spotted salamander (Ambystoma laterale) (Metropolitan Interstate Committee, 1977). The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in these 26 wetlands.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the St. Louis River Wetland Complex.

Mammals

The snowshoe hare (Lepus americanus), muskrat (Ondatra zibethicus), Norway rat (Rattus norvegicus), weasel (Mustela sp.) and white-tailed deer (Odocoileus virginianus) are common in the Superior City area (U.S. Army Corps of Engineers, 1975) and may be found in the 26 wetlands comprising the St. Louis River Wetland Complex.

Muskrat, river otter (Lutra canadensis), beaver (Castor canadensis), and mink (Mustela vison) are trapped in wetlands near Superior City (U.S. Army Corps of Engineers, 1975) which probably include at least parts of the St. Louis River Wetland Complex.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

No plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Hine et al., 1975; Wm. B. Nye, Minnesota Department of Natural Resources, personal communication, 1977) were documented in the St. Louis River Wetland Complex by the literature search.

Health

The environmental quality of the St. Louis River Wetland Complex appears to be good. However, four NPDES permits are held by companies operating in the vicinity of the wetlands. Three permits are for the discharge of primary treated effluent. The fourth permit is for discharges from the U.S. Steel Corporation's Duluth Works, American Steel, and Wire Division. The effects of these discharges on the wetlands comprising the St. Louis River Wetland Complex are not known.

CULTURAL SETTING

LS 288-312

Population

The St. Louis River Wetland Complex is located along both sides of the St. Louis River in the area that serves as the border between the cities of Duluth, Minnesota, and Superior, Wisconsin. Table 9-24 indicates that both the city of Duluth and the city of Superior experienced a rapid decline in population between 1970 and 1975. The population of Douglas County remained stable during the same time period, while the population of St. Louis County declined slowly. Projections for 1990 indicate that Douglas County is expected to undergo a slow decline in population and that the population of St. Louis County will remain stable.

Table 9-24. Population Data for the Vicinity of the St. Louis River Wetland Complex

	Estimated population 1975[a]	Estimated $\%_{\Delta}$ 1970-1975[a]	Projected population 1990[b]
St. Louis County	216,226	-2.0	215,047[b]
City of Duluth	93,971	-6.6	--
Douglas County	44,379	-0.6	42,430[c]
City of Superior	30,038	-6.8	--

[a] U.S. Bureau of the Census (1977)
[b] Minnesota State Planning Agency (1975)
[c] Wisconsin State Bureau of Program Management (1975)

Land Use and Ownership

Land use within the St. Louis River Wetland Complex is rural open space, but the surrounding area is rural, residential and commercial. The city of Duluth and its suburbs are located north and west of the St. Louis River Wetland Complex; therefore, some of these wetlands, especially those on the western bank of the St. Louis River, are located near metropolitan districts. Railroads cross Mud Lake wetland in three places, and also cross Spirit Lake Wetlands #3 and #4. Other special features of Mud Lake Wetland include State Route 39 in the southern section, unimproved dirt roads and railroad tracks to the northwest, radio towers in the south, and scattered buildings along the periphery. Numerous buildings and railroads lie west and northwest of Spirit Lake Wetland #3, while Spirit Lake Wetland #4 contains a light-duty road through the central section, as well as an unimproved dirt road, numerous light-duty roads, and buildings to the west. A light duty road and several buildings lie north of Indian Point Park Wetland #2, which also contains two radio towers. Railroad tracks are located east and north of Keene Creek Wetland. Several wetlands along the eastern bank of the St. Louis River also contain various special features. An unimproved dirt road and several buildings are located west of Billings Park Area Wetland, which also contains a light-duty road along its northwestern border. This same road runs through the northwestern section of Kimballs Bay Wetland and along several eastern parts of Pokegama River Wetland. This latter wetland also has unimproved dirt roads in the south and west, and State Route 105 lies south of the wetland. Light duty roads are along the southeastern boundary of Little Pokegama River Wetland, and north and west of Little Pokegama Bay Wetland #2. There is a gravel pit south of Little Pokegama River Wetland. Light-duty roads, unimproved dirt roads, buildings, and a gravel pit are located south of Oliver Wetland. Some of the island wetlands are fairly exposed, but the narrowness of certain regions of the St. Louis River helps to provide some protection. The wetlands are under private ownership, and their location suggests that they are subject to severe development pressure (U.S.G.S. quadrangle map, West Duluth, Minnesota-Wisconsin, 1975).

Recreation

No known state or federal recreational facilities are present in the vicinity of the St. Louis River Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the St. Louis River Wetland Complex are limited to gravel and stone (Great Lakes Basin Commission, 1974). Duluth Gabbro bedrock is present under the northwestern half of the wetland complex. The complex has very few even partially wooded wetlands, but the surrounding areas to the south and north are wooded and represent a potential forest resource. No significant energy resources are known to be present in the vicinity of the wetlands.

Public Utilities and Facilities

Three sewage treatment facilities are located on the St. Louis River in close proximity to several of the wetlands. The Gary-New Duluth Sewage Treatment Plant is located on the west side of the Mud Lake Wetland. The Smithville Sewage Treatment Plant is located northwest of Spirit Lake Wetland #6 and to the west of Clough Island Area Wetland #2. The Fairmont Sewage Treatment Plant is located to the northwest of Indian Point Park Wetland #1, to the west of Indian Point Park Wetland #2, to the northwest of Clough Island Area Wetland #1, and to the northeast of Tallas Island Wetland (Metropolitan Interstate Committee, 1977).

Pollution Sources

The Fairmont sewage treatment plant holds an NPDES permit for the discharge of primary treated effluent into the St. Louis River. The discharge point is northwest of Clough Island Area Wetland #1, northeast of Tallas Island Wetland, northwest of Indian Point Park Wetland #1, and west of Indian Point Park Wetland #2. Similarly, the Gary-New Duluth sewage treatment plant holds an NPDES permit for the discharge of primary treated effluent to the St. Louis River; the discharge point is situated west of Mud Lake Wetland. The Smithville sewage treatment plant also holds an NPDES permit for the discharge of primary treated effluent into the St. Louis River, and its discharge point is situated northwest of Spirit Lake Wetland #6 and west of Clough Island Area Wetland. The effect on the wetlands of discharges by the Smithville, Fairmont, and Gary-New Duluth treatment plants is not known. However, the Western Lake Superior Sanitary District intends to link these plants to a regional sewage collection system, and to phase out all three facilties by the end of 1978 (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior Sanitary District, 1973, 1976; Minnesota Pollution Control Agency, Permits Section, 1978).

United States Steel Corporation holds an NPDES permit for its Duluth Works, American Steel and Wire Division. Discharges are from a settling pond for wastes from cooking operations and from another settling pond which receives wire mill wastes and sanitary wastes. The effluents are then discharged to the St. Louis River. The discharge is located west of Spirit Lake Wetland #3 and south of Spirit Lake Wetland #4 (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior Sanitary District, 1973, 1976; Minnesota Pollution Control Agency, Permits Section, 1978). The effect of the discharges by United State Steel Corporation is not known.

There are no NPDES permit holders adjacent to any other wetlands in the St. Louis River Wetland Complex (Wisconsin Department of Natural Resources, Industrial Discharge Section, 1978; Minnesota Pollution Control Agency, Permits Section, 1978).

No site-specific information was located through the literature search pertaining to non-point sources of pollution in the St. Louis River Wetland Complex. However, shipping wastes, vessel discharges, and harbor dredging constitute a pollution problem in the Duluth-Superior Harbor (Minnesota State Planning Agency, Coastal Zone Management Program, 1978; Western Lake Superior

Sanitary District, 1976; U.S. Army Corps of Engineers, 1974)and the effect of this pollution on the wetlands in the St. Louis River Wetland Complex is not known. Further information on non-point pollution in this general area is available in Andrews et al. (1976).

Historical and Archaeological Features

The Duluth-Superior Harbor Cultural Resources Study indicates that there are no historical or archaeological sites present in the St. Louis River Wetland Complex (Minnesota Historical Society).

RESEARCH PROJECTS LS 288-312

The literature search identified no on-going or impending research projects pertaining to the St. Louis River Wetland Complex.

Table 9-25. Data Gaps-Lake Section 9

Data Gap*		Wetland Number	269-270	271	272	273	274	275	276	277-279	280	281-287	286-312
Physiographic Setting		Setting											
		Topography											
		Surficial Geology											
		Soils	*	*	*	*	*	*	*	*	*	*	*
	Hydrology	Water Level Fluctuations	*	*	*	*	*	*	*	*	*	*	*
		Groundwater	*	*	*	*	*	*	*	*	*	*	*
		Water Quality	*	*	*	*	*	*	*	*	*	*	*
		Depth	*	*	*	*	*	*	*	*	*	*	*
		Seasonal Changes	*	*	*	*	*	*	*	*	*	*	*
		Climate											
		Special Features											
Biotic Setting	Vegetation	Major Species Distribution	*	*	*	*	*	*		*	*	*	*
		Major Species Composition	*	*	*	*	*	*	c	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*
	Fish	Major species					*	*				*	
		Species Composition					*	*				*	*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*
		Spawning and Hatching Areas	*	*	*	*	*	*	*		*	*	*
		Commercial/Recreational Use	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*
	Invertebrates	Species Composition	*	*	*	*	*	*	*	*	*	*	
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*
	Amphibians/Reptiles	Major Species	*	*	*	*	*	*					
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*	*	*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*
	Avifauna	Major Species	*	*	*	*	*	*			*		*
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*	*		*	*	*
		Recreational/Commercial Use	*	*	*	*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*
	Mammals	Major Species	*		*	*	*	*					
		Seasonal Distribution	*	*	*	*	*	*	*	*	*	*	*
		Density/Productivity	*	*	*	*	*	*		*	*	*	*
		Recreational/Commercial Use	*	*		*	*	*	*	*	*	*	*
		Life Histories	*	*	*	*	*	*	*	*	*	*	*
		Food Sources	*	*	*	*	*	*	*	*	*	*	*
		Relationship to Water Levels	*	*	*	*	*	*	*	*	*	*	*
		Endangered Species											
		Health	*	*	*	*	*	*	*		*	*	
Cultural Setting		Population											
		Land Use and Ownership											
		Recreation											
		Mineral, Energy, Forest Resource											
		Public Utilities/Facilities											
		Point Pollution Sources											
		Non-Point Pollution Sources											
		Historic Features											
		Archeologic Features											

LAKE SECTION 10

INTRODUCTION

Lake Section 10 extends along the northern shore from Two Harbors, Minnesota to the Canadian border, within Lake County. The region features hilly topography in the vicinity of the wetlands. The predominant shore type along this 98 mile stretch of shoreline is non-erodible bluff.

Figure 10-1 shows the approximate location of the 7 coastal wetlands in Lake Section 10. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 10-1. The wetlands of Lake Section 10 are located at elevations between 610 and 660 feet above sea level, 8 to 58 feet above the mean elevation of Lake Superior. The Section 10 wetlands are all classified as Palustrine.

Available information related to physiographic and cultural features of these 7 coastal wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

Figure 10-1. Lake Section 10 - Paradise Beach Area

Table 10-1. Location, Acreage, and Classification of Wetlands in Lake Section 10

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LS 313	Hovland Area Wetland	47°50'43"	89°56'31"	10	P
	PARADISE BEACH AREA WETLAND COMPLEX				
LS 314	Marr Island Area Wetland	47°47'46"	90°07'06"	25	P
LS 315	Paradise Beach Wetland #1	47°48'21"	90°04'50"	2.5	P
LS 316	Paradise Beach Wetland #2	47°48'25"	90°04'34"	12	P
LS 317	Paradise Beach Wetland #3	47°48'35"	90°04'35"	2	P
LS 318	Paradise Beach Wetland #4	47°48'49"	90°04'06"	2.5	P
LS 319	Paradise Beach Wetland #5	47°48'53"	90°03'40"	1	P

[a]P=palustrine

PARADISE BEACH AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LS 313-318

Setting

The Paradise Beach Area Wetland Complex is located along the northern coast of Lake Superior, in Cook County, Minnesota. The various parts of the complex extend from the shoreline to approximately 0.1 mile inland. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960).

Topography

The Paradise Beach Area Wetland Complex has 58 feet of relief and a maximum elevation of 660 feet above mean sea level (58 feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is hilly; the greatest local elevation is about 1800 feet above mean sea level (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960).

Surficial Geology

The Paradise Beach Area Wetland Complex lies in the North Shore Highlands, which are underlain mostly by southeastward-dipping Keweenawan basalt and diabase. Short streams lead from the highlands directly to Lake Superior. The linear pattern produced by the streams reflects a fine pattern of till ridges and grooves, produced by the Superior lobe of the Wisconsin Glacier and terminating at the Highland moraine (Wright, 1972).

Soils

No soil survey is currently available for Cook County.

Hydrology

One unnamed stream flows through Paradise Beach Wetland #3. No streams flow through the other wetlands of the Paradise Beach Area Wetland Complex (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in these wetlands.

Climate

The closest weather station providing climatic data for the Paradise Beach Area Wetland Complex is located in Grand Marais, Minnesota. The average annual temperature is 38.6°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.8°F and the mean monthly high for July is 60.4°F.

The average annual precipitation is 26.65 inches, with a mean monthly precipitation of 1.19 inches in January and 3.00 inches in July. The growing season is approximately six and one-half months long, with the last killing frost ($28^{o}F$) in 1975 occurring on April 21 and the first killing frost on November 12 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of these wetlands (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960).

