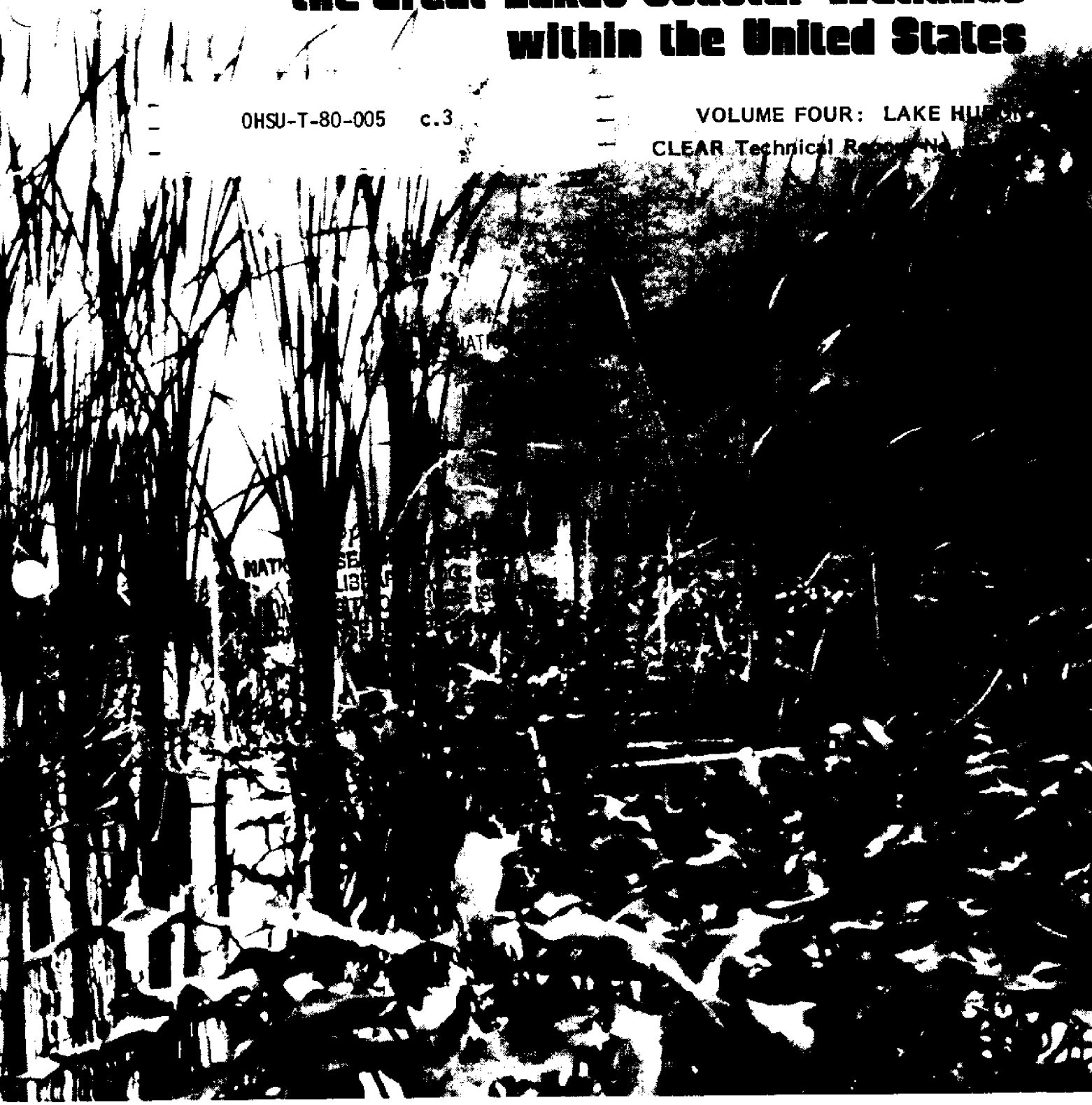
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Fish and Wildlife Resources of the Great Lakes Coastal Wetlands within the United States

OHSU-T-80-005 c.3

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Prepared for U.S. Fish and Wildlife Service, Division of Ecological Services-Region 3
Twin Cities, Minnesota. Project Officer: Herbert W. Hyatt. Grant No. 14-16-0009-77-076

The Ohio State University, Center for Lake Erie Area Research,
and Ohio Sea Grant Program. Columbus, Ohio

in cooperation with

Indiana University, Environmental Systems Application Center. Bloomington, Indiana

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TABLE OF CONTENTS

	Page No.
PREFACE	i
ACKNOWLEDGEMENTS	ii
LIST OF CONTRIBUTORS	iii
INTRODUCTION	v
LIST OF TABLES	xix
LIST OF FIGURES	xxviii
LAKE SECTION 1	1
LAKE SECTION 2	107
LAKE SECTION 3	193
LAKE SECTION 4	321
LAKE SECTION 5	424
LAKE SECTION 6	508
LAKE SECTION 7	583
LAKE SECTION 8	679
SUMMARY	749
LIST OF APPENDICES	763
APPENDIX A - Fish	764
APPENDIX B - Invertebrates	767
APPENDIX C - Reptiles and Amphibians	773
APPENDIX D - Avifauna	777
APPENDIX E - Mammals	779
APPENDIX F - Endangered Species	781
BIBLIOGRAPHY	784
LIST OF USGS MAPS	791

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PREFACE

OBJECTIVES

The purpose of the volumes of which this is the fifth is the compilation of published 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 Huron'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 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.

We would like to acknowledge all of the individuals contacted during this study who provided us with information concerning the coastal wetlands of Lake Huron. A special thanks 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 Huron and the St. Clair River, Lake St. Clair, and the Detroit 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 Huron 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 Huron, were similarly included. Figure 1 illustrates the above delineation rules.

An aerial reconnaissance of the Lake Huron 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, 196 wetlands were identified and delineated along the Lake Huron and the St. Clair River, Lake St. Clair and the Detroit River shoreline. The 197 wetlands of Lake Huron are located along approximately 565 shoreline miles in Michigan State.

USE OF THIS DOCUMENT

In order to facilitate the use of this report, the Lake Huron and the St. Clair River, Lake St. Clair and the Detroit River shoreline has been divided into 8 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