BIOTIC SETTING LS 313-318

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the Paradise Beach Area Wetland Complex.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the Paradise Beach Area Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Paradise Beach Area Wetland Complex.

Reptiles and Amphibians

The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Paradise Beach Area Wetland Complex.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Paradise Beach Area Wetland Complex.

Mammals

A general survey of the mammals of Cook County (Timm, 1975) provides information concerning the mammalian fauna which may utilize the six wetlands comprising the Paradise Beach Area Wetland Complex (Appendix C-6).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting these wetlands.

Endangered Species

According to a regional study (Van Ballenberghe, 1972) on the movement and ecology of the timber wolf (*Canis lupus lycon*), which is classified as an endangered species in Minnesota, the coastal areas of Lake Superior are occasionally used by wolves. However, no plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Wm. B. Nye, Minnesota Department of Natural Resources, personal communication, 1977) were documented in the Paradise Beach Area Wetland Complex by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands.

CULTURAL SETTING LS 313-318

Population

The Paradise Beach Area Wetland Complex is located in Cook County, Minnesota. The county is sparsely populated, having a density of 3 persons per square mile. The 1970 estimated population of Cook County was 3,686, and the estimated percent change in population between 1970 and 1975 was 7.7 (U.S. Bureau of the Census, 1977). These estimates indicate that Cook County underwent a rapid rate of population growth between 1970 and 1975. No 1990 population projections were available for the county.

Land Use and Ownership

Land use within the Paradise Beach Area Wetland Complex and the surrounding area is rural open space. U.S. Route 61 is adjacent to the northern boundaries of Marr Island Area Wetland and Paradise Beach Wetlands #2 and #3, and run south of Paradise Beach Wetlands #4 and #5. An unimproved dirt road lies south of Paradise Beach Wetlands #1 and #2, and there are several buildings south of Paradise Beach Wetlands #4. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960).

Recreation

The Paradise Beach Area Wetland Complex is located in Grand Portage State Forest. Recreational activities permitted in the forest include fishing, boating, camping, picnicking, swimming, cross-country skiing, and snowmobiling (Minnesota Department of Natural Resources, 1978).

Mineral, Energy, and Forest Resources

The Paradise Beach Area Wetland Complex lies in an area characterized by deposits of igneous and metamorphic rock lying close to the surface, representing a potential mineral resource (Schwartz and Prokapovich, 1966).

The area is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Paradise Beach Area Wetland Complex (U.S.G.S. quadrangle map, Marr Island, Minnesota, 1960).

Pollution Sources

There are no NPDES permit holders adjacent to the Paradise Beach Area Wetland Complex (Minnesota Pollution Control Agency, Permits Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

An archaeological assessment of the north shore area of Lake Superior in the vicinity of the Paradise Beach Area Wetland Complex has been completed, but the information was not available for the purposes of this study. Information concerning the assessment can be obtained from the Minnesota Historical Society.

RESEARCH PROJECTS

LS 313-318

The literature search identified no on-going or impending research projects pertaining to the Paradise Beach Area Wetland Complex.

HOVLAND AREA WETLAND

PHYSIOGRAPHIC SETTING

LS 319

Setting

Hovland Area Wetland is located on the shoreline of Lake Superior in Cook County, Minnesota. There are no major population centers in the area. This wetland is a Palustrine System and occupies a wooded site (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960).

Topography

Hovland Area Wetland has eight feet of relief and a maximum elevation of 610 feet above mean sea level (eight feet above the approximate mean elevation of Lake Superior). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is hilly; the greatest local elevation is about 1,100 feet above mean sea level (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960).

Surficial Geology

Hovland Area Wetland lies in the North Shore Highlands, which are underlain mostly by southeastward-dipping Keweenawan basalt and diabase. Short streams lead from the highlands directly to Lake Superior. The linear pattern produced by the streams reflects a fine pattern of till ridges and grooves, produced by the Superior lobe of the Wisconsin Glacier and terminating at the Highland moraine (Wright, 1972).

Soils

No soil survey is currently available for Cook County.

Hydrology

One unnamed stream flows through Hovland Area Wetland (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960). The literature search located no site-specific information pertaining to water level influences, patterns of groundwater drainage and runoff, water quality, depth, or seasonal changes in this wetland.

Climate

The closest weather station providing climatic data for Hovland Area Wetland is located in Grand Marais, Minnesota. The average annual temperature is 38.6°F, based on the normal period from 1941-1970. The mean monthly low for January is 14.8°F and the mean monthly high for July is 60.4°F. The average annual precipitation is 26.65 inches, with a mean monthly precipitation of 1.19 inches in January and 3.00 inches in July. The growing season is approximately

six and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 21 and the first killing frost on November 12 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of this wetland (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960).

BIOTIC SETTING LS 319

Vegetation

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of Hovland Area Wetland.

Fish

Fish species generally associated with coastal wetland habitats of Michigan, Wisconsin, and Minnesota are listed in Appendix A-1. However, a search of the literature provided no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in Hovland Area Wetland.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Hovland Area Wetland.

Reptiles and Amphibians

The literature search yielded no site-specific information pertaining to major species, seasonal distribution and abundance, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Hovland Area Wetland.

Avifauna

The literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Hovland Area Wetland.

Mammals

A general survey of the mammals of Cook County (Timm, 1975) provides information concerning the mammalian fauna which may utilize Hovland Area Wetland (Appendix C-6).

The literature search provided no site-specific data pertaining to major species, seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, food sources, or relationship to water levels of the mammals inhabiting this wetland.

Endangered Species

According to a regional study (Van Ballenberghe, 1972) on the movement and ecology of the timber wolf (Canis lupus lycon), which is classified as an endangered species in Minnesota, the coastal areas of Lake Superior are occasionally used by wolves. However, no plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Wm. B. Nye, Minnesota Department of Natural Resources, personal communication, 1977) were documented in Hovland Area Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland.

CULTURAL SETTING LS 319

Population

Hovland Area Wetland is located in Cook County, Minnesota. The county is sparsely populated, having a density of 3 persons per square mile. The 1970 estimated population of Cook County was 3,686, and the estimated percent change in population between 1970 and 1975 was 7.7 (U.S. Bureau of the Census, 1977). These estimates indicate that Cook County underwent a rapid rate of population growth between 1970 and 1975. No 1990 population projections were available for the county.

Land Use and Ownership

Land use within Hovland Area Wetland and the surrounding area is rural open space. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960).

Recreation

Hovland Area Wetland is located in Grand Portage State Forest. Recreational activities permitted in the forest include fishing, boating, camping, picnicking, swimming, cross-country skiing, and snowmobiling (Minnesota Department of Natural Resources, 1978).

Mineral, Energy, and Forest Resources

Hovland Area Wetland lies in an area characterized by deposits of igneous and metamorphic rock lying close to the surface, representing a potential mineral resource (Schwartz and Prokapovich, 1966).

The area is wooded and represents a potential forest resource, but no significant energy resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Hovland Area Wetland (U.S.G.S. quadrangle map, Hovland, Minnesota, 1960).

Pollution Sources

There are no NPDES permit holders adjacent to Hovland Area Wetland (Minnesota Pollution Control Agency, Permits Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

An archaeological assessment of the north shore area of Lake Superior near Hovland Area Wetland has been completed, but the information was not available for the purposes of this study. Information concerning the assessment can be obtained from the Minnesota Historical Society.

RESEARCH PROJECTS

LS 319

The literature search identified no on-going or impending research projects pertaining to Hovland Area Wetland.

Table 10-2. Data Gaps-Lake Section 10

	Data Gap*		Wetland Number	313	314-319
Physiographic Setting			Setting		
			Topography		
			Surficial Geology		
			Soils	*	*
	Hydrology		Water Level Fluctuations	*	*
			Groundwater	*	*
			Water Quality	*	*
			Depth	*	*
			Seasonal Changes	*	*
			Climate		
			Special Features		
Biotic Setting	Vegetation		Major Species Distribution	*	*
			Major Species Composition	*	*
			Density/Productivity	*	*
			Relationship to Water Levels	*	*
	Fish		Major species	*	*
			Species Composition	*	*
			Seasonal Distribution	*	*
			Spawning and Hatching Areas	*	*
			Commercial/Recreational Use	*	*
			Life Histories	*	*
			Food Sources	*	*
	Invertebrates		Species Composition	*	*
			Seasonal Distribution	*	*
			Density/Productivity	*	*
			Food Sources	*	*
			Relationship to Water Levels	*	*
	Amphibians/Reptiles		Major Species	*	*
			Seasonal Distribution	*	*
			Density/Productivity	*	*
			Recreational/Commercial Use	*	*
			Life Histories	*	*
			Food Sources	*	*
			Relationship to Water Levels	*	*
	Avifauna		Major Species	*	*
			Seasonal Distribution	*	*
			Density/Productivity	*	*
			Recreational/Commercial Use	*	*
			Life Histories	*	*
			Food Sources	*	*
			Relationship to Water Levels	*	*
	Mammals		Major Species	*	*
			Seasonal Distribution	*	*
			Density/Productivity	*	*
			Recreational/Commercial Use	*	*
			Life Histories	*	*
			Food Sources	*	*
			Relationship to Water Levels	*	*
			Endangered Species		
			Health	*	*
Cultural Setting			Population		
			Land Use and Ownership		
			Recreation		
			Mineral, Energy, Forest Resource		
			Public Utilities/Facilities		
			Point Pollution Sources		
			Non-Point Pollution Sources		
			Historic Features		
			Archaeologic Features		

LAKE SECTION 11

INTRODUCTION

Lake Section 11 encompasses Isle Royale, which is under the jurisdiction of the state of Michigan. The region features irregular topography in the vicinity of the wetlands.

Figures 11-1 and 11-2 show the approximate location of the 29 coastal wetlands in Lake Section 11. Latitude, longitude, acreage, and classification for each of these wetlands are presented in Table 11-1. The wetlands of Lake Section 11 are located at a maximum elevation of 800 feet above sea level, up to 198 feet above the mean elevation of Lake Superior. The wetlands of this section are all classified as Palustrine.

Available information related to physiographic and cultural features of the 29 coastal wetlands of Isle Royale is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to the biotic characteristics of many of these wetlands.

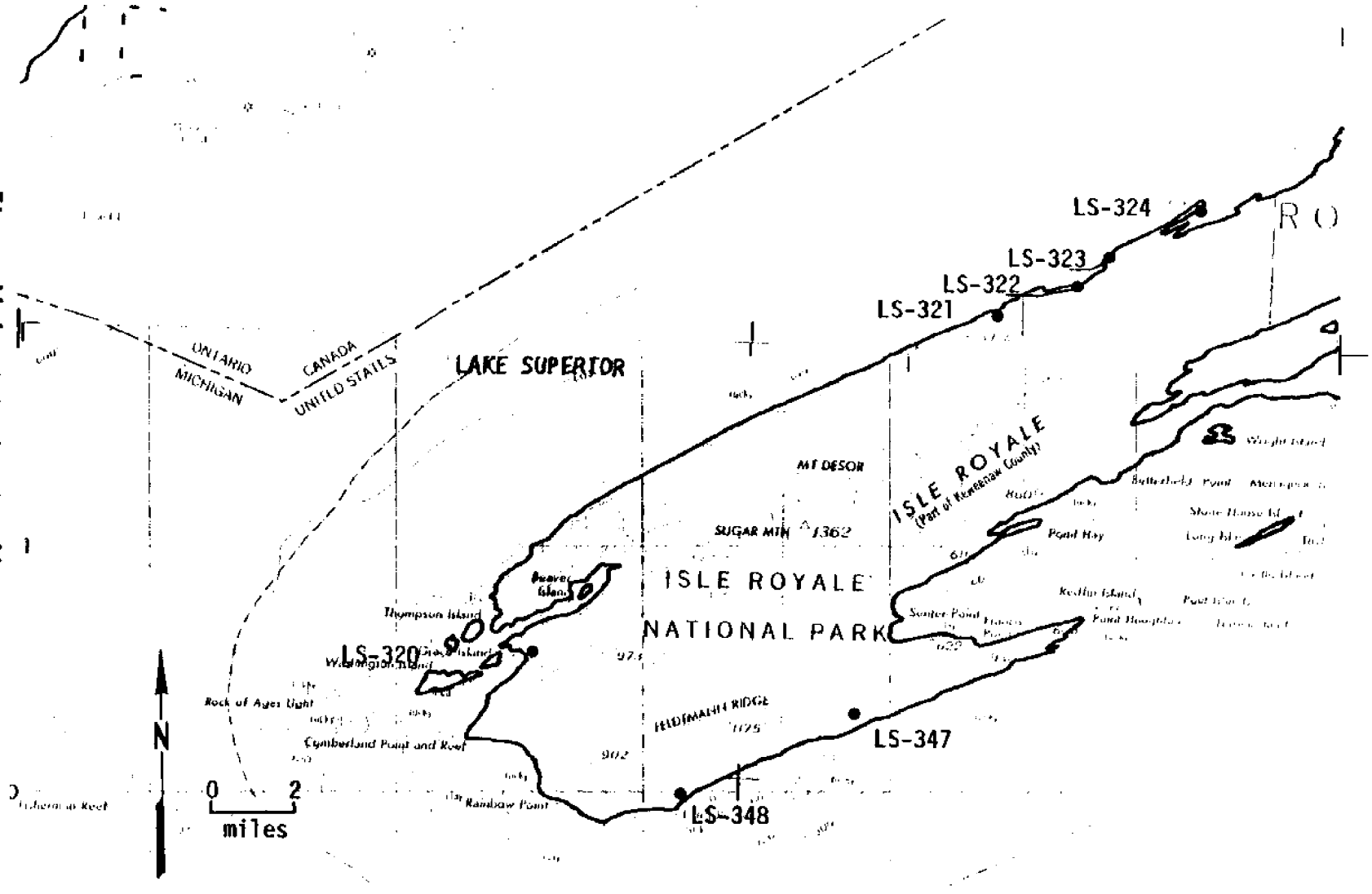


Figure 11-1 Lake Section 11 - West Isle Royale

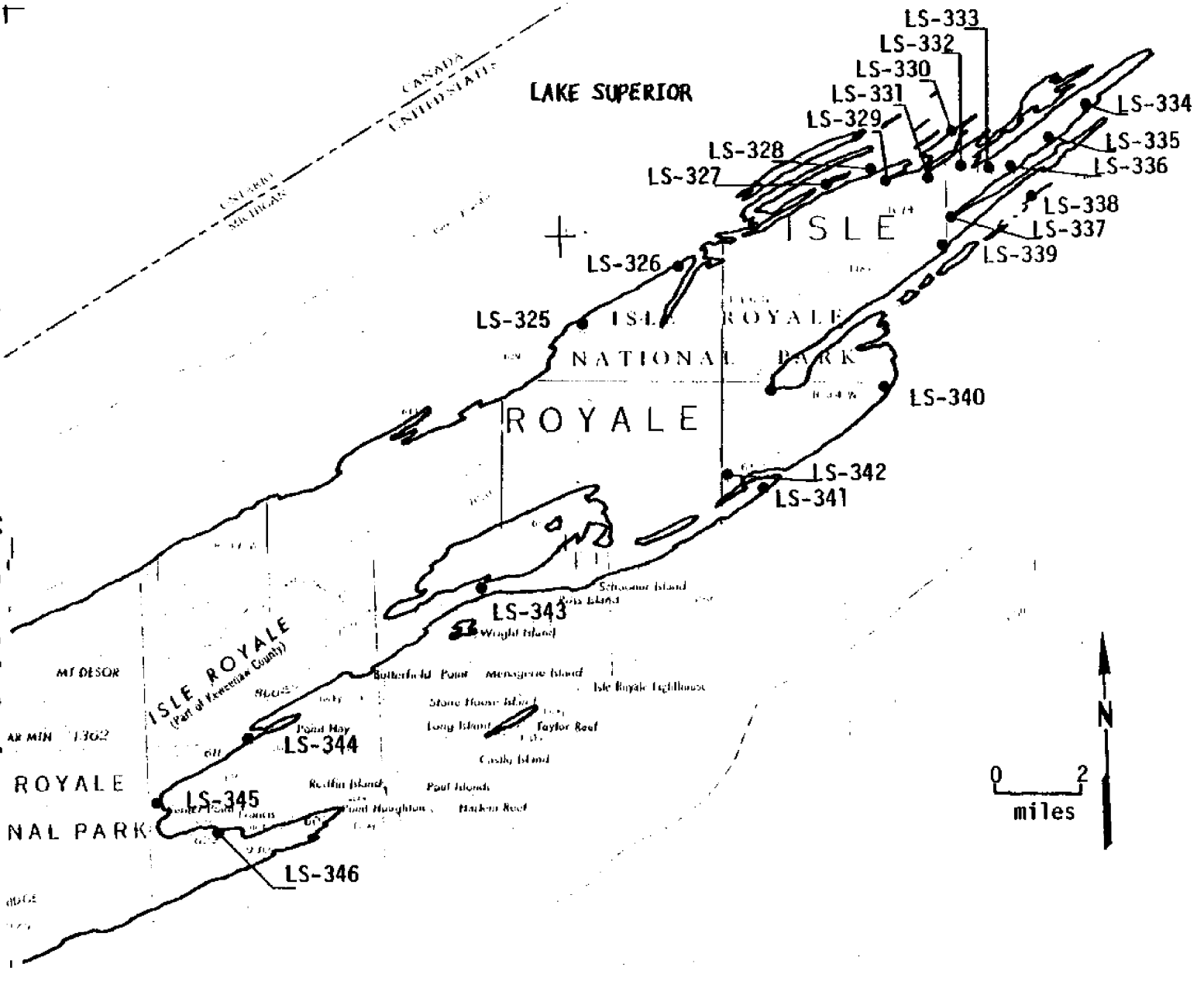


Figure 11-2 Lake Section 11 - East Isle Royale

Table 11-1. Location, Acreage, and Classification of Wetlands in Lake Section 11

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	ISLE ROYALE WETLAND COMPLEX				
LS 320	Grace Harbor Wetland	47°53'02"	89°11'59"	45	P
LS 321	Thomsonite Beach Wetland	48°00'28"	88°58'06"	29	P
LS 322	Little Todd Harbor Wetland	48°01'25"	88°54'08"	195	P
LS 323	Florence Bay - Pickett Bay Wetland	48°02'19"	88°52'20"	275	P
LS 324	Pickett Bay Area Wetland	48°02'42"	88°50'02"	10	P
LS 325	Beaver Lake - McDonald Lake Area Wetland	48°05'25"	88°44'12"	335	P
LS 326	McCargoe Cove Wetland	48°06'20"	88°41'00"	175	P
LS 327	Lake Eva Wetland	48°07'40"	88°38'01"	10	P
LS 328	Horner Area Wetland	48°08'28"	88°35'30"	5	P
LS 329	Lane Cove Wetland	48°08'28"	88°34'42"	5	P
LS 330	Five Finger Bay Area Wetland	48°09'25"	88°32'20"	10	P
LS 331	Patterson Lake Wetland	48°08'28"	88°33'20"	50	P
LS 332	Duncan Bay Tributary Wetland	48°08'35"	88°32'30"	95	P
LS 333	Duncan Bay Wetland	48°09'00"	88°30'40"	110	P
LS 334	Hidden Lake Wetland	48°09'35"	88°28'31"	40	P
LS 335	Tobin Harbor Wetland	48°09'09"	88°29'35"	25	P
LS 336	Moose Lake Wetland	48°09'00"	88°30'42"	20	P
LS 337	Tobin Creek Wetland	48°07'04"	88°33'26"	150	P
LS 338	Raspberry Island (Isle Royale) Wetland	48°08'30"	88°28'30"	15	P
LS 339	Siskowit Mine Area Wetland	48°06'42"	88°33'08"	15	P
LS 340	Maskey Basin Campground Wetland	48°03'28"	88°39'30"	70	P
LS 341	Chippewa Harbor Area Wetland	48°01'25"	88°38'58"	5	P
LS 342	Lake Richie Outlet Wetland	48°01'40"	88°40'09"	20	P
LS 343	Malone Bay Area Wetland	47°59'10"	88°49'10"	75	P
LS 344	Hay Bay Area Wetland	47°56'09"	88°57'52"	160	P
LS 345	Caribou Creek Wetland	47°54'09"	89°00'30"	160	P
LS 346	Francis Point Area Wetland	47°53'26"	88°57'02"	9	P
LS 347	Attwood Beach Area Wetland	47°51'42"	89°02'00"	177	P
LS 348	Long Point Area Wetland	47°50'06"	89°07'30"	110	P

[a]P=palustrine

ISLE ROYALE WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LS 320-348

Setting

The Isle Royale Wetland Complex is located on Isle Royale in the coastal zone of Lake Superior, within Houghton Township of Keweenaw County, Michigan. The various component parts of the complex extend from the shoreline to approximately 0.2 mile inland. There are no major population centers in the area. This wetland complex is a Palustrine System and occupies both wooded and non-wooded sites (U.S.G.S. topographic map, Isle Royale National Park, Michigan, 1950-1970, scale 1:62500).

Topography

The Isle Royale Wetland Complex has 198 feet of relief and a maximum elevation of 800 feet above mean sea level (198 feet above the approximate mean elevation of Lake Superior). Isle Royals terrain has been uniquely shaped by glacial and geological forces. Innumerable variations in the terrain adjacent to wetlands may be found in this area.

Surficial Geology

No information is available concerning the surficial geology of Isle Royale.

Soils

No soil survey is currently avaliable for Keweenaw County.

Hydrology

Of the 29 wetlands of Isle Royale, those which have streams running through them are listed in Table 11-2. Wetlands in the complex that have no streams flowing through them do not appear on the list.

Climate

The closest weather station providing climatic data for the Isle Royale Wetland Complex is located in Mott Island-Isle Royale, Michigan. The annual temperature averages and the mean monthly lows for January are not available. The mean monthly high for July is 56.4°F. Data concerning average annual precipitation and mean monthly precipitation in January are not available, but the mean monthly precipitation is 1.55 inches in July. The growing season is approximately four and three fourths months long, with the last killing frost (28°F) in 1972 occurring on May 10 and the first killing frost on October 17 (National Oceanic and Atmospheric Administration, 1973).

Table 11-2. Streams Associated with Isle Royale Wetlands[a]

Wetland name	Named streams or creeks	Number of unnamed streams	Number of intermittent streams
Grace Harbor Wetland	Grace Creek	0	0
Florence Bay-Pickett Bay Wetland	--	1	0
Pickett Bay Area Wetland	--	1	0
Beaver Lake-McDonald Lake Area Wetland	--	1	0
McCargoe Cove Wetland	--	2	1
Lake Eva Wetland	--	1	0
Duncan Bay Tributary Wetland	--	1	0
Moose Lake Wetland	--	1	0
Tobin Creek Wetland	Tobin Creek	0	0
Siskowit Mine Area Wetland	--	0	1
Lake Richie Outlet Wetland	--	1	0
Hay Bay Area Wetland	Little Siskiwit Rvr.	0	0
Caribou Creek Wetland	Caribou Creek	0	0
Francis Point Area Wetland	--	1	0
Attwood Beach Area Wetland	--	0	1
Long Point Area Wetland	--	0	1

[a]U.S.G.S. topographic map, Isle Royale National Park, Michigan, 1950-1970, scale 1:62,500

Special Features

No natural special features are found in the vicinity of the Isle Royale Wetland Complex (U.S.G.S. topographic map, Isle Royale National Park, Michigan, 1950-1970, scale 1:62500).

BIOTIC SETTING LS 320-348

Vegetation

The following general description of the vegetation of Isle Royale may or may not be applicable to any one wetland of the complex, but is included to provide a characterization of the Island's vegetation in lieu of site specific information.

The forest vegetation of Isle Royale has been investigated extensively, beginning with Cooper (1913), who believed all of the island's environments tended toward succession to boreal spruce-fir forest, not recognizing the northern hardwoods as a climax type. However, three major forest types occur on Isle Royale, climax northern hardwood forest dominated by sugar maple (Acer saccharum) and yellow birch (Betula lutea), climax northern conifer forest dominated by white spruce (Picea glauca) and balsam fir (Abies balsamea), and subclimax forests of quaking aspen (Populus tremuloides) and paper birch (Betula papyrifera) which cover over half of the island. Krefting (1951) stated that 10% of the island's forests were sugar maple-yellow birch, 29% spruce-fir-paper birch, 56% aspen-birch-conifer, and 5% swamp forest. Of the aspen-birch-conifer forest, about half occurs on land burned in 1936 and some occurs on land burned prior to 1900.

Swamp forests occur in favorable locations throughout the coastal and interior portions of Isle Royale, but are extensive only in the Big Siskiwit Swamp area between Siskiwit Bay and Lake Feldtmann. Major swamp forest species include black spruce (Picea mariana), white cedar (Thuja occidentalis), and balsam fir, with black ash contributing significantly to forest composition on the higher portions of the island. Speckled alder (Alnus rugosa) thickets occur along streams and in damp narrow ravines throughout the island. In addition to the two previous wetland habitats, bogs are also found in poorly drained depressions and at the margins of small lakes and ponds where slight wave action permits the establishment of mat-forming plants. Black spruce and tamarack (Larix larcina) comprise the major woody species of bogs, while the understory is composed of sphagnum moss (Sphagnum sp.) and members of the heath family (Ercaceae) (Shelton, 1966).

Additional information regarding the vegetation of Isle Royale may be found in Brown (1935) who discussed changes in the island's vegetation related to insects, mammals, and fire. Brown also discussed the history of botanical investigations on Isle Royale up to 1930, and provided the most complete record of the flora in an annotated catalog of the vascular flora including 671 species and varieties. Linn (1957) provides a discussion of the relationship between the two major climax forests as related to microclimate variation.

The literature search yielded no site-specific information pertaining to major species composition and distribution, density and productivity, or relationship to water levels of the vegetation of the 29 wetlands comprising the Isle Royale Wetland Complex.

Fish

Moore and Braem (1965) reported rainbow trout (Salmo gairdneri), brown trout (Salmo trutta), lake chub (Couesius plumbeus), longnose dace (Rhinichthys atratulus), white sucker (Catostomus commersoni), and brook stickleback (Culea inconstans) from Grace Creek. Of these, white sucker and brook stickleback are known to be associated with wetlands on Isle Royale (Hubbs and Lagler, 1947) and probably occur in Grace Harbor Wetland (LS 320). Hubbs and Lagler (1947) reported three species of fishes specifically from Todd Harbor, all of which are generally associated with wetlands and probably occur in Florence Bay-Pickett Bay Wetland (LS 323) and in Pickett Bay Area Wetland (LS 324). These included yellow perch (Perca flavescens), mottled sculpin (Cottus bairdi), and brook stickleback. The same authors reported goldenshiner (Notemigonus crysoleucas), spottail shiner (Notropis hudsonius), blacknose shiner (Notropis heterolepis), northern pike (Esox lucius), and yellow perch from Beaver Lake and McDonald Lake. All these species except the spottail shiner are known to occur in sheltered, often vegetated coves, or boggy ponds and streams on Isle Royale and would be expected to utilize Beaver-Lake McDonald Lake Wetland (LS 325).