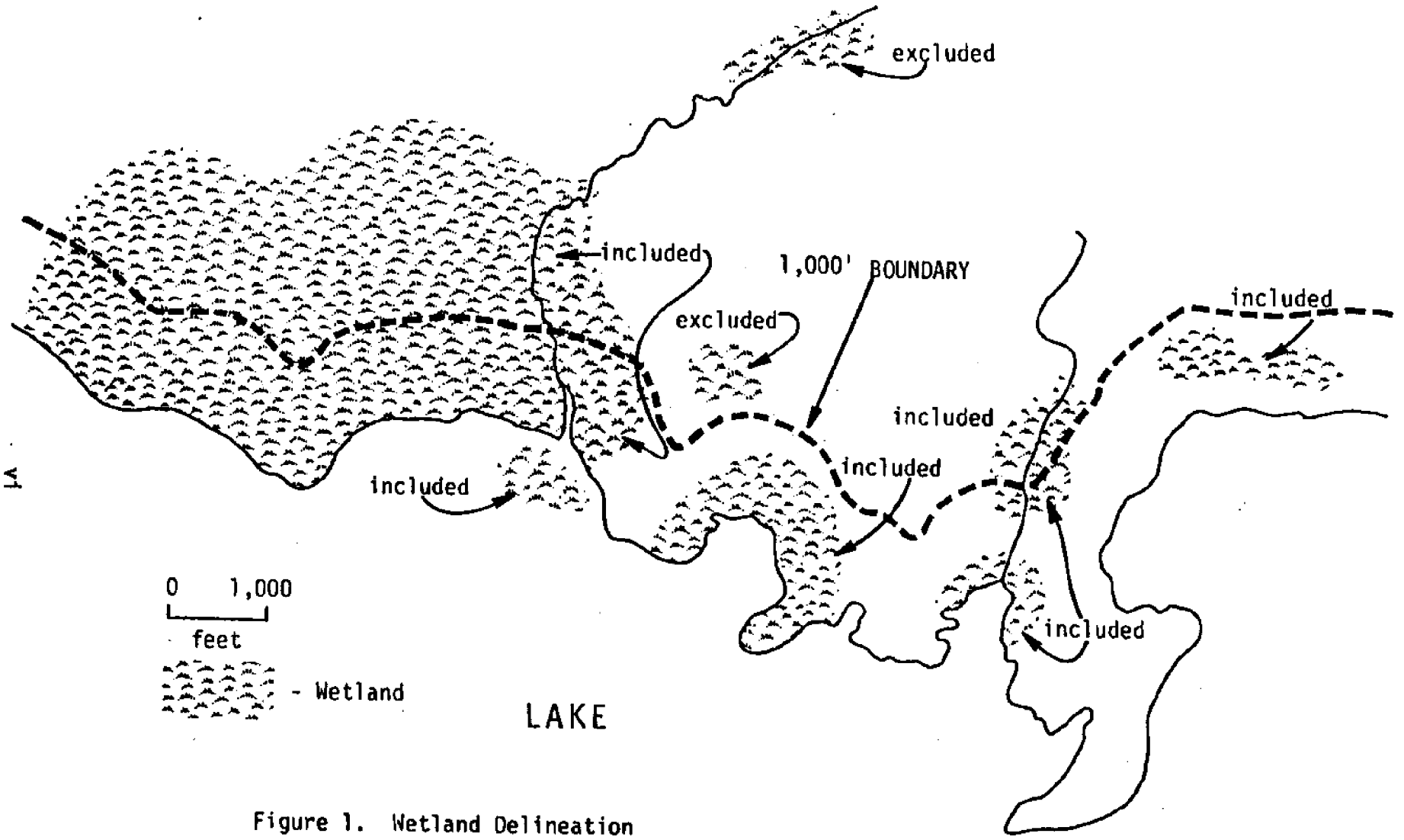


Figure 1. Wetland Delineation

Table 1. The Eight Lake Sections of Lake Huron

Lake section	Shoreline area included
1	The southern tip of Grosse Ile north to the Sanilac-Huron County line including the U.S. Islands in Wayne, Macomb and St. Clair Counties
2	Sanilac-Huron County line north to Albert Sleeper State Park in Huron County
3	Albert Sleeper State Park to the Arenac-Iosco County line
4	Arenac-Iosco County line to South Nine Mile Point
5	South Nine Mile Point to Adams Point
6	Adams Point to Grosse Point
7	Grosse Point to Huron Point
8	Huron Point to False Detour Channel in Chippewa County, Michigan

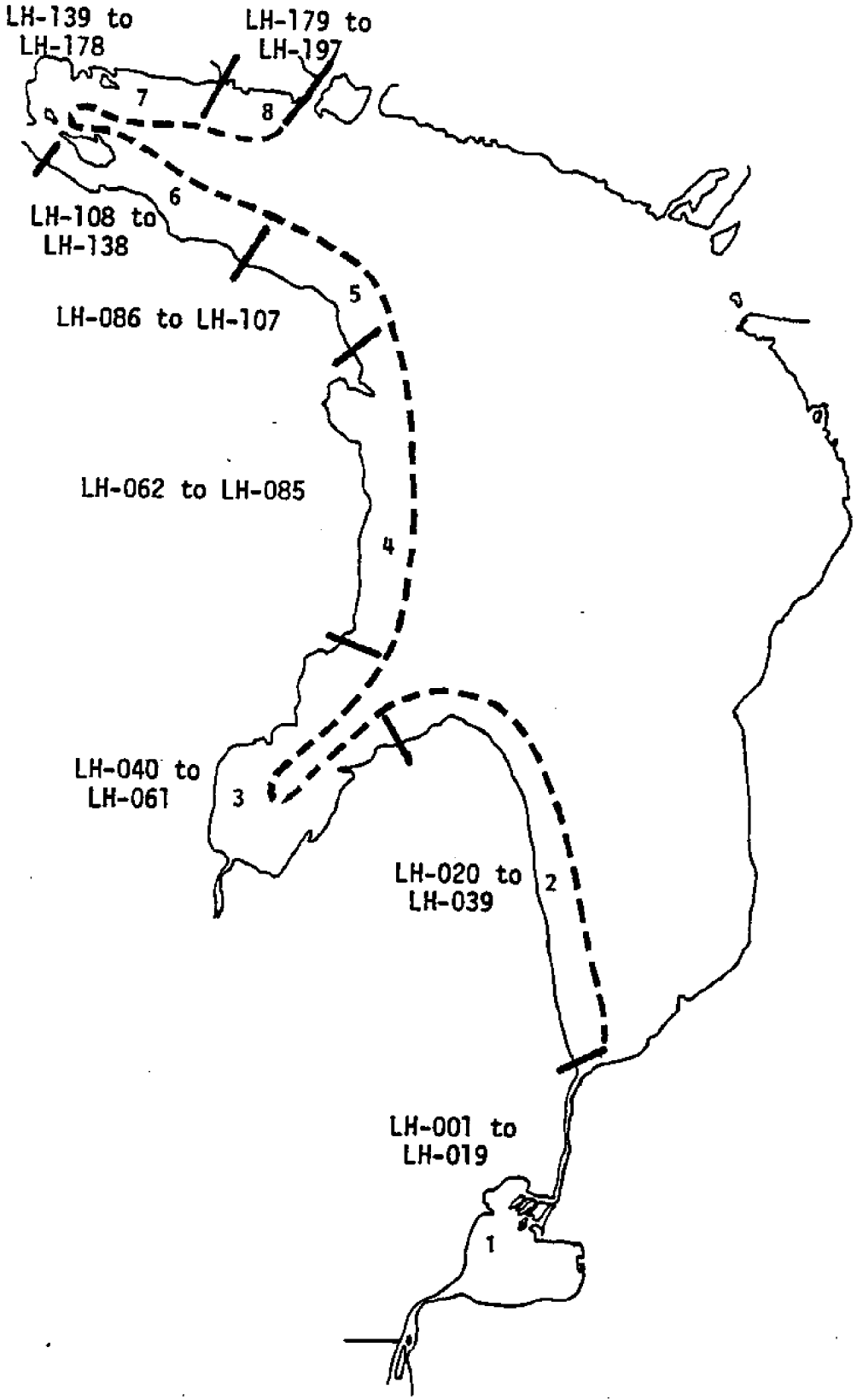


Figure 2. Lake Sections of Lake Huron and the St. Clair River

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
Amphibians and Reptiles
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

list of threatened and endangered species of Michigan State appears in Appendix F-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 Huron 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 Huron 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 Huron 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 Huron