The following fish species have been reported from Chickenbone Lake, Chickenbone Lake Creek, and McCargoe Cove: brook trout (Salvelinus fontinalis), northern pike, white sucker, spottail shiner, longnose dace, blacknose shiner, yellow perch, walleye (Stizostedion vitreum), Iowa darter (Etheostoma exile), mottled sculpin, and slimy sculpin (Cottus cognatus) (Moore and Braem, 1965; Hubbs and lagler, 1947). All of these species, except the walleye, brook trout, slimy sculpin, and spottail shiner, are generally associated with wetland habitats (Trautman, 1957) and probably utilize McCargoe Cove Wetland (LS 326).

Species reported by Hubbs and Lagler (1947) from Lake Eva and Pickerel Cove included northern pike, white sucker, blacknose shiner, goldenshiner, spottail shiner, brook stickleback, and mottled sculpin. All these species except the spottail shiner are commonly found in sheltered coves or wetland areas and may occur in Lake Eva Wetland (LS 327). Northern pike and yellow perch were reported from Patterson Lake, and both probably utilize Patterson Lake Wetland (LS 331, Hubbs and Lagler, 1947).

Fish species which occur in wetland habitats on Isle Royale and have been reported from Rock Harbor may utilize Raspberry Island Wetland (LS 338) and Siskiwit Mine Area Wetland (LS 339). These include white sucker, mottled sculpin, and brook stickleback (Hubbs and Lagler, 1947). Moore and Braem (1965) documented five fish species from the Lake Richie outlet stream on which Lake Ritchie Outlet Wetland (LS 342) is situated. These included longnose dace, white sucker, yellow perch, mottled sculpin, and slimy sculpin, of which white sucker, yellow perch, and mottled sculpin are known to utilize wetland habitats on Isle Royale (Hubbs and Lagler, 1947). In addition, Hubbs and Lagler (1947) reported blacknose shiner and goldenshiner from Chippewa Harbor. According to

the habitat descriptions for these two species (Hubbs and Lagler, 1947), they generally occur in sheltered, vegetated areas and probably utilize Chippewa Harbor Wetland. Other fish species known to occur in sheltered, often vegetated, coves and boggy streams and ponds on Isle Royale are listed in Appendix A-2. However, a search of the literature provided no site-specific information pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, recreational and commercial use, or food sources of the fish populations in the 29 wetlands of the Isle Royale Wetland Complex.

Invertebrates

The literature search produced no site-specific data pertaining to species composition, seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in the Isle Royale Wetland Complex.

Reptiles and Amphibians

Shelton (1975) listed the reptiles and amphibians found on Isle Royale, with notes on relative abundance and habitats. This list has been reproduced, with some revision of species names, in Appendix B-2. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational and commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in any of the 29 wetlands comprising the Isle Royale Wetland Complex.

Avifauna

An incomplete list of the birds of Isle Royale is presented in Table 11-3. The species listed may occur in the wetlands of this complex. However, the literature search provided no site-specific information pertaining to seasonal abundance, density and productivity, recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilize the Isle Royale Wetland Complex.

Mammals

No hunting or trapping has been permitted on the 29 wetlands of the Isle Royale Wetland Complex since 1940 when Isle Royale became a national park. Although wetland habitats have not been the main focus of any investigations, the mammalian fauna of Isle Royale has been a subject of study since 1909. Many early studies and some recent research can be found in the files of the National Park Service.

Only 16 mammalian species are found on Isle Royale. The probable usage of wetlands by these mammals is presented in Table 11-4. Moose (Alces alces), beaver (Castor canadensis), red fox (Vulpes vulpes), and the gray (timber) wolf (Canis lupus lycon) are the most studied mammalian species of Isle Royale.

Table 11-3. Birds of Isle Royale[a]

Species	Permanent resident	Summer resident	Winter resident	Migrant
common loon		C		C
red-throated loon (rare)				
red-necked grebe				U
horned grebe				C
pied-billed grebe		U		U
white pelican				R
double-crested cormorant		U		U
great blue heron		U		C
green heron (rare)				
American bittern		U		
mute swan (rare)				
whistling swan				R
Canada goose				C
snow goose				U
blue goose				R
mallard		U		U
black duck		C		
gadwall (rare)				
pintail				R
green-winged teal		U		
blue-winged teal		U		U
American wigeon (rare)				
northern shoveler (rare)				
wood duck		U		
redhead (rare)				
ring-necked duck		U		
greater scaup				C
lesser scaup				C
common goldeneye		C		C
bufflehead				C
oldsquaw				C
white-winged scoter				C
surf scoter (rare)				
common scoter				R
ruddy duck (rare)				
hooded merganser		U		C
common merganser		C		C
red-breasted merganser		C		
goshawk		R	U	
sharp-shinned hawk		U		C
Cooper's hawk.		U		U
red-tailed hawk		U		
red-shouldered hawk		R		
broad-winged hawk		C		C
rough-legged hawk				U

-continued-

Table 11-3. (continued)

Species	Permanent resident	Summer resident	Winter resident	Migrant
golden eagle (rare)				
bald eagle		R		
marsh hawk		U		U
osprey		U		
gyrfalcon			R	
peregrine falcon		R		
pigeon hawk		U		R
American kestrel		C		C
Virginia rail (rare)				
sora		U		U
American coot				R
semipalmated plover (rare)				
killdeer		U		U
black-bellied plover				U
American woodcock		U		
common snipe		R		U
whimbrel				R
spotted sandpiper		C		
solitary sandpiper		R		U
greater yellowlegs (rare)				
lesser yellowlegs (rare)				
least sandpiper (rare)				
semipalmated sandpiper (rare)				
sanderling (rare)				
herring gull		C		
ring-billed gull				U
Bonaparte's gull				U
common tern (rare)				
Caspian tern				R
mourning dove				R
yellow-billed cuckoo		R		R
black-billed cuckoo		R		
great horned owl	U			
snowy owl			U	
hawk owl	R			
long-eared owl (rare)				
short-eared owl (rare)				
saw-whet owl (rare)				
whip-poor-will		R		
common nighthawk		C		
chimney swift		U		
ruby-throated hummingbird		U		
belted kingfisher		C		
yellow-shafted flicker		C		C
pileated woodpecker	U			
red-headed woodpecker (rare)				

-continued-

Table 11-3. (concluded)

Species	Permanent resident	Summer resident	Winter resident	Migrant
yellow-bellied sapsucker		U		
hairy woodpecker	C			
downy woodpecker	C			
black-backed three-toed woodpecker	R			
northern three-toed woodpecker				R
eastern kingbird		C		
eastern phoebe		U		C
yellow-bellied flycatcher		U		
Traill's flycathcer		U		
least flycatcher		U		C
eastern wood pewee		U		U
olive-sided flycathcer		U		
horned lark				C
tree swallow		C		
bank swallow (rare)				
barn swallow		U		
cliff swallow		R		
purple martin (rare)				
house wren		R		
winter wren		C		
short-billed marsh wren		U		
wood thrush		R		
hermit thrush		U		
Swainson's thrush		C		
gray-checked thrush				U
veery		U		
ovenbird		C		
northern waterthrush		U		U
yellowthroat		U		U
bobolink		R		R
eastern meadowlark				R
red-winged blackbird		C		
Baltimore oriole				R
rusty blackbird				C
Brewer's blackbird				R
common grackle		C		
brown-headed cowbird		U		C
swamp sparrow		C		

[a]Taken from Shelton, 1975

KEY: C=common
U=uncommon
R=rare

Table 11-4. The Relative Abundance and Wetland Usage[a] of the Mammalian Species of Isle Royale

Common name	Relative abundance[b]	Wetland usage[c]
little brown myotis	P	foraging area
Keen's myotis	P	foraging area
big brown bat	P	foraging area
red bat	P	foraging area
snowshoe hare	C	cover
red squirrel	C-A	minor-S
beaver	C	primary
deer mouse	C	cover
muskrat	UC	primary
gray (timber) wolf	UC	foraging area
red fox	C	foraging area
ermine	R	foraging area
mink	UC	primary
river otter	UC	primary
lynx	R	foraging area
moose	C	foraging area

[a] adapted from Mech, 1966; Shelton, 1966; Jordan et al., 1967; Johnson, 1970; Nichols and Stones, 1971; Peterson, 1974, and Shelton, 1975.

[b] P=present, relative abundance not determined, R=rare, UC=uncommon, C=common, A=abundant

[c] based on whether wetland habitat is primary or minor habitat for breeding, nesting, raising of young, cover and foraging, S=found only in swamps or wooded wetlands

The moose herd of Isle Royale has drawn much attention as a classical problem in wildlife management (Murie, 1934; Hickie, 1936; Aldous and Kiefting, 1946; Krefting, 1951). After the arrival of moose to Isle Royale in 1912 or 1913, their numbers increased to a peak of 1000 to 3000 around 1930. No natural predators were present to limit population growth. The high population density predictably lead to overbrowsing of the island, to the depletion of the food supply, and ultimately to a dramatic reduction in population size to 100 moose by the mid 1930's. The habitat has recovered very slowly from the effects of overbrowsing. The number of moose on Isle Royale has increased slowly and has apparently been stable since the gray wolf arrived on this island (Mech, 1966). Predation by wolves is the most significant mortality factor for Isle Royale moose (Mech, 1962, 1966; Peterson, 1974); wolves typically select older moose and calves. In recent years, moose from the middle age classes have been more frequently taken by wolves. The change in prey selection has been linked to a nutritional stress caused by severe winters which moose from the middle age classes encountered during gestation. The degree of control exerted by wolf predation on moose numbers has a complex relationship with other environmental factors such as the severity of the winter.

The distribution of moose on Isle Royale varies seasonally (Mech, 1962, 1966; Peterson, 1974). The marshy areas in the northeastern third of the island are heavily utilized by moose in the spring. Usage of these areas decreases through the summer and ends by September. Few moose are found in the northeastern third of the island during winter; the highest concentrations of moose in the winter are found in swamps, coniferous cover, and burns. Raspberry Island is not utilized by moose (Snyder and Janke, 1976). The reproductive biology of Isle Royale moose has been described by several researchers (Murie, 1934; Mech, 1966; Jordan et al., 1971). The rut begins in early September to mid-October, and calving occurs from mid-may to mid-June. Twins are occasionally born, but triplets are very rare (Moll and Moll, 1976).

Aquatic plants and browse are important food times for Isle Royale moose (Aldous and Krefting, 1946; Krefting, 1951). Preferred species of aquatic plants include yellow water lilies (Nuphar advena), sedges (Cyperaceae), and pondweeds (Potemogeton spp.). Major browse species, in order of preference, are aspen (Populus tremuloides), paper birch (Betula papyrifera), balsam fir (Abies balsam), mountain ash (Sorbus americana), willow (Salix spp.), and red osier dogwood (Cornus stolonifera). Ground hemlock or American yew (Taxus canadensis) was a highly preferred browse but has almost disappeared as a result of browse pressure (Snyder and Janke, 1976).

The ecology of the beaver on Isle Royale has been documented by Shelton (1966). The northeast portion of the island provides the best beaver habitat because of an abundant food supply. Colonies in Washington Harbor, Grace Harbor, and Malone may have the longest history of continuous occupancy. Preferred food items are aspen, paper birch, willow, and aquatic vegetation, including yellow water lilly, pondweeds, and watershields (Bransenia scheberi). Beavers are the secondary prey of the gray wolf; dispersing two year old beavers are most commonly taken by wolves. The importance of beaver in the diet has increased for the wolves which hunt on the northeastern portion of the island (Peterson, 1974).

The feeding habits of the red fox on Isle Royale have been studied by Johnson (1969, 1970). Mammals were the most frequent prey of red fox (Table 11-5). The snowshoe hare (Lepus americanus) was the most important prey in all months except August and September. During these two months, fruits were consumed almost exclusively by red fox.

Table 11-5. Food Items of Red Fox on Isle Royale[a]

Common name	Percent occurrence
snowshoe hare	14.3
muskrat	8.3
red squirrel	7.9
deer mouse	7.1
moose (carrion)	0.2
beaver	0.1
Subtotal	37.9
plant matter	40.0
birds	9.2
insects	5.8
fish	3.6
amphibians and reptiles	1.4

[a] Johnson, 1969, 1970.

The reproductive biology of the snowshoe hare has been described by Johnson (1969). Breeding begins in late February to early April and ends in August. The first litters are born in mid-May. On the average, adult females have 1.95 litters per year. Mean litter size is 3.33 young, with a range of 2 to 5 young. Survivial of snowshoe hare is low on Isle Royale.

The reproductive biology of the red squirrel (Tamiasciurus hudsonicus) on Isle Royale has been discussed by Johnson (1969). Red squirrels have only one litter per year, and young are usually born in June. The mean litter size is 3.1 young, with a range of 3 to 4 young. The reproductive biology of the deer mouse (Peromyscus maniculatus) has also been described by Johnson (1969). Breeding begins in April and ends in late October; females typically have 3 to 4 litters per season. The mean litter size is 4.85 young, with a range of 2 to 7 young.

Endangered Species

The gray (timber) wolf (Canis lupus lycon), a species endangered in Michigan, has been present on Isle Royale since about 1948 (Hakala, 1954). Numbers of wolves have varied from 17 to 31 between 1959 and 1974. The ecology of the Isle Royale wolves has been studied intensively since 1958. The results of these studies (Mech, 1962, 1966; Shelton,1966; Jordan et al., 1967; Jordan et al., 1971; Wolfe and Allen, 1973; Peterson, 1974; and Wolfe, 1977) provide information on the social behavior of wolves, population dynamics, reproductive biology, and the predator-prey relationship of wolves and moose.

The 29 coastal wetlands of Isle Royale represent relatively unimportant habitat for the gray wolf but wetlands are visited during the course of hunting activities. The major and minor prey species of Isle Royale wolves are moose

and beaver, respectively. Coastal areas are hunted less frequently during winters when ice on harbors and bays is not well-developed.

Bird species observed on Isle Royale (Shelton, 1975) which are endangered in Michigan included the common tern (Sterna hirundo), the peregrine falcon (Falco peregrinus), and the double-crested cormorant (Phalacrocorax auritus). Those on the list of threatened species included the bald eagle (Haliaeetus leucocephalus), the osprey (Pandion haliaetus), the Cooper's hawk (Accipiter cooperii), the red-shouldered hawk (Buteo lineatus), the marsh hawk (Circus cyaneus), and the Caspian tern (Sterna caspia).

No other plants or animals appearing on the federal or state lists of endangered or threatened species (U.S. Fish and Wildlife Service, 1977; Michigan Endangered and Threatened Species Program, 1976) were documented in the Isle Royale Wetland Complex by the literature search.

Health

The environmental quality of Isle Royale Wetland Complex appears to be excellent.

CULTURAL SETTING LS 320-348

Population

The Isle Royale Wetland Complex is located on the island of Isle Royale, which is officially part of Keweenaw County, Michigan. Isle Royale has been one of the nation's better known National Parks since 1933. Owing to a combination of its status as a National Park and its isolated nature, the island has had no permanent population since the 1930's (Sheldon, 1975).

Land Use and Ownership

Land use within the Isle Royale Wetland Complex and the surrounding area is rural open space. The Isle Royale Wetland Complex does not contain many special features, with the exception of numerous trails, some camping sites, and a mining area. Trails are located in or near the following wetlands: Little Todd Harbor, Florence Bay-Pickett Bay, Pickett Bay Area, McCargoe Cove, Duncan Bay, Hidden Lake, Tobin Harbor, Moose Lake, Tobin Creek, Raspberry Island (Isle Royale), Siskiwit Mine Area, Maskey Basin Campground, Lake Richie Outlet, Malone Bay Area, Caribou Creek, Francis Point Area, and Attwood Beach Area Wetlands. Campgrounds are located near McCargoe Cove Wetland, Maskey Basin Campground Wetland, and Malone Bay Area Wetland. The mining area is located south of Siskiwit Mine Area Wetland. The wetlands are under federal ownership and their location suggests that they are subject to minimal development pressure (U.S.G.S. topographic map, Isle Royale National Park, Michigan, scale 1:62500, 1957-70).

Recreation

The Isle Royale Wetland Complex is within Isle Royale National Park. Recreational activities permited in the park include fishing, camping, and hiking, and cabins are available (Center for Urban Regional Affairs, University of Minnesota, 1973).

Mineral, Energy, and Forest Resources

No potential mineral or energy resources are known to be present in the vicinity of the Isle Royale Wetland Complex but the Isle is wooded and represents a potential forest resource.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Isle Royale Wetland Complex (U.S.G.S. topographic map, Isle Royale National Park, Michigan, 1957-1970).

Pollution Sources

There are no NPDES permit holders adjacent to the Isle Royale Wetland Complex (Minnesota Pollution Control Agency, Permits Section, 1978). No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

The Siskiwit Mine is located just south of Siskiwit Mine Area Wetland. The mine was once one of the more productive operations on Isle Royale; mining operations were initiated in 1847 and were halted in 1855 owing to technical and financial problems (Rabestraw, 1966). The Haytown Mine is located just to the northeast of Pickett Bay Area Wetland. This mine was initiated by the Pittsburgh and Isle Royale Mining Companies in 1847. Several other mines and exploration sites were initiated along the shoreline of Todd Harbor, but the Haytown Mine produced the only profitable ore. The Haytown operation was abandoned by 1853, probably because of its isolated location and lack of protection from northerly gales (Rabestraw, 1965).

The Michigan Inventory of Coastal Sites indicates that three archaeological sites are located in the vicinity of Siskiwit Mine Wetland. Sites 20-IR-40 and 20-IR-37 are aboriginal copper mines, while site 20-IR-41 is a historical copper mine. The Michigan Inventory of Coastal Sites indicates that one archaeological site (20-IR-96, also an aboriginal copper mine) is located in the vicinity of Grace Harbor Wetland. Two archaeological sites are located near Malone Bay Area, site 20-IR-99 is an Indian Portage Trail and Site 20-IR-8 is a habitation of an unknown culture and time period. Two archaeological sites are located in the vicinity of Hay Bay Area Wetland; site 20-IR-101 is an aboriginal copper mine and site 20-IR-3 is a habitation of an unknown culture and time period. Site 20-IR-1, a habitation of an unknown culture and date is located near Chippewa Harbor Area Wetland. Two archaeological sites (20-IR-27 and 20-IR-28, habitations of the Woodland

culture) are located in the vicinity of McCargoe Cove Wetland. Further information concerning field research and the exact location of these sites can be obtained from the Michigan History Division.

RESEARCH PROJECTS

LS 320-348

The literature search identified no on-going or impending research projects pertaining to the Isle Royale Wetland Complex.

Table 11-6. Data Gaps-Lake Section 11

320-348

Data Gap*		Wetland Number	
Physiographic Setting		Setting	
		Topography	
		Surficial Geology	
		Soils	*
	Hydrology	Water Level Fluctuations	*
		Groundwater	*
		Water Quality	*
		Depth	*
		Seasonal Changes	*
		Climate	
		Special Features	
Biotic Setting	Vegetation	Major Species Distribution	*
		Major Species Composition	*
		Density/Productivity	*
		Relationship to Water Levels	*
	Fish	Major species	*
		Species Composition	
		Seasonal Distribution	*
		Spawning and Hatching Areas	*
		Commercial/Recreational Use	*
		Life Histories	*
		Food Sources	*
	Invertebrates	Species Composition	*
		Seasonal Distribution	*
		Density/Productivity	*
		Food Sources	*
		Relationship to Water Levels	*
	Amphibians/Reptiles	Major Species	*
		Seasonal Distribution	*
		Density/Productivity	*
		Recreational/Commercial Use	*
		Life Histories	*
		Food Sources	*
		Relationship to Water Levels	*
	Avifauna	Major Species	*
		Seasonal Distribution	*
		Density/Productivity	*
		Recreational/Commercial Use	*
		Life Histories	*
		Food Sources	*
		Relationship to Water Levels	*
	Mammals	Major Species	
		Seasonal Distribution	
		Density/Productivity	
		Recreational/Commercial Use	
		Life Histories	
		Food Sources	
		Relationship to Water Levels	
		Endangered Species	
		Health	*
Cultural Setting		Population	
		Land Use and Ownership	
		Recreation	
		Mineral, Energy, Forest Resource	
		Public Utilities/Facilities	
		Point Pollution Sources	
		Non-Point Pollution Sources	
		Historic Features	
		Archeologic Features	

SUMMARY

PHYSIOGRAPHIC SETTING

The information necessary to prepare the setting, topography, surficial geology, soil, hydrology, climate, and special features elements for each wetland description was gathered from U.S.G.S. quadrangle maps, publications of the Great Lakes Basin Commission, and published as well as open file material of various agencies of the States of Michigan, Wisconsin, and Minnesota. The wetlands of Lake Superior are palustrine in nature and frequently are partially or wholly wooded. These areas typically have low relief and are underlain by rock, lake bed sand, lake bed clay, glacial till or lacustrine sediments. Wetland soils, where known, are loams, peats, or sands. The growing season for wetland vegetation extends from almost four months to almost seven months. Annual precipitation ranges from 23.08 to 39.19 inches. Special features are almost entirely absent.

BIOTIC SETTING

Vegetation

The available literature provides little current site-specific information regarding major species composition, density and productivity, or relationship of vegetation to water levels in the coastal wetlands of Lake Superior. However, limited information is available regarding major species composition of some wetlands near Duluth, on the Keweenau Peninsula and on Isle Royale. Lakela (1939) provides a sound historical record of vegetational composition of Minnesota Point, while the forest history of Isle Royale is well documented by Cooper (1913). Much of the available information concerning vegetational composition of Lake Superior wetlands is found in literature concerning wildlife, or is currently unavailable as the information is maintained in the open files of state departments of natural resources.

Vegetation in the Lake Superior coastal zone is more Northern in aspect than that of the lower Great Lakes. Species such as paper birch (Betula papyrifera), yellow birch (Betula lutea), quaking aspen (Populus tremuloides), white spruce (Picea glauca), black spruce (P. mariana) predominate the woody cover. While major herbaceous wetland genera present in the lower Great Lakes are generally represented in Lake Superior wetlands, a distinct shift in species composition occurs.

Fish

There have been no comprehensive surveys of the fishes in coastal wetlands of Lake Superior. However, it is possible to extrapolate the utilization by fishes of coastal wetlands when habitat preferences of species are known, by consulting literature dealing with fishes in adjacent deepwater habitats (lakes, ponds, streams, and nearshore waters).

Moore and Braem (1965) and Taylor (1954) compiled lists of fish species from many U.S. streams tributary to Lake Superior. Where these streams were associated with coastal wetlands, it was possible to extrapolate which species were most likely to utilize those wetlands. Similar fishery surveys of tributary streams and coastal ponds, many of which are associated with coastal wetlands, have been conducted and published (often in-house only) by the Michigan Department of Natural Resources, Institute for Fisheries Research. The state of Wisconsin has developed a mapping and inventory program for fish and wildlife habitat in its coastal zone. The fisheries component of this program was based primarily on lists of species from tributaries, swamps, marshes, lakes, and ponds of the coastal zone as originally reported in the "Surface Water Resources" series developed for each county by the Wisconsin Department of Natural Resources and cited throughout this volume. Fishes in streams and embayments associated with the major coastal wetlands in Minnesota, which are concentrated in the Duluth-Superior area, were surveyed by the University of Wisconsin at Superior in connection with studies of red clay erosion and turbidity problems in the region. Environmental impact statements filed by the U.S. Army Corps of Engineers concerning harbor maintenance activities were occasionally useful in extrapolating fish community composition of coastal wetlands adjacent to such harbors. Unpublished test-netting and ichthyological collection data of the Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Michigan Department of Natural Resources, University of Michigan Museum of Zoology, and collections at other academic institutions may be consulted for further data concerning fishes in the coastal wetlands of Lake Superior.

The lack of intensive human activity in the Lake Superior basin has caused few, and relatively ephemeral, changes in the fish community of the lake in general (Lawrie and Rahrer, 1973). The commercially important salmonid stocks of the lake have been overexploited and generally depleted, but these species are not directly associated with coastal wetlands. Of those nearshore species which utilize coastal wetlands, apparently little change in abundance has been documented except in localized areas of more intensive cultural activity, such as in harbors and shipping channels and in the area of red clay turbidity in the far western coastal region. Table 4 documents relative abundances of fish species which probably utilize the coastal wetlands of Lake Superior. Since Lake Superior is the nothernmost of the Great Lakes, many species common in warmer coastal wetlands of the other four lakes are absent or uncommon in Lake Superior.

Although many species of fish utilize coastal wetlands, relatively few species in the Great Lakes basin are strongly dependent on aquatic vegetation for spawning, feeding, or cover. The more common wetland-dependent species found in the Lake Superior coastal region (Table 4) include central mudminnow (Umbra limi), northern pike (Esox lucius), goldenshiner (Notemigonus crysoleucas), blacknose shiner (Notropis heterolepis), blackchin shiner (Notropis heterodon), brook stickleback (Culaea inconstans), banded killifish (Fundulus diaphanus), and Iowa darter (Etheostoma exile). The northern pike is a popular game fish. Several other species are largely restricted to vegetated waters and are uncommon or rare in the region, primarily because most are at their northern range limits. These are the longnose gar (Lepisosteus osseus), bowfin (Amia calva), pugnose shiner (Notropis anogenus), tadpole madtom

Table 4. Relative Abundances of Fish Species Known or Presumed to Utilize the Coastal Wetlands of Lake Superior[a]

Family and Species	Relative Abundance[b]
Lepisosteidae	
longnose gar[c]	U
Amiidae	
bowfin[c]	U
Clupeidae	
gizzard shad[c]	U
Umbridae	
central mudminnow	A
Esocidae	
northern pike	C
muskellunge	U
Catostomidae	
white sucker	A
Cyprinidae	
carp	C
goldfish	R
pugnose shiner	R
goldenshiner	C
blackchin shiner	C
blacknose shiner	C
spottail shiner	A
mimic shiner	C
emerald shiner	A
sand shiner	C
fathead minnow	A
bluntnose minnow	A
brassy minnow	C
Ictaluridae	
channel catfish[c]	U
yellow bullhead	C
black bullhead	C
brown bullhead[c]	U
tadpole madtom[c]	U
Cyprinodontidae	
banded killifish	C
Percopsidae	
trout-perch	C
Centrarchidae	
largemouth bass	C
smallmouth bass	C
rock bass	C
black crappie	C
green sunfish[c]	U
bluegill	C
pumpkinseed[c]	U
Percichthyidae	
white bass	U
Percidae	
walleye	C
yellow perch	A
log perch	C
johnny darter	C
Iowa darter	C
Gasterosteidae	
brook stickleback	C
Sciaenidae	
freshwater drum[c]	U
Cottidae	
mottled sculpin	C

[a] Jaworski and Raphael, 1978; Hubbs and Lagler, 1958; Scott and Crossman, 1973

[b] A=abundant; C=common; U=uncommon; R=rare

[c] Species of more southerly ranges with northern range limit in Lake Superior.