Wetland Number	Wetland	Page Number
LAKE SECTION 1		
LH 001	Round Island Wetland	5
LH 002	Trenton Channel Wetland	10
LH 003	Elba Island Wetland	15
LH 004	Calf Island Wetland	20
LH 005	Stony Island Wetland	25
LH 006	No. 2 Drain Wetland	31
LH 007	Grassy Island Wetland	36
	CLINTON RIVER WETLAND COMPLEX	41
LH 008	Black Creek Area Wetland	
LH 009	Belvidere Bay Wetland	
LH 010	Marsac Point Wetland	49
LH 011	Swan Creek Wetland	54
	ST. CLAIR FLATS WETLAND COMPLEX	59
LH 012	Bouvier Bay Wetland	
LH 013	Dickenson Island Area Wetland	
LH 014	Harsens Island Area Wetland	
LH 015	Pointe aux Tremble Wetland	77
LH 016	Pointe aux Chenes Wetland	82
LH 017	Russell Island Wetland	87
LH 018	Algonac Wetland	92
LH 019	Cuttle Creek Area Wetland	96
LH 020	Port Huron Area Wetland	101
LAKE SECTION 2		
	WHITE ROCK AREA WETLAND COMPLEX	111
LH 021	White Rock Area Wetland #1	
LH 022	White Rock Area Wetland #2	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LH 023	White River Area Wetland	116
LH 024	Purdy Bay Wetland	120
LH 025	Wagener County Park Wetland	124
LH 026	North Sharpe Bay Wetland	129
LH 027	Old Shore Road Area Wetland	133
LH 028	St. Margaret Mission Wetland	138
LH 029	Hardwood Point Wetland	142
LH 030	Port Hope Wetland	147
LH 031	Gore Township Wetland	151
LH 032	Whiskey Harbor Wetland	155
LH 033	North Gore Township Wetland	160
LH 034	Bald Eagle Point Area Wetland	165
LH 035	Willow Creek Wetland	169
LH 036	Burnt Cabin Point Wetland	173
LH 037	Pointe Aux Barques Wetland	177
LH 038	Flat Rock Point Area Wetland	182
LH 039	Hat Point Wetland	187
LAKE SECTION 3		
LH 040	Albert Sleeper State Park Wetland	198
LH 041	Caseville Township Wetland	203
	SAND POINT WETLAND COMPLEX	208
LH 042	Sand Point Wetland #1	
LH 043	Sand Point Wetland #2	
LH 044	Sand Point Wetland #3	
LH 045	Sand Point Wetland #4	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LH 046	Wildfowl Bay Wetland	213
LH 047	North Island Wetland	219
LH 048	South Gull Island Wetland	224
LH 049	Charity Island Wetland	228
LH 050	East Saginaw Bay Coastal Wetland	233
LH 051	Windy Point Wetland	251
LH 052	Aplin Beach Wetland	256
LH 053	Lagoon Beach Wetland	261
LH 054	Tobico Lagoon Wetland	266
LH 055	Tobico Marsh	271
LH 056	Linwood Area Wetland	278
LH 057	Nayanquing Point Wildlife Area Wetland	283
LH 058	West Saginaw Bay Wetland	295
LH 059	Schnitzelbank Creek Wetland	305
LH 060	Whitestone Point Area Wetland	310
LH 061	Pine Wood Park Area Wetland	315
LAKE SECTION 4		
LH 062	Benson Park Area Wetland	325
LH 063	Lake Huron Beach Area Wetland	330
LH 064	Tawas Point Wetland	335
LH 065	Au Sable Point Wetland	340
LH 066	South Thunder Bay Wetland	345
LH 067	Sulfur Island Wetland	350

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LH 068	Squaw Bay Wetland	356
LH 069	South Alpena Area Wetland	364
LH 070	McRae Park Area Wetland	369
LH 071	Thunder Bay Island Wetland	374
LH 072	Sugar Island Wetland	379
LH 073	North Gull Island Wetland	384
LH 074	Whitefish Bay Wetland #1	389
	NORTH THUNDER BAY WETLAND COMPLEX	394
LH 075	Whitefish Point Wetland	
LH 076	North Thunder Bay Wetland #1	
LH 077	North Thunder Bay Wetland #2	
LH 078	North Thunder Bay Wetland #3	
LH 079	North Thunder Bay Wetland #4	
LH 080	North Thunder Bay Wetland #5	
LH 081	Misery Bay Wetland	399
LH 082	Crooked Island Wetland	406
LH 083	El Cajon Beach Wetland #1	411
LH 084	El Cajon Beach Wetland #2	415
LH 085	Grass Creek Wetland	419
LAKE SECTION 5		
LH 086	South Ninemile Point Wetland	427
LH 087	Morris Bay Wetland	432
LH 088	Long Lake Creek Wetland	436
LH 089	Middle Island Wetland	441
	ROCKPORT AREA WETLAND COMPLEX	445
LH 090	Rockport Area Wetland #1	
LH 091	Rockport Area Wetland #2	
LH 092	Rockport Area Wetland #3	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
	FERRON POINT AREA WETLAND COMPLEX	450
LH 093	Ferron Point Area Wetland #1	
LH 094	Ferron Point Area Wetland #2	
LH 095	Ferron Point Area Wetland #3	
LH 096	Ferron Point Area Wetland #4	
LH 097	Black Lake State Forest Wetland	455
LH 098	Bell River Wetland	460
LH 099	False Presque Isle Wetland	465
LH 100	Wreck Point Wetland	470
LH 101	Albany Bay Wetland	475
LH 102	Presque Isle Harbor Wetland	480
LH 103	Harbor View Area Wetland	485
LH 104	North Bay Area Wetland	490
LH 105	Thompsons Harbor Wetland	494
LH 106	West Thompsons Harbor Wetland	498
LH 107	Adams Point Area Wetland	503
LAKE SECTION 6		
LH 108	Swan Lake Area Wetland	513
LH 109	Calcite Road Wetland	517
LH 110	Nagels Creek Area Wetland	521
LH 111	Forty Mile Point Area Wetland	526
LH 112	Evergreen Beach Wetland	530
	MAST POINT AREA WETLAND COMPLEX	534
LH 113	Grace Area Wetland #1	
LH 114	Grace Area Wetland #2	
LH 115	Mast Point Area Wetland #1	
LH 116	Mast Point Area Wetland #2	