(Noturus gyrinus), and pumpkinseed (Lepomis gibbosus). The muskellunge (Esox masquinongy), another important game fish, is apparently common locally in certain streams and marshes but is not as widespread as the northern pike.

Other species found in the Lake Superior coastal region occur commonly in coastal wetlands, although they occupy other habitats as well. These include common species such as the carp (Cyprinus carpio), bluntnose minnow (Pimephales notatus), fathead minnow (Pimephales promelas), white sucker (Catostomus commersoni), black bullhead (Ictalurus melas), yellow bullhead (Ictalurus natalis), bluegill (Lepomis macrochirus), largemouth bass (Micropterus salmoides), black crappie (Pomoxis nigromaculatus), and yellow perch and rare or uncommon species like the goldfish (Carassius auratus), brown bullhead (Ictalurus nebulosus), and gizzard shad (Dorosoma cepedianum), all of which prefer low-gradient waters with mud or clay bottoms and have an affinity for, but are not dependent on, aquatic vegetation. Such species are generally cover-oriented and may be encountered in sheltered riverine and lacustrine coastal wetlands. All except the bluntnose minnow, fathead minnow, goldfish, and gizzard shad are potentially important game fish.

Common species such as the white sucker, sand shiner (Notropis stramineus), mimic shiner (Notropis volucellus), brassy minnow (Hybognathus hankinsoni), smallmouth bass (Micropterus dolomieui), rock bass (Ambloplites rupestris), logperch (Percina caprodes), johnny darter (Etheastoma nigrum), mottled sculpin (Cottus bairdi), and the less common green sunfish (Lepomis cyanellus), are generally associated with lotic waters and clean, sand, gravel, or rocky bottoms. These species are common in streams, but they are also probably common in Lake Superior coastal waters with similar habitat characteristics, including deep Lacustrine wetlands with sand or gravel bottoms. The white sucker, green sunfish, rock bass, and smallmouth bass are potentially important game species. Among commercial and game species, the walleye (Stizostedion vitreum) and the salmonids are not generally associated with coastal wetlands, although they may occur in them incidentally. Other species of commercial, recreational, or forage importance, such as the emerald shiner (Notropis atherinoides), spottail shiner (Notropis hudsonius), channel catfish (Ictalurus punctatus), white bass (Morone chrysops), and freshwater drum (Aplodinotus grunniens) often occur in low-gradient waters adjacent to coastal wetlands, although they are not regarded as wetland species.

Beyond a general knowledge, often indirect and fragmentary, of the species composition of the fish fauna of Lake Superior coastal wetlands, little is known about the actual relationships of the fishes to the wetlands in terms of their utilization for spawning, nursery, or feeding areas, or fish community structure, niche occupation, and interspecific relationships within wetlands. The coastal wetlands of Lake Superior support a mixed coldwater-warmwater fish fauna, of which the warmwater component is much less significant than the other four Great Lakes. Many of the species directly associated with the coastal wetlands are important or potentially important as recreational, commercial, or forage species which depend on the wetlands for food, cover, and spawning and nursery habitat. The distribution of these species among coastal wetlands is probably dependent on conditions of shelter, bottom type, water clarity, depth, chemical composition, and types and density of aquatic vegetation. The more extensive Lacustrine and Riverine coastal wetlands are potentially of greater

economic and biological importance in terms of the biomass and diversity of species they support. However, large palustrine wetlands, given sufficient winter oxygen levels or at least seasonal surface water connections to the lake or its tributaries, may be significant fish habitats. However, insufficient information is available to permit evaluation of the individual coastal wetlands of Lake Superior in terms of their importance to fish production for commercial and recreational exploitation or as preserves for unique fish species or communities.

Invertebrates

The invertebrate fauna of Lake Superior wetlands is poorly documented. The basis for the paucity of information is twofold. First, the invertebrate fauna of these wetlands frequently must be inferred from studies specifically concerned with the fauna of the nearshore zone, harbors, and/or tributaries, and sampling programs for these efforts normally restrict the number of study sites within wetland boundaries.

Secondly, wetland habitats are diverse. The diversity of species is exceeded only by the complexity of sampling procedures required to properly assess their numbers. The taxonomy and systematics of many groups of organisms common to wetlands have been poorly studied. The latter problem alone is sufficient to deter all but the most intrepid ecologist. The knowledge required to properly identify the diversity of wetland invertebrates is scattered among several score of taxonomic specialists. These problems combine to prevent any comprehensive characterization of the invertebrate fauna of wetlands. In contrast, open water habitats in the nearshore zone, harbors and stream channels are relatively easy to sample and the fauna is relatively well known.

Overall environmental impact statements of harbor improvements have provided distribution data for macrobenthic indicator species. The remainder of the information reported in this volume was gleaned from regional and watershed surveys, which represent historical rather than current sources.

Reptiles and Amphibians

Little site-specific information concerning reptiles and amphibians in the coatal wetlands of Lake Superior and its downstream connecting waters is available in published sources. The general and dated works of Ruthven et al. (1928), Pope and Dickenson (1928), Ruthven (1904), and Thompson and Thompson (1913), and the more recent but very general work of Conant (1975) provided some basis for extrapolating the presence of certain species in the coastal wetlands, given known ranges and habitat. Thompson and Thompson (1913) provided some site-specific information on the herpetofauna of the Whitefish Point region of Chippewa County, Michigan, including some coastal wetlands. Also Stadnyk (1974) provided some information on the herpetofauna of Stockton Island (Apostle Islands) wetlands. Unpublished collection data at museums and academic institutions in Michigan, Wisconsin, and Minnesota probably comprise the bulk of information available on reptiles and amphibians of Lake Superior coastal wetlands. The University of Michigan, Museum of Zoology and the Milwaukee Public Museum in particular, as well as other academic institutions, should be consulted for pertinent data.

The total assemblage of reptiles and amphibians recorded in the U.S. coastal region of Lake Superior can be divided into four major groups: (1) those species almost always found in wetlands and somehow dependent on wetland habitats to the degree that they are uncommon elsewhere; (2) aquatic and semi-aquatic species found in a wide range of lowland wet habitats, including coastal wetlands; (3) lowland terrestrial species which enter water (including wetlands) only incidentally or to breed; and (4) aquatic, semi-aquatic, and terrestrial species found primarily in upland or lotic water habitats and generally not encountered in coastal wetlands. The latter are not discussed here. Three species and subspecies recorded in the literature as occurring in the U.S. coastal zone of Lake Superior are largely wetland-dependent: the mudpuppy (Necturus maculosus), the central newt (Notophthalmus viridescens louisianensis), and the western fox snake (Elaphe vulpina vulpina). The mudpuppy is largely an open lake species which is probably most common around large Lacustrine and Riverine wetlands with submersed aquatic vegetation, whereas the central newt is found primarily in small ponds and sheltered palustrine or riverine wetlands. The western fox snake is common primarily in coastal emergent wetlands.

Amphibians found in a wide range of lowland wet or aquatic habitats in the Lake Superior coastal zone include Tremblay's salamander (Ambystoma tremblayi), blue-spotted salamander (Ambystoma laterale), spotted salamander (Ambystoma maculatum), eastern tiger salamander (Ambystoma triseriata triseriata), boreal chorus frog (Pseudacris triseriata maculata), bullfrog (Rana catesbeiana), green frog (Rana clamitans melanota), pickerel frog (Rana palustris), northern leopard frog (Rana pipiens), and mink frog (Rana septentrionalis). The salamanders and tree frogs (Hyla, Acris, and Pseudacris) may often be found in moist habitats distant from open water, but their larvae are aquatic. Aquatic and semi-aquatic reptiles which probably occur in coastal wetlands or their margins along the U.S. shore of Lake Superior include northern ringneck snake (Diadophis punctatus edwardsi), northern water snake (Natrix sipedon sipedon), northern red-bellied snake (Storeria occipitomaculata occipitomaculata), eastern garter snake (Thamnophis sirtalis sirtalis), snapping turtle (Chelydra serpentina), Blanding's turtle (Emydoidea blandingi), map turtle (Graptemys geographica), midland painted turtle (Chrysemys picta marginata), and western painted turtle (Chrysemys picta bellii).

Several amphibians in the coastal zone of Lake Superior are largely terrestrial, although they are found in lowland areas and are dependent on water for breeding. Consequently the adults or larvae may occur in coastal wetlands or their margins at least seasonally. These species include the red-backed salamander (Plethodon cinereus cinereus), American toad (Bufo americanus americanus), Fowler's toad (Bufo woodhousei fowleri), and the wood frog (Rana sylvatica). Terrestrial reptiles which may occur in the margins of Lake Superior coastal wetlands or incidentally in the wetlands themselves, include the wood turtle (Clemmys insculpta), eastern smooth green snake (Opheodrys vernalis vernalis), and eastern hognose snake (Heterodon platyrhinos).

Although few species of reptiles and amphibians are absolutely dependent on the coastal wetlands of Lake Superior for habitat, the continued abundance of most species in the coastal zone probably depends on the presence of extensive coastal wetlands. The relatively undisturbed coastal habitat along most of Lake

Superior probably supports a present herpetofauna similar in species composition and relative abundance to that of pre-settlement times. Table 5 lists the species known or presumed to occur in or adjacent to the coastal wetlands of Lake Superior, as well as their relative abundances and distributions along the coast. Given the scarcity of published records, Table 5 is largely speculative. The presence of water, food, and cover, as well as relative isolation from the cultural development which occurs around many bodies of water, are among the factors that contribute to the importance of wetlands in maintaining the coastal zone herpetofauna. No published information was found pertaining to recreational or commercial importance of the coastal zone herpetofauna, but the bullfrog, green frog, and snapping turtle are edible species that may be harvested. In addition, reptiles and amphibians may serve as food sources for many species of fish, birds, and mammals in coastal wetlands or may themselves (e.g. northern water snake, snapping turtle) be predators of economically important fish and wildlife. Beyond general background on the occurrence and relative abundance of reptiles and amphibians in the coastal region, no published information was found pertaining to population and community structure and dynamics of the herpetofauna in coastal wetlands.

Avifauna

Published information pertaining to the avifauna of the coastal wetlands of Lake Superior was available for the Wisconsin shoreline, while data for Michigan were limited to the St. Marys River. The seasonal occurrence of birds in habitat types was recorded in the Apostle Islands by Harris (1977) and Stadnyk et al. (1974), in the Duluth-Superior harbor by Niemi et al. (1977) and on Isle Royale by Shelton (1975). The Michigan and Wisconsin Departments of Natural Resources provided open file data on bird censuses, spring waterfowl migrations and waterfowl management. Historical data on the summer birds of the Wisconsin shoreline was found in Jackson (1941, 1942, 1943).

The wetlands along the St. Marys River, Chequamegon Bay, the Apostle Islands and the Duluth-Superior harbor area provide nesting, feeding, and resting habitat for waterfowl, waterbirds, shorebirds, wading birds, marshbirds, raptors, and passerines. Avian species recorded for Lake Superior coastal wetlands are listed in Table 6. Several endangered and threatened species are included.

The Apostle Islands are suitable nesting habitat for bald eagles (Haliaeetus leucocephalus) and common loons (Gavia immer), although no current nesting activity has been noted for the bald eagle. The habitat along the St. Marys River supports nesting ospreys (Pandion haliaetus) and common terns (Sterna hirundo) in addition to bald eagles. Bald eagle nesting activity has also been documented in Chequamegon Bay. Uncommon species along Lake Superior such as American coot (Fulica americana), glaucous gull (Larus hyperboreus), yellow-headed blackbird (Xanthocephalus xanthocephalus), and black-crowned night heron (Nycticorax nycticorax) have been reported in the Duluth-Superior harbor area. Species of waterfowl commonly reported for Lake Superior include mallards (Anas rubripes), blue-winged teal (A. discors), American wigeon (A. americana), and wood ducks (Aix sponsa).