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LH 117	Mulligan Creek Area Wetland	539
	NINEMILE POINT AREA WETLAND COMPLEX	543
LH 118	Ninemile Point Area Wetland #1	
LH 119	Ninemile Point Area Wetland #2	
LH 120	Ninemile Point Area Wetland #3	
LH 121	Cheboygan Point Wetland	548
	CHEBOYGAN AREA WETLAND COMPLEX	553
LH 122	Cheboygan Area Wetland #1	
LH 123	Cheboygan Area Wetland #2	
LH 124	Cheboygan Area Wetland #3	
LH 125	Cheboygan Area Wetland #4	
LH 126	Cheboygan Area Wetland #5	
LH 127	Cheboygan Area Wetland #6	
	BOIS BLANC ISLAND WETLAND COMPLEX	563
LH 128	Pointe aux Pins Wetland	
LH 129	Bois Blanc Island Wetland	
LH 130	Point Catosh Wetland	
LH 131	Swedes Bay Wetland	
LH 132	Cadottes Point Wetland	568
	EDGEWATER BEACH AREA WETLAND COMPLEX	572
LH 133	Edgewater Beach Area Wetland #1	
LH 134	Edgewater Beach Area Wetland #2	
LH 135	Edgewater Beach Area Wetland #3	
LH 136	Edgewater Beach Area Wetland #4	
LH 137	Edgewater Beach Area Wetland #5	
LH 138	Hiawatha National Forest Wetland	577
LAKE SECTION 7		
LH 139	Charles Wetland	586
LH 140	St. Martin Bay Wetland	590
LH 141	St. Martin Point Wetland	595
LH 142	Big St. Martin Island Wetland	599
LH 143	St. Martin Island Wetland	603

-continued-

Table 3. (continued)

Wetland Number	Wetland	Page Number
LH 144	Brulee Point Wetland	607
	MISMER-HESSEL BAY WETLAND COMPLEX	611
LH 145	Loon Lake Wetland	
LH 146	Steel Creek Wetland	
LH 147	Mortsen Point Wetland	
LH 148	Mill Pond Wetland	
	MACKINAC BAY WETLAND COMPLEX	616
LH 149	Mackinac Creek Wetland	
LH 150	Mackinac Bay Wetland	
	MARQUETTE ISLAND WETLAND COMPLEX	621
LH 151	Marquette Island Wetland #1	
LH 152	Duck Bay Wetland	
LH 153	Peck Bay Wetland	
LH 154	Marquette Island Wetland #2	
LH 155	Marquette Island Wetland #3	
LH 156	Marquette Island Wetland #4	
LH 157	Voight Bay Wetland	
LH 158	Point Fuyards Area Wetland	
LH 159	Marquette Island Wetland #5	
LH 160	Marquette Island Wetland #6	
LH 161	Marquette Island Wetland #7	
	LASALLE ISLAND WETLAND COMPLEX	626
LH 162	Ailes Point Area Wetland	
LH 163	Lasalle Island Wetland #1	
LH 164	Lasalle Island Wetland #2	
LH 165	Bass Cove Lake Wetland	
	HILL ISLAND-ISLAND NO. 8 WETLAND COMPLEX	631
LH 166	Island No. 8 Wetland	
LH 167	Flowers Bay Wetland	
LH 168	Hill Channel Wetland	
LH 169	Government Island Wetland	636
LH 170	Flowers Creek Wetland	640
LH 171	Lakeside Road Wetland	645
LH 172	Bush Bay Wetland	649
LH 173	Prentiss Bay Area Wetland	653

-continued-

Table 3. (concluded)

Wetland Number	Wetland	Page Number
LH 174	Prentiss Bay Wetland	657
LH 175	Rover Island Wetland	662
LH 176	Scotty Bay Wetland	666
LH 177	Beaver Tail Bay Wetland	670
LH 178	Albany Bay Wetland	674
LAKE SECTION 8		
	ST. VITAL BAY WETLAND COMPLEX	682
LH 179	St. Vital Bay Wetland #1	
LH 180	St. Vital Bay Wetland #2	
LH 181	St. Vital Bay Wetland #3	
LH 182	St. Vital Bay Wetland #4	
LH 183	Carlton Bay Wetland	687
LH 184	Seymour Bay Wetland	691
LH 185	Bennett Point Wetland	695
	WHITNEY BAY WETLAND COMPLEX	699
LH 186	Whitney Bay Wetland #1	
LH 187	Whitney Bay Wetland #2	
LH 188	Seaman Lake Wetland	704
	PIKE BAY WETLAND COMPLEX	709
LH 189	Pike Bay Wetland #1	
LH 190	Pike Bay Wetland #2	
LH 191	Knutsen Lake Area Wetland	714
LH 192	Warners Cove Wetland	719
LH 193	Toivola Lake Area Wetland	724
LH 194	Scammon Cove Wetland	729
LH 195	Meade Island Wetland	734
LH 196	Big Shoal Cove Area Wetland	738
LH 197	Dickenson Creek Wetland	743

LIST OF TABLES

		Page No.
Introduction		
Table 1.	Eight Lake Sections of Lake Huron	vii
Table 2.	Major Components Addressed in Individual Wetland Narratives	ix
Table 3.	Wetlands in Lake Huron	xi
LAKE SECTION 1		
Table 1-1.	Location, Acreage and Classification of Wetlands in Lake Section 1	4
Table 1-2.	Population Data for the Vicinity of Round Island Wetland	8
Table 1-3.	Population Data for the Vicinity of Trenton Channel Wetland	13
Table 1-4.	Population Data for the Vicinity of Elba Island Wetland	18
Table 1-5.	Population Data for the Vicinity of Calf Island Wetland	23
Table 1-6.	Fishes Collected in Test Netting Surveys in the Vicinity of Stony and Sugar Islands, Detroit River, Michigan	27
Table 1-7.	Population Data for the Vicinity of Stony Island Wetland	29
Table 1-8.	Population Data for the Vicinity of No. 2 Drain Wetland	34
Table 1-9.	Population Data for the Vicinity of Grassy Island Wetland	39
Table 1-10.	Birds Observed in Belvidere Bay Wetland on April 25, 1975	44
Table 1-11.	Seasonal Abundance, Density and Productivity of Waterfowl in Black Creek Area Wetland	45
Table 1-12.	Population Data for the Vicinity of the Clinton River Wetland Complex	47
Table 1-13.	Population Data for the Vicinity of Marsac Point Wetland	52
Table 1-14.	Population Data for the Vicinity of Swan Creek Wetland	57
Table 1-15.	Birds Observed in the Three Wetlands in the St. Clair Flats Wetland Complex	65
Table 1-16.	Seasonal Abundance, Density and Productivity of Waterfowl in Bouvier Bay Wetland	67
Table 1-17.	Species Composition of Waterfowl Observed During Fall Migration on Lake St. Clair, October 7 through December 3, 1974	69
Table 1-18.	Seasonal Abundance, Density and Productivity of Waterfowl in the Interior Wetlands of Harsen's Island	70

		Page No.
Table 1-19.	Average Species Composition of Retrieved Ducks in the St. Clair Flats State Game Area (1974-1975)	72
Table 1-20.	Comparison of Number of Applications to Numbers of Available Waterfowl Hunting Reservations at St. Clair Flats Game Wildlife Area, 1976	73
Table 1-21.	Mammalian Species on Dickenson Island Area Wetland and Harsens Island Area Wetland	74
Table 1-22.	Population Data for the Vicinity of the St. Clair Flats Wetland Complex	75
Table 1-23.	Population Data for the Vicinity of Pointe aux Tremble Wetland	80
Table 1-24.	Population Data for the Vicinity of Pointe aux Chenes Wetland	85
Table 1-25.	Population Data for the Vicinity of Russell Island Wetland	90
Table 1-26.	Population Data for the Vicinity of Algonac Wetland	94
Table 1-27.	Population Data for the Vicinity of Cuttle Creek Area Wetland	99
Table 1-28.	Population Data for the Vicinity of Port Huron Area Wetland	104
Table 1-29.	Data Gaps for Lake Section 1	106

LAKE SECTION 2

Table 2-1.	Location, Acreage and Classification of Wetlands in Lake Section 2	110
Table 2-2.	Population Data for the Vicinity of the White Rock Area Wetland Complex	114
Table 2-3.	Population Data for the Vicinity of White River Area Wetland	118
Table 2-4.	Population Data for the Vicinity of Purdy Bay Wetland	122
Table 2-5.	Population Data for the Vicinity of Wagener County Park Wetland	127
Table 2-6.	Population Data for the Vicinity of North Sharpe Bay Wetland	131
Table 2-7.	Population Data for the Vicinity of Old Shore Road Area Wetland	136
Table 2-8.	Population Data for the Vicinity of St. Margaret Mission Wetland	140
Table 2-9.	Birds Observed in Hardwood Point Wetland and Vicinity on April 28, 1975 and September 13, 1976	144
Table 2-10.	Population Data for the Vicinity of Hardwood Point Wetland	145
Table 2-11.	Population Data for the Vicinity of Port Hope Wetland	149

		Page No.
Table 2-12.	Population Data for the Vicinity of Gore Township Wetland	153
Table 2-13.	Population Data for the Vicinity of Whiskey Harbor Wetland	158
Table 2-14.	Population Data for the Vicinity of North Gore Township Wetland	163
Table 2-15.	Population Data for the Vicinity of Bald Eagle Point Area Wetland	167
Table 2-16.	Population Data for the Vicinity of Willow Creek Wetland	171
Table 2-17.	Population Data for the Vicinity of Burnt Cabin Point Wetland	175
Table 2-18.	Population Data for the Vicinity of Pointe aux Barques Wetland	180
Table 2-19.	Population Data for the Vicinity of Flat Rock Point Area Wetland	185
Table 2-20.	Population Data for the Vicinity of Hat Point Wetland	190
Table 2-21.	Data Gaps for Lake Section 2	192
LAKE SECTION 3		
Table 3-1.	Location, Acreage and Classification of Wetlands in Lake Section 3	197
Table 3-2.	Population Data for the Vicinity of Albert Sleeper State Park Wetland	201
Table 3-3.	Population Data for the Vicinity of Caseville Township	206
Table 3-4.	Population Data for the Vicinity of the Sand Point Wetland Complex	211
Table 3-5.	Birds Observed in Wildfowl Bay Wetland, 1975-1977	216
Table 3-6.	Population Data for the Vicinity of Wildfowl Bay Wetland	217
Table 3-7.	Population Data for the Vicinity of North Island Wetland	222
Table 3-8.	Population Data for the Vicinity of South Gull Island Wetland	226
Table 3-9.	Population Data for the Vicinity of Charity Island Wetland	231
Table 3-10.	Birds Observed in East Saginaw Bay Coastal Wetland	237
Table 3-11.	Aerial Survey of Spring Waterfowl Migrations, Fish Point and Sebewaing Bay, 1967, 1969, 1971, 1977	239
Table 3-12.	Seasonal Abundance, Density and Productivity of Waterfowl in Wildfowl Bay	240
Table 3-13.	Seasonal Abundance, Density and Productivity of Waterfowl in the Vicinity of Fish Point and Sebewaing Bay	242

		Page No.
Table 3-14.	Seasonal Abundance, Density and Productivity of Waterfowl in the Vicinity of Quanicassee Wildlife Area	244
Table 3-15.	Comparison of Number of Applications to Number of Available Waterfowl Hunting Reservations at Fish Point, Nayanquing Point, and St. Clair Flats State Wildlife Areas, 1976	246
Table 3-16.	The Relative Abundance of Mammalian Species on East Saginaw Bay Coastal Wetland	247
Table 3-17.	Population Data for the Vicinity of East Saginaw Bay Coastal Wetland	248
Table 3-18.	Mammalian Species Observed on Windy Point Wetland	253
Table 3-19.	Population Data for the Vicinity of Windy Point Wetland	254
Table 3-20.	Mammalian Species Observed on Aplin Beach Wetland	258
Table 3-21.	Population Data for the Vicinity of Aplin Beach Wetland	259
Table 3-22.	Population Data for the Vicinity of Lagoon Beach Wetland	264
Table 3-23.	Population Data for the Vicinity of Tobico Lagoon Wetland	269
Table 3-24.	Birds Observed in Tobico Marsh on May 13, 1975 and June 2, 1976	273
Table 3-25.	Seasonal Abundance, Density and Productivity of the Waterfowl in Tobico Marsh	274
Table 3-26.	Population Data for the Vicinity of Tobico Marsh	276
Table 3-27.	Population Data for the Vicinity of Linwood Area Wetland	281
Table 3-28.	Birds Observed in Nayanquing Point Wildlife Area Wetland in 1975 and 1976	286
Table 3-29.	Seasonal Abundance, Density and Productivity of the Waterfowl of Nayanquing Point	287
Table 3-30.	Seasonal Abundance, Density and Productivity of the Waterfowl in the Vicinity of Pinconning	289
Table 3-31.	Species of Ducks Nesting at Nayanquing Point, Saginaw Bay	291
Table 3-32.	Comparison of Number of Applications to Number of Available Waterfowl Hunting Reservations at Nayanquing Point, 1976	291
Table 3-33.	Population Data for the Vicinity of Nayanquing Poing Wildlife Area Wetland	293
Table 3-34.	Fish Species Collected in the Lower Rifle River, Arenac County, Michigan	297
Table 3-35.	Birds Observed in West Saginaw Bay Wetland in the Vicinity of the Au Gres River, Wigwam Bay and the Pine River in 1975, 1976, and 1977	299
Table 3-36.	Seasonal Abundance, Density and Productivity of Waterfowl in Wigwam Bay	300

Page No.

Table 3-37. Population Data for the Vicinity of West Saginaw Bay Wetland 303
Table 3-38. Population Data for the Vicinity of Schnitzelbank Creek Wetland 308
Table 3-39. Population Data for the Vicinity of Whitestone Point Area Wetland 313
Table 3-40. Population Data for the Vicinity of Pine Wood Park Area Wetland 318
Table 3-41. Data Gaps for Lake Section 3 320

LAKE SECTION 4

Table 4-1. Location, Acreage and Classification of Wetlands in Lake Section 4 324
Table 4-2. Population Data for the Vicinity of Benson Park Area Wetland 328
Table 4-3. Population Data for the Vicinity of Lake Huron Beach Area Wetland 333
Table 4-4. Population Data for the Vicinity of Tawas Point Wetland 338
Table 4-5. Population Data for the Vicinity of Au Sable Point Wetland 343
Table 4-6. Birds Observed in South Thunder Bay Wetland 348
Table 4-7. Population Data for the Vicinity of South Thunder Bay Wetland 349
Table 4-8. Population Data for the Vicinity of Sulfur Island Wetland 354
Table 4-9. Birds Observed on the West Shoreline of Squaw Bay 358
Table 4-10. Seasonal Abundance, Density and Productivity of Waterfowl in Squaw Bay in 1976 359
Table 4-11. Population Data for the Vicinity of Squaw Bay Wetland 362
Table 4-12. Population Data for the Vicinity of South Alpena Area Wetland 367
Table 4-13. Population Data for the Vicinity of McRae Park Area Wetland 372
Table 4-14. Population Data for the Vicinity of Thunder Bay Island Wetland 377
Table 4-15. Birds Observed in Sugar Island Wetland on June 24, 1975 381
Table 4-16. Population Data for the Vicinity of Sugar Island Wetland 382
Table 4-17. Population Data for the Vicinity of North Gull Island Wetland 387
Table 4-18. Birds Observed in Whitefish Bay Wetland 391
Table 4-19. Population Data for the Vicinity of Whitefish Bay Wetland 392
Table 4-20. Population Data for the Vicinity of the North Thunder Bay Wetland Complex 397

Page No.