Table 5. Reptiles and Amphibians of the U.S. Coastal Zone of Lake Superior, their Relative Abundances, and General Distribution Along the Coast[a]

Order and Species	Relative Abundance[b]	Distribution
Caudata		
mudpuppy	C	entire coast
central newt	C	entire coast
Tremblay's salamander	U	Ashland and Bayfield Counties, Wisc.
spotted salamander	C	coastal Michigan only
blue-spotted salamander	C	entire coast
eastern tiger salamander	U	north shore only
four-toed salamander	C	coastal Michigan only
red-backed salamander	A	entire coast
Anura		
American toad	C	entire coast
Fowler's toad	R	Stockton Island, only record
western chorus frog	U	primarily coastal Wisconsin
boreal chorus frog	C	entire north shore and Wisconsin Coast
northern spring peeper	C	entire coast
gray treefrog	C	entire coast
bullfrog	C	most of southern coast
green frog	C	entire coast
wood frog	C	entire coast
mink frog	C	entire coast
northern leopard frog	C	entire coast
pickerel frog	C	entire south coast
Squamata		
five-lined skink	?	Marquette and Alger Counties, Michigan
northern ringnecked snake	C	entire coast
eastern smooth green snake	C	entire southern coast
eastern hognose snake	U	Duluth-Superior area only
western fox snake	C	coastal Michigan only, except extreme eastern Upper Penninsula
northern water snake	A	entire southern coast except Keweenaw Peninsula area
northern red-bellied snake	C	entire coast
eastern garter snake	A	entire coast
Testudines		
wood turtle	?	Michigan coast only
snapping turtle	C	entire coast
map turtle	U	Duluth-Superior area only
Blanding's turtle	U	Marquette and Alger Counties, Mich.
western painted turtle	C	entire coast
midland painted turtle	C	primarily Mackinac and Chippewa Counties Michigan

[a]Conant, 1975; Ruthven et al., 1928; Pope and Dickinson, 1928; Thompson and Thompson, 1913; Stadnyk et al. 1974

[b]A=abundant; C=common; U=uncommon; R=rare

Table 6. Avian Species Recorded for Lake Superior Coastal Wetlands

Waterfowl

whistling swan
Canada goose
snow (blue) goose
mallard
black duck
gadwall
pintail
green-winged teal
blue-winged teal
American wigeon
northern shoveler
wood duck
redhead
ring-necked duck
canvasback
greater scaup
lesser scaup
common goldeneye
bufflehead
oldsquaw
white-winged scoter
surf scoter
ruddy duck
hooded merganser
common merganser
red-breasted merganser

Waterbirds

common loon
horned grebe
pied-billed grebe
white-pelican
double-crested cormorant
Virginia rail
sora
common gallinule
American coot

Wading Birds

great blue heron
green heron
black-crowned night heron
American bittern
least bittern
sandhill crane

Shorebirds

piping plover
semipalmated plover
killdeer
American golden plover
black-bellied plover
ruddy turnstone
American woodcock
common snipe
whimberal
spotted sandpiper
willet
greater yellowlegs
lesser yellowlegs
least sandpiper
dunlin
short-billed dowitcher
stilt sandpiper
semipalmated sandpiper
sanderling

Gulls and Terns

glaucous gull
herring gull
ring-billed gull
Bonaparte's gull
Forster's tern
common tern
Caspian tern
black tern

Raptors

bald eagle
osprey
goshawk
sharp-shinned hawk
Cooper's hawk
red-tailed hawk
broad-winged hawk
rough-legged hawk
marsh hawk
American kestrel
short-eared owl

-continued-

Table 6. (concluded)

Perching Birds	Perching Birds (cont'd)
eastern kingbird	rusty blackbird
long-billed marsh wren	Brewer's blackbird
short-billed marsh wren	common grackle
wood thrush	brown-headed cowbird
hermit thrush	savannah sparrow
Swainson's thrush	swamp sparrow
gray-checked thrush	
veery	Other Birds
ovenbird	
northern waterthrush	black-billed cuckoo
bobolink	yellow-billed cuckoo
yellow-headed blackbird	common nighthawk
red-winged blackbird	belted kingfisher
northern oriole	common flicker

Mammals

The results of the literature search indicate that relatively little is known about the mammals in specific wetlands of Lake Superior. Sources such as technical reports, management plans, and environmental impact statements provided some site-specific material regarding key and major species and the recreational and commercial usage of Lake Superior wetlands with respect to mammalian fauna. Open file reports and data sheets of the Wisconsiin Department of Natural Resources from the wetland classification program (Thompson et al., 1976) and the scientific Areas Preservation Council contain much site-specific information. Although some information from these sources has been included in this document, a complete analysis of these sources is beyond the scope of this project. Other published literature, particularly regional surveys (Wood, 1917; Jackson, 1920; Manville, 1948, 1950; Pruitt, 1951; Beals et al., 1960; Timm, 1975), supply information that is useful for a general characterization of some Lake Superior Wetlands. An assessment of the value of Michigan's coastal wetlands (Jaworski and Raphael, 1978) provide general material relating to the recreational and commercial use of wetland mammals. Many studies of mammals have been conducted on Isle Royale, but the majority of these studies were concerned with the island as a whole and not specifically with wetland habitat.

The coastal wetlands of Lake Superior harbor many mammalian species (Table 7). Coastal wetlands are essential habitat for the masked shrew (Sorex cinereus), beaver (Castor canadensis), muskrat (Ondatra zibethicus), mink (Mustela vison), river otter (Lutra canadensis), and moose (Alces alces). Red squirrels (Tamiasciurus hudsonicus) utilize wooded wetlands. The Norway rat (Rattus norvegicus) is found only on the wetlands near Duluth-Superior City which are in close proximity to highly developed areas. Black bears (Ursus americanus) use wetlands only as foraging areas and are not frequently observed on Lake Superior wetlands. Moose are found commonly on the wetlands of Isle Royale but are rarely observed on other wetlands of Lake Superior. Furbearers are a valuable resource in most Lake Superior wetlands, particularly in the Munuscong Bay area. Larger wetlands associated with rivers and streams are typically good habitat for muskrat and have high recreational and commercial value for trappers.

Table 7. Mammals Which May Utilize the Coastal Wetlands of Lake Superior

Common Name	Common Name
masked shrew	coyote
short-tailed shrew	red fox
snowshoe hare	black bear
eastern cottontail	raccoon
red squirrel	weasel (spp.)
beaver	mink
meadow vole	river otter
muskrat	white-tailed deer
norway rat	moose

Endangered Species

Seven species of fishes which are associated with aquatic vegetation are listed as endangered, threatened, or placed on watch status by the state of Wisconsin. These are the pugnose shiner (Notropis anogenus) (endangered), redfin shiner (Notropis umbratilis) (threatened), weed shiner (Notropis texanus) (threatened), starhead topminnow (Fundulus notti) (threatened), pugnose minnow (Notropis emiliae) (watch), lake chubsucker (Erimyzon sucetta) (watch), and pirate perch (Aphredoderus sayanus) (watch). No site-specific literature records were located indicating the presence of any of these species in coastal wetlands of Lake Superior. None of the fishes listed as endangered, threatened, or rare by the U.S. Department of the Interior or by the states of Minnesota and Michigan are generally associated with wetlands in the Lake Superior region.

The following species of amphibians and reptiles which may occur in coastal wetlands of Lake Superior have been assigned endangered, threatened, rare, or watch status: four-toed salamander (Hemidactylium scutatum) (rare, Michigan), Tremblay's salamander (Ambystoma tremblayi) (watch, Wisconsin), pickerel frog (Rana palustris) (threatened, Wisconsin), bullfrog (Rana catesbeiana) (watch, Wisconsin), Blanchard's cricket frog (Acris crepitans blanchardi) (watch, Wisconsin), and Blanding's turtle (Emydoidea blandingi) (watch, Wisconsin). Although these species are documented in the general coastal region of Lake Superior, no site-specific literature records indicated their presence in the coastal wetlands. No species protected by the U.S. Department of the Interior were documented in Lake Superior coastal wetlands.

Several endangered and threatened species of birds have been documented in the wetlands of Lake Superior. Recent nesting activity by the bald eagle (Haliaeetus leucocephalus) has been recorded in the Apostle Islands by Harris (1977) and Stadnyk et al. (1974), along the St. Marys River by Weise and Schemenauer (1976) and on Chequamegon Bay by Wisconsin Department of Natural Resources personnel (1970, 1971, and 1976). Reports of nesting ospreys (Pandion haliaetus) have been limited to the St. Marys River, but transient and summering ospreys have occasionally been reported along the entire coastal zone of Lake Superior. Common terns (Sterna hirundo) have also been recorded in the vicinity of coastal wetlands, as has the double-crested cormorant (Phalacrocorax auritus); both are endangered in Michigan. The Isle Royale bird population includes species threatened in Michigan such as the Cooper's hawk (Accipiter cooperii), the red-shouldered hawk (Buteo lineatus), the marsh hawk (Circus cyaneus), and the Caspian tern (Sterna caspia) (Van Ballenberghe, 1972).

According to a regional study on the movement and ecology of the timber wolf (Canis lupus lycon) the coastal wetlands of Lake Superior are occasionally used by this mammal for foraging. The timber wolf is an endangered species in Michigan, Wisconsin, and Minnesota.

CULTURAL SETTING

The information necessary to prepare the population portion of each wetland description was gathered from publications of various regional planning

agencies, colleges, and universities, and the U.S. Census Bureau. With the exception of wetlands in the vicinity of Duluth, Minnesota-Superior, Wisconsin, the coastal wetlands of Lake Superior are located in sparsely populated areas which are expected to undergo increases in population. A slow decline in population is projected for the Duluth-Superior region.

The remaining elements of each wetland description were prepared from personal interviews, correspondence interrogatories, various federal, private, and state registers, publications of regional and state planning agencies, colleges, and universities, and U.S.G.S. quadrangle maps. Coastal wetlands typically exist as rural open space or rural wooded space under private or state ownership, and are subject to low or moderate development pressure. Public ownership is usually represented by wetlands within the confines of state and national forests or parks. Recreation within a wetland proper is limited in scope, although all state forest lands in Michigan are open for camping unless posted otherwise.

The potential for stone, sand and/or gravel, copper, and forest resource extraction exists in a number of Lake Superior coastal wetlands. Wetlands, like many other areas, are crossed by electric transmission lines, telephone lines, pipelines, and a diversity of roadways. No point source discharges of pollutants were noted within the limits of a coastal wetland; in several instances there are wastewater discharges located in the vicinity of a wetland, but in no case was the impact of the discharge on the respective wetland documented. Known archaeological and historical sites are uncommon except in the Apostle Islands National Lakeshore and on Isle Royale. There are very few wetland research efforts under way in the Lake Superior coastal wetlands.

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Appendix D - Endangered Species

D-1. Endangered or Threatened Species in the States Surrounding Lake Superior

Appendix A-1. Fish Species Associated with Coastal Wetlands of Michigan, Wisconsin, and Minnesota[a]

Family and Species	Family and Species
Lepisosteidae	Ictaluridae
longnose gar	channel catfish
Amiidae	yellow bullhead
bowfin	black bullhead
Clupeidae	brown bullhead
gizzard shad	tadpole madtom
Umbridae	Cyprinodontidae
central mudminnow	banded killifish
Esocidae	Percopsidae
northern pike	trout-perch
muskellunge	Centrarchidae
Catostomidae	largemouth bass
white sucker	smallmouth bass
silver redhorse	green sunfish
golden redhorse	bluegill
shorthead redhorse	longear sunfish
lake chubsucker	pumpkinseed
Cyprinidae	black crappie
carp	Percidae
goldfish	yellow perch
pugnose minnow	walleye
blackchin shiner	logperch
blacknose shiner	johnny darter
spottail shiner	Iowa darter
emerald shiner	least darter
goldenshiner	Gasterosteidae
fathead minnow	brook stickleback
brassy minnow	Cottidae
	mottled sculpin

[a]Jaworski and Raphael (1978); Hubbs and Lagler (1958); and Trautman (1957)

Appendix A-2. Fish Species from Stream Mouths, Sheltered Coves, Wetlands, Boggy Streams, Beaver Ponds, and Dystrophic Lakes of Isle Royale, Keweenaw County, Michigan[a]

Family and Species	Family and Species
Esocidae	Gasterosteidae
northern pike	brook stickleback
muskellunge	ninespine stickleback
Cyprinidae	Percopsidae
lake chub	trout-perch
longnose dace	
finescale dace	Percidae
northern redbelly dace	yellow perch
goldenshiner	Iowa darter
blacknose shiner	
fathead minnow	Cottidae
	slimy sculpin
Catostomidae	mottled sculpin
white sucker	

[a]From Hubbs and Lagler (1947). Some of these species, though not specifically associated with wetland habitats, occur in shallow lentic, or base gradient, waters near which wetlands on the island are situated. Such species may occur incidentally in wetlands.

Appendix B-1. Records of Reptiles and Amphibians from Coastal Counties oj Michigan and Wisconsin on Lake Superior and St. Marys River*

Order and Species	Michigan[a]									Wisconsin[b]			
	Chippewa	Luce	Alger	Marquette	Baraga	Houghton	Keweenaw[c]	Ontonagon	Gogebic	Iron	Ashland	Bayfield	Douglas
Caudata													
mudpuppy		X	X			X	X				X	X	
red-spotted newt[d]	X	X	X	X		X							
Jefferson salamander	X			X					X	X	X		
spotted salamander				X					X				
four-toed salamander	X		X										
red-backed salamander	X	X	X	X	X			X	X	X			
Anura													
American toad	X	X	X	X	X	X		X	X	X	X	X	X
Fowler's toad[e]											X		
northern spring peeper	X		X	X	X	X	X	X	X	X		X	X
gray treefrog				X		X			X				
wood frog	X		X	X	X	X	X	X	X		X	X	X
bullfrog		X							X			X	
green frog	X	X	X		X	X	X	X	X	X	X	X	X
pickerel frog				X									X
northern leopard frog	X	X	X	X	X	X		X	X	X	X	X	X
mink frog	X	X	X	X		X	X	X			X	X	
Squamata													
northern ringneck snake				X								X	
eastern smooth green snake	X									X			
western fox snake			X	X				X					
northern water snake	X												X
red-bellied snake	X	X		X		X	X	X	X	X		X	X
eastern garter snake	X	X	X	X	X	X	X	X	X			X	X
Testudines													
snapping turtle	X			X		X							X
Blanding's turtle				X									
map turtle													X
western painted turtle	X	X	X	X				X	X				X
midland painted turtle						X				X			X

*Only those species which may occur in or near wetlands are listed.