Table 4-21. Seasonal Abundance, Density and Productivity of Waterfowl in Misery Bay, 1976 401
Table 4-22. Population Data for the Vicinity of Misery Bay Wetland 404
Table 4-23. Birds Observed in Crooked Island Wetland 407
Table 4-24. Population Data for the Vicinity of Crooked Island Wetland 409
Table 4-25. Population Data for the Vicinity of El Cajon Beach Wetland #1 413
Table 4-26. Population Data for the Vicinity of El Cajon Beach Wetland #2 417
Table 4-27. Population Data for the Vicinity of Grass Creek Wetland 421
Table 4-28. Data Gaps for Lake Section 4 423

LAKE SECTION 5

Table 5-1. Location, Acreage and Clasification of Wetlands in Lake Section 5 426
Table 5-2. Population Data for the Vicinity of South Ninemile Point Wetland 430
Table 5-3. Population Data for the Vicinity of Morris Bay Wetland 434
Table 5-4. Population Data for the Vicinity of Long Lake Creek Wetland 439
Table 5-5. Population Data for the Vicinity of Middle Island Wetland 443
Table 5-6. Population Data for the Vicinity of Rockport Area Wetland Complex 448
Table 5-7. Population Data for the Vicinity of the Ferron Point Area Wetland Complex 453
Table 5-8. Population Data for the Vicinity of Black Lake State Forest Wetland 458
Table 5-9. Population Data for the Vicinity of Bell River Wetland 463
Table 5-10. Population Data for the Vicinity of False Presque Isle Wetland 468
Table 5-11. Population Data for the Vicinity of Wreck Point Wetland 473
Table 5-12. Population Data for the Vicinity of Albany Bay Wetland 478
Table 5-13. Population Data for the Vicinity of Presque Isle Harbor Wetland 483
Table 5-14. Population Data for the Vicinity of Harbor View Area Wetland 488
Table 5-15. Population Data for the Vicinity of North Bay Area Wetland 492
Table 5-16. Population Data for the Vicinity of Thompsons Harbor Wetland 496

Page No.

Table 5-17. Population Data for the Vicinity of West Thompson Harbor Wetland 501
Table 5-18. Population Data for the Vicinity of Adams Point Area Wetland 505
Table 5-19. Data Gaps for Lake Section 5 508

LAKE SECTION 6

Table 6-1. Location, Acreage and Classification of Wetland in Lake Section 6 512
Table 6-2. Population Data for the Vicinity of Swan Lake Area Wetland 515
Table 6-3. Population Data for the Vicinity of Calcite Road Wetland 519
Table 6-4. Population Data for the Vicinity of Nagels Creek Area Wetland 524
Table 6-5. Population Data for the Vicinity of Forty Mile Point Area Wetland 528
Table 6-6. Population Data for the Vicinity of Evergreen Beach Wetland 532
Table 6-7. Population Data for the Vicinity of Mast Point Area Wetland Complex 537
Table 6-8. Population Data for the Vicinity of Mulligan Creek Area Wetland 541
Table 6-9. Population Data for the Vicinity of the Nine-mile Point Area Wetland Complex 546
Table 6-10. Population Data for the Vicinity of Cheboygan Point Wetland 551
Table 6-11. Seasonal Abundance, Density and Productivity of Waterfowl in Cheboygan Area Wetlands #1 and #2 556 558
Table 6-12. Waterfowl shot (in order of abundance) in Fall 1974 in Cheboygan Area Wetlands #1 and #2 559
Table 6-13. Birds Observed in Cheboygan Area Wetlands #1 and #2 561
Table 6-14. Population Data for the Vicinity of the Cheboygan Area Wetland Complex 566
Table 6-15. Population Data for the Vicinity of the Bois Blanc Wetland Complex 570
Table 6-16. Population Data for the Vicinity of Cadottes Point Wetland 575
Table 6-17. Population Data for the Vicinity of Edgewater Beach Area Wetland Complex 580
Table 6-18. Population Data for the Vicinity of Hiawatha National Forest Wetland 582
Table 6-19. Data Gaps for Lake Section 6

LAKE SECTION 7

Table 7-1. Location, Acreage and Classification of Wetlands in Lake Section 7 585

		Page No.
Table 7-2.	Population Data for the Vicinity of Charles Wetland	588
Table 7-3.	Waterfowl Observed in St. Martin Bay Wetland During Migration in 1974	592
Table 7-4.	Population Data for the Vicinity of St. Martin Bay Wetland	593
Table 7-5.	Population Data for the Vicinity of St. Martin Point Wetland	597
Table 7-6.	Population Data for the Vicinity of Big St. Martin Island Wetland	601
Table 7-7.	Population Data for the Vicinity of St. Martin Island Wetland	605
Table 7-8.	Population Data for the Vicinity of Brulee Point Wetland	609
Table 7-9.	Waterfowl Observed in Steel Creek Wetland During Migration in 1976	613
Table 7-10.	Population Data for the Vicinity of the Mismer-Hessel Bay Wetland Complex	614
Table 7-11.	Waterfowl Observed in the Mackinac Bay Wetland Complex During Migration in 1976	618
Table 7-12.	Population Data for the Vicinity of the Mackinac Bay Wetland Complex	619
Table 7-13.	Waterfowl Observed in Duck Bay Wetland During Migration in 1976	623
Table 7-14.	Population Data for the Vicinity of the Marquette Island Wetland Complex	624
Table 7-15.	Population Data for the Vicinity of the LaSalle Island Wetland Complex	629
Table 7-16.	Population Data for the Vicinity of the Hill Island - Island No. 8 Wetland Complex	634
Table 7-17.	Population Data for the Vicinity of Government Island Wetland	638
Table 7-18.	Waterfowl in Flowers Creek Wetland During Migration in 1976	642
Table 7-19.	Population Data for the Vicinity of Flowers Creek Wetland	643
Table 7-20.	Population Data for the Vicinity of Lakeside Road Wetland	647
Table 7-21.	Population Data for the Vicinity of Bush Bay Wetland	651
Table 7-22.	Population Data for the Vicinity of Prentiss Bay Area Wetland	655
Table 7-23.	Waterfowl Observed in Prentiss Bay Wetland During Migration in 1976	659
Table 7-24.	Population Data for the Vicinity of Prentiss Bay Wetland	660
Table 7-25.	Population Data for the Vicinity of Rover Island Wetland	664
Table 7-26.	Population Data for the Vicinity of Scotty Bay Wetland	668

Page No.

Table 7-27. Population Data for the Vicinity of Beaver Tail Bay Wetland 672
Table 7-28. Population Data for the Vicinity of Albany Bay Wetland 676
Table 7-29. Data Gaps for Lake Section 7 678

LAKE SECTION 8

Table 8-1. Location, Acreage, and Classification of Wetlands in Lake Section 8 681
Table 8-2. Population Data for the Vicinity of the St. Vital Bay Wetland Complex 685
Table 8-3. Population Data for the Vicinity of Carlton Bay Wetland 689
Table 8-4. Population Data for the Vicinity of Seymour Bay Wetland 693
Table 8-5. Population Data for the Vicinity of Bennett Point Wetland 697
Table 8-6. Population Data for the Vicinity of Whitney Bay Wetland Complex 702
Table 8-7. Population Data for the Vicinity of Seaman Lake Wetland 707
Table 8-8. Population Data for the Vicinity of the Pike Bay Wetland Complex 712
Table 8-9. Population Data for the Vicinity of Knutsen Lake Area Wetland 717
Table 8-10. Population Data for the Vicinity of Warners Cove Wetland 722
Table 8-11. Population Data for the Vicinity of Toivola Lake Area Wetland 727
Table 8-12. Population Data for the Vicinity of Scammon Cove Wetland 732
Table 8-13. Population Data for the Vicinity of Meade Island Wetland 736
Table 8-14. Population Data for the Vicinity of Big Shoal Cove Area Wetland 741
Table 8-15. Population Data for the Vicinity of Dickenson Creek Wetland 746
Table 8-16. Data Gaps for Lake Section 8 748

Summary

Table 4. Fish Species Known or Presumed to Utilize the Coastal Wetlands of Lake Huron, St. Clair River, Lake St. Clair, and Detroit River 751
Table 5. Relative Abundance and Distribution in the Coastal Zone of Amphibians and Reptiles Which Probably Occur in Coastal Wetlands of Lake Huron 753
Table 6. Birds Recorded for Lake Huron 758
Table 7. Mammals Which May Utilize the Coastal Wetlands of Lake Huron 760

LIST OF FIGURES

		Page No.
Figure 1.	Wetland Delineation	vi
Figure 2.	The Eight Lake Sections of Lake Huron	viii
Figure 1-1.	Lake Section 1 - Grosse Ile Area	2
Figure 1-2.	Lake Section 1 - St. Clair Flats Area	3
Figure 2-1.	Lake Section 2 - Harbor Beach Area	108
Figure 2-2.	Lake Section 2 - Pointe Aux Barques Area	109
Figure 3-1.	Lake Section 3 - Wildfowl Bay Area	194
Figure 3-2.	Lake Section 3 - Saginaw Bay	195
Figure 3-3.	Lake Section 3 - East Tawas Point Area	196
Figure 4-1.	Lake Section 4 - Tawas Bay Area	322
Figure 4-2.	Lake Section 4 - Thunder Bay	323
Figure 5-1.	Lake Section 5	425
Figure 6-1.	Lake Section 6 - Adams Point Area	509
Figure 6-2.	Lake Section 6 - Cheboygan Area	510
Figure 6-3.	Lake Section 6 - Horseshoe Bay Area	511
Figure 7-1.	Lake Section 7	584
Figure 8-1.	Lake Section 8	680

LAKE SECTION 1

INTRODUCTION

Lake Section 1 extends from the southern tip of Grosse Ile north to the Sanilac-Huron County line and includes the U.S. islands in Wayne, Macomb, and St. Clair Counties. The region features gently rolling topography in the vicinity of the wetlands. The surficial geology along this 160 mile stretch of shoreline is waterlaid moraines to the south and lake bed clay to the north.

Figures 1-1 and 1-2 show the approximate location of the 20 coastal wetlands in Lake Section 1. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 1-1. The wetlands of Lake Section 1 lie at elevations ranging from 570 to 595 feet above sea level. These wetlands are all classified as Palustrine, Lacustrine, and Riverine Systems.

Available information related to physiographic and cultural features of these 20 wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to biotic characteristics of many of these wetlands.

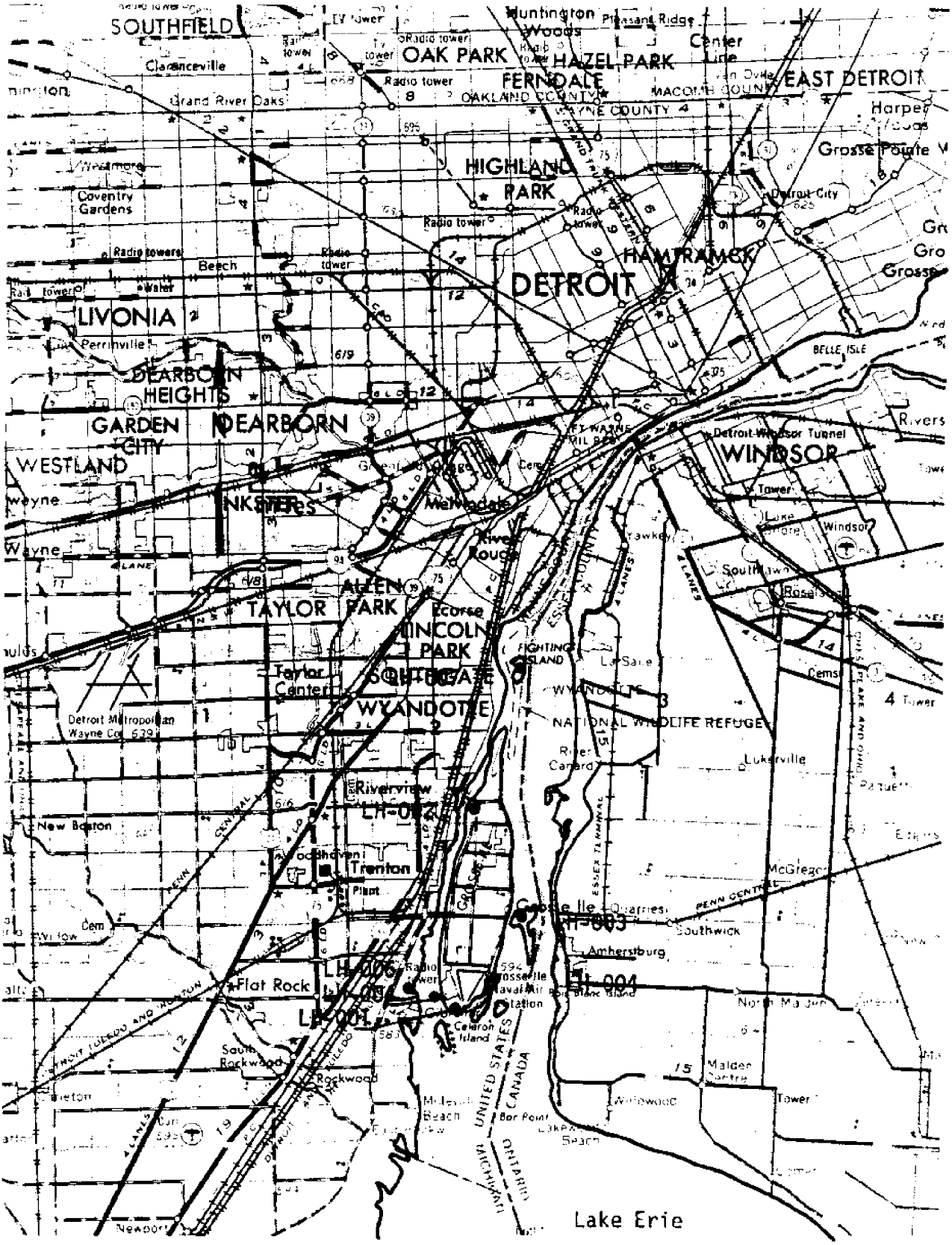


Figure 1-1. Lake Section 1 - Grosse Isle Area



Figure 1-2. Lake Section 1 - St. Clair Flats Area

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

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 001	Round Island Wetland	42°05'24"	83°09'59"	30	P
LH 002	Trenton Channel Wetland	42°10'28"	83°09'24"	45	R
LH 003	Elba Island Wetland	42°06'04"	83°09'02"	80	R
LH 004	Calf Island Wetland	42°06'09"	83°10'40"	7	R
LH 005	Stony Island Wetland	42°07'32"	83°07'56"	65	R
LH 006	No. 2 Drain Wetland	42°06'26"	83°11'20"	110	P
LH 007	Grassy Island Wetland	46°13'22"	83°08'04"	48	R
	CLINTON RIVER WETLAND COMPLEX				
LH 008	Black Creek Area Wetland	42°34'56"	82°48'00"	485	P
LH 009	Belvidere Bay Wetland	42°36'06"	82°47'34"	100	P
LH 010	Marsac Point Wetland	42°41'02"	82°42'26"	5	P-L
LH 011	Swan Creek Wetland	42°41'07"	82°39'30"	77	R
	ST. CLAIR FLATS WETLAND COMPLEX				
LH 012	Bouvier Bay Wetland	42°38'48"	82°36'51"	1873	P-L-R
LH 013	Dickenson Island Area Wetland	42°36'07"	82°39'12"	3353	P-L-R
LH 014	Harsens Island Area Wetland	42°34'52"	82°36'49"	2870	P-L-R
LH 015	Point aux Tremble Wetland	42°37'26"	82°35'14"	60	R
LH 016	Point aux Chenes Wetland	42°36'39"	82°32'46"	27	R
LH 017	Russell Island Wetland	42°36'35"	82°31'52"	20	R
LH 018	Algonac Wetland	42°38'25"	82°31'32"	260	P
LH 019	Cuttle Creek Area Wetland	42°53'56"	82°27'30"	6	P

[a]P=palustrine

PHYSIOGRAPHIC SETTING LH 001

Setting

Round Island Wetland is located on the shoreline of Round Island in the Detroit River, within Grosse Ile Township of Wayne County, Michigan. The wetland lies approximately 0.9 mile from Gibraltar, Michigan. This Palustrine-Riverine wetland is partially wooded (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Topography

Round Island Wetland has a relief of approximately ten feet and a maximum elevation of 580 feet above sea level, which is nine feet above the approximate mean elevation of Lake Erie (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973). The remaining part of the island outside the wetland is a gently rising slope.

Surficial Geology

The surficial geology of the area in which Round Island Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in Round Island Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine-to fine-textured (Larson, 1977).

Hydrology

Round Island Wetland lies at the mouth of Frenchman Creek where it enters the Detroit River (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Round Island Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1°F based on the normal period from 1941-1970. The mean monthly low for January is 21.9°F and the mean monthly high for July is 83.6°F. The average annual precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing

season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Round Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

BIOTIC SETTING LH 001

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 Round Island Wetland.

Fish

The following fish species are known to spawn in coastal wetlands of Lake St. Clair: lake sturgeon (Acipenser fulvescens), northern pike (Esox lucius), muskellunge (Esox masquinongy), carp (Cyprinus carpio), channel catfish (Ictalurus punctatus), largemouth bass (Micropterus salmoides), smallmouth bass (Micropterus dolomieui), bluegill (Lepomis macrochirus), yellow perch (Perca flavescens), and walleye (Stizostedion vitreum) (Jaworski and Raphael, 1978). Common fish species which utilize the coastal wetlands of Michigan are listed in Appendix A-1. Commercial fishing in the Detroit River has been discontinued for several decades (Jaworski and Raphael, 1978), and evidently does not occur in Round Island Wetland. Non-salmonid sport fishing for carp, channel catfish, bullheads (Ictalurus spp.), yellow perch, walleye, and white bass (Morone chrysops), is common along the Detroit River and there are 14 shore sites, one pier, and eight boat launching facilities which provide anglers with access to the river (Jaworski and Raphael, 1978). No published information exists to specifically document sport fishing in Round Island Wetland, nor did the literature search provide any site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, or food sources of the fish populations of this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of Round Island, the fauna consisted of a snail aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Round Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Round 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 Round 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 Round Island Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Round 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 LH 001

Population

Round Island Wetland is located in Grosse Ile Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons

per square mile. Table 1-2 indicates that Wayne County underwent a rapid decline in population, while Grosse Ile Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-2. Population Data for the Vicinity of Round Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Grosse Ile Township	9,303	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly institutional. The Grosse Ile Naval Air Station is nearby. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1967).

Recreation

No known state or federal recreational facilities are present in the vicinity of Round Island Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Round Island Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974).

Round Island is a wooded area, but is not large enough to represent a significant forest resource. No significant oil or gas resources are known to be present on the island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Round Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Round Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Round Island Wetland.

RESEARCH PROJECTS LH 001

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

PHYSIOGRAPHIC SETTING LH 002

Setting

Trenton Channel Wetland is located on the shoreline of Grosse Ile in the Detroit River, within Grosse Ile Township of Wayne County, Michigan. The wetland is approximately 1.0 mile from Riverview, Michigan. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Topography

Trenton Channel Wetland has very little relief and lies at an elevation of about 575 feet above sea level, which is four feet above the approximate mean elevation of Lake Erie (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973). The area surrounding the wetland is a gently rising slope.

Surficial Geology

The surficial geology of the area in which Trenton Channel Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in Trenton Channel Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine- to fine-textured (Larson, 1977).

Hydrology

The Trenton Channel of the Detroit River flows by Trenton Channel Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Trenton Channel Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 21.9^{o}F and the mean monthly high for July is 83.6^{o}F. The average annaul precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing season is approximately six months long, with the last killing frost (28^{o}F) in

1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Trenton Channel Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Trenton Channel Wetland.

Fish

Common species which utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may utilize Trenton Channel Wetland. General information regarding fishes associated with wetlands along the Detroit River is discussed under Round Island Wetland and is also applicable to Trenton Channel Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish populations in this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of the Trenton channel, the fauna consisted of a snail aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Trenton Channel Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in

Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Trenton Channel 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 Trenton Channel 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 Trenton Channel Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Round 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 LH 002

Population

Trenton Channel Wetland is located in Grosse Ile Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-3 indicates that Wayne County underwent a rapid decline in population, while Grosse Ile Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-3. Population Data for the Vicinity of Trenton Channel Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Grosse Ile Township	9,303	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. A bridge crosses the wetland and divides it into two nearly equal portions. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Trenton Channel Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Trenton Channel Wetland include limestone, dolomite, stone, sand, gravel, and salt (Great Lakes Basin Commission, 1974). The International Salt Company has a halite mine in nearby Wyandotte, Michigan (Dorr and Eschman, 1970). Brine wells and pits are located less than a mile north of the wetland on Grosse Ile.

Inland from Trenton