[a]Ruthven et al., 1928

[b]Pope and Dickinson, 1928

[c]including Isle Royale

[d]more probably the central newt

[e]Stockton Island

Appendix C-1. Mammals of Drummond Island Which May Utilize the the Wetlands of Drummond Island[a]

Common name	Common Name
masked shrew	meadow vole
short-tailed shrew	muskrat
star-nosed mole	coyote
little brown myotis	red fox
red squirrel	ermine
snowshoe hare	mink
beaver	river otter
Gapper's red-backed mouse	white-tailed deer

[a]from Manville, 1950a

Appendix C-2. Mammal Species Found on Rogg Island and Little Rogg Island Which May Occur in the Three Wetlands of Potagannissing Bay Islands Wetland Complex[a]

Common name	Common name
snowshoe hare	muskrat
red squirrel	beaver
deer mouse	mink
meadow vole	white-tailed deer

[a]from Manville, 1950b, 1951

Appendix C-3. Relative Abundance of Mammal Species[a] of Northwestern Algee County in 1917[a]

Common name	Relative abundance[b]
masked shrew	U
short-tailed shrew	U
star-nosed mole	R
snowshoe hare	C
red squirrel	C
beaver	R
Gapper's red-backed mouse	R
deer mouse	A
meadow vole	C
muskrat	C
meadow jumping mouse	R
coyote	R
gray wolf	R
red fox	U
black bear	U
raccoon	R
mink	C
river otter	U
lynx	R
bobcat	R
white-tailed deer	C

[a] from Wood, 1917
[b] R=rare, U=uncommon, C=common, A=abundant

Appendix C-4. Mammal Species of the Huron Mountains Area Which May Utilize the Six Wetlands of Huron Mountains Area Wetland Complex and Salmon Trout River Wetland[a]

Common name	Common name
masked shrew	coyote
water shrew	gray wolf
pygmy shrew	red fox
short-tailed shrew	black bear
star-nosed mole	raccoon
snowshoe hare	ermine
little brown myotis	long-tailed weasel
red squirrel	mink
beaver	striped skunk
deer mouse	river otter
meadow vole	bobcat
muskrat	white-tailed deer
meadow jumping mouse	

[a]from Manville, 1948

Appendix C-5. Mammal Species of the Apostle Islands, Wisconsin[a]

Common name	Common name
masked shrew	Norway rat
short-tailed shrew	house mouse
hoary bat	coyote
snowshoe hare	red fox
red squirrel	black bear
deer mouse	weasel
Gapper's red-backed mouse	mink
meadow vole	river otter
muskrat	white-tailed deer

[a]from Jackson, 1920; Beals et al., 1960

Appendix C-6. Mammals of Cook County Which May Utilize Wetlands[a]

Common name	Common name
masked shrew	muskrat[b]
water shrew	southern bog lemming
artic shrew	meadow jumping mouse
short-tailed shrew	coyote[c]
star-nosed mole	gray wolf[c]
snowshoe hare	red fox
red squirrel	ermine
deer mouse	mink
Gapper's red-backed mouse	striped skunk[b]
meadow vole	white-tailed deer

[a] from Timm, 1975
[b] Not common in northeastern Minnesota
[c] Observed along the shore of Lake Superior

Appendix D-1.
Endangered or Threatened Species in the States Bordering Lake Superior

	Minnesota[a]	Michigan[b]	Wisconsin[c]
MOLLUSKS			
Actinonaias ellipsiformis		T	
Anodonta subgibbosa		T	
Cyclonais tuberculata		T	
Dysnomia triquetra		T	
Elliptio complanatus		T	
Lampsilis fasciola		T	
Lampsilis higginsi*	E		E
Obovaria leibii		E	
Pleurobema clava		T	
Simpsoniconcha ambigua		E	
Amnicola binneyana[d]		T	
Anguispira kochi[d]		T	
Discus patulus[d]		T	
Fontigens nicklineana[d]		T	
Haplotrema concavum[d]		T	
Lymnaea megasoma		T	
Mesodon elevatus[d]		T	
Mesodon sayanus[d]		T	
Mesomphix cupreus[d]		T	
Pomatiopsis cincinnatiensis		T	
Triodopsis notata[d]		T	
Zoogenetes harpa		T	
FISH			
lake sturgeon (Acipenser fulvescens)		T	
longjaw cisco (Coregonus alpenae)*		E	
lake herring (Coregonus artedii)		T	
bloater (Coregonus hoyi)		T	
deepwater cisco (Coregonus johannae)		E	
kiyi (Coregonus kiyi)		T	
blackfin cisco (Coregonus nigripinnis)		E	
shortnose cisco (Coregonus reighardi)		E	
shortjaw cisco (Coregonus zenithicus)		E	

-continued-

Appendix D-1. (continued)

	Minnesota[a]	Michigan[b]	Wisconsin[c]
goldeye (Hiodon alosiodes)			T
redside dace (Clinostomus elongatus)		T	
Ozark minnow (Dionda nubila)			T
speckled chub (Hybopsis aestivalis)			T
gravel chub (Hybopsis x-punctata)			E
pallid shiner (Notropis amnis)			T
pugnose shiner (Notropis anogenus)			T
striped shiner (Notropis chrysocephalus)			E
silver shiner (Notropis photogenis)		T	
starhead topminnow (Fundulus notti)			E
blue sucker (Cycleptus elongatus)			T
black buffalo (Ictiobus niger)			T
river redhorse (Moxostoma carinatum)		T	T
slender madtom (Noturus exilis)			E
northern madtom (Noturus stigmosus)		T	
longear sunfish (Lepomis megalotis)			T
crystal darter (Ammocrypta asprella)			E
eastern sand darter (Ammocrypta pellucida)		T	
mud darter (Etheostoma asprigene)			T
bluntnose darter (Etheostoma chlorosomum)			E
gilt darter (Percina evides)			E
blue pike (Stizostedion vitreum glaucum)		E	

-continued-

Appendix D-1. (continued)

	Minnesota[a]	Michigan[b]	Wisconsin[c]
REPTILES AND AMPHIBIANS			
spotted salamander (Ambystoma maculatum)			T
marbled salamander (Ambystoma opacum)		T	
small-mouthed salamander (Ambystoma texanum)		T	
Tremblay's salamander (Ambystoma tremblayi)			T
western lesser siren (Siren intermedia nettingi)		T	
pickerel frog (Rana palustris)			T
Burn's leopard frog (Rana pipiens burnsi)			T
wood turtle (Clemmys insculpta)			E
Blanding's turtle (Emydoidea blangingi)			T
eastern box turtle (Terrapene carolina carolina)		T	
ornate box turtle (Terrapene ornata)			E
western slender glass lizard (Ophisaurus attenuatus)			T
black rat snake (Elaphe obsoleta obsoleta)		T	
northern copperbelly (Natrix erythrogaster neglecta)		T	
Kirtland's water snake (Natrix kirtlandi)		T	
queen snake (Natrix septemvitatta)			E
eastern massasauga (Sistrurus catenatus)			E
western ribbon snake (Thamnophis proximus proximus)			E
northern ribbon snake (Thamnophis sauritus septentrionalis)			E
AVIFAUNA			
great egret (Casmerodius albus)			T

-continued-

Appendix D-1. (continued)

	Minnesota[a]	Michigan[b]	Wisconsin[c]
whooping crane (Grus americana)*	E		
double-crested cormorant (Phalacrocorax auritus)		T	E
Cooper's hawk (Accipiter cooperi)		T	E
red-shouldered hawk (Buteo lineatus)		T	T
bald eagle (Haliaeetus leucocephalus)**	T	T	E
marsh hawk (Circus cyaneus)		T	
osprey (Pandion haliaetus)		T	E
peregrine falcon (Falco peregrinus)*	E	E	E
greater prairie chicken (Tympanuchus cupido)		T	T
piping plover (Charadrius melodus)		T	E
Forster's tern (Sterna forsteri)			E
common tern (Sterna hirundo)			E
Kirtland's warbler (Dendroica kirtlandii)*	E	E	
barn owl (Tyto alba)		T	E
loggerhead shrike (Lanius ludovicianus)		T	T
MAMMALS			
least shrew (Cryptotis parval)		T	
Indiana bat (Myotis sodalis)*		E	
pine vole (Microtus pinetorum)		T	
southern bog lemming (Synatomys cooperi)		T	
eastern timber wolf (Canis lupus)*	E	E	E

-continued-

Appendix D-1. (concluded)

	Minnesota[a]	Michigan[b]	Wisconsin[c]
pine marten (*Martes americana*)		T	E
Canada lynx (*Lynx canadensis*)			E

*Also on the federal list of endangered and threatened species (U.S. Fish and Wildlife Service, 1977).

**The bald eagle was reduced to threatened status on the federal list in 1978.

[a]Minnesota has no official state listing of threatened and endangered species. Only species listed as threatened or endangered by the U.S. Fish and Wildlife Service (1977) are officially recognized.

[b]Michigan Endangered and Threatened Species Program (1976).

[c]Based on Hine et at. (1975); updated during review using Wisconsin Department of Natural Resources (1979) due to major changes since 1975.

[d]Scientific name equivalents for endangered and threatened mollusks: *Amnicola binneyana* = *Cincinnatia emarginata*; *Anguispira kochi* = *A. solitaria*; *Discus patulus* = *Gonyodiscus perspectivus*; *Fontigens* = *Paludestrina*; *Haplotrema* = *Cincinnaria*; *Mesodon* = *Polygyra*; *Mesomphix* = *Omphalina*; *Triodopsis notata* = *Polygyra palliata*.

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LIST OF U.S.G.S. QUADRANGLE MAPS

Ahmeek, Michigan	1975
Amnicon Point, Wisconsin	1964
Ashland East, Wisconsin	1975
Ashland West, Wisconsin	1975
Au Sable Point, Michigan	1966
Au Sable Point Southwest, Michigan	1966
Au Train, Michigan	1958
Baie de Wasai, Michigan	1951
Bark Bay, Wisconsin	1964
Bayfield, Wisconsin	1975
Beacon Hill, Michigan	1975
Betsy Lake Northwest, Michigan	1968
Big Bay, Michigan	1954
Brule, Wisconsin	1961
Brumley, Michigan-Ontario	1975
Burnt Island, Michigan-Ontario	1964
Cat Island, Wisconsin	1963
Cedar, Wisconsin	1975
Chassell, Michigan	1975
Chequamegon Point, Wisconsin	1964
Cornucopia, Wisconsin	1964
Deer Lake, Michigan	1975
Delaware, Michigan	1948
Dollar Settlement, Michigan	1951
Drummond, Michigan-Ontario	1964
Drummond Southeast, Michigan-Ontario	1964
Eagle Harbor, Michigan	1975
Emerson, Michigan	1975
Fort Wilkins, Michigan	1975
Gay, Michigan	1975
Goetzville, Michigan-Ontario	1964
Grand Marais, Michigan	1968
Grand Portal Point, Michigan	1958
Greenland, Michigan	1950
Hancock, Michigan	1975
Hovland, Minnesota	1960
Huron Mountain, Michigan	1954
Isle Royale National Park, Michigan	1950-1970
Keweenaw Bay, Michigan	1954
Lake Medora, Michigan	1975
Laughing Fish Point, Michigan	1958
Laurium, Michigan	1975
Lime Island, Michigan-Ontario	1964
Little Girls Point, Wisconsin-Michigan	1956
Long Island, Wisconsin	1964
Madeline Island, Wisconsin	1964
Manitou Island, Michigan	1975
Marble Head, Michigan-Ontario	1964
Marquette, Michigan	1975

Marr Island, Minnesota	1960
McNearney Lake, Michigan	1975
Michigan Island, Michigan	1963
Mt. Ashwabay, Wisconsin	1975
Muggun Creek, Michigan	1975
Munising, Michigan	1958
Munuscong, Michigan	1953
Munuscong Northeast, Michigan	1953
Muskallonge Lake West, Michigan	1968
Negaunee, Michigan	1954
Oak Ridge, Michigan	1951
Odanah, Wisconsin	1975
Ontonagon, Michigan	1955
Oskar, Michigan	1975
Outer Island, Wisconsin	1963
Parkland, Wisconsin-Minnesota	1975
Payment, Michigan	1951
Pelkie, Michigan	1954
Pendills Lake, Michigan	1951
Phoenix, Michigan	1975
Piatt Lake, Michigan	1975
Pickford, Michigan	1975
Point Isabelle, Michigan	1975
Point Mills, Michigan	1954
Poplar Northeast, Wisconsin	1975
Port Wing, Wisconsin-Minnesota	1961
Rice Lake, Michigan	1975
Rockhouse Point, Michigan	1975
Rocky Island, Wisconsin	1963
Sand Island, Wisconsin	1964
Sault Ste Marie South, Michigan-Ontario	1975
Shallous, Michigan	1951
Sheephead Lake, Michigan	1951
Shelldrake, Michigan	1975
Sidnaw, Michigan	1954
Skandia, Michigan	1958
Skanee, Michigan	1954
Stockton Island, Wisconsin	1963
Superior, Wisconsin-Minnesota	1975
Traverse Island, Michigan	1975
Vermilion, Michigan	1951
Vermilion Southeast, Michigan	1951
Washburn, Wisconsin	1975
West Duluth, Minnesota-Wisconsin	1975
Whitefish Point, Michigan	1951
Wood Island, Michigan	1958
York Island, Wisconsin	1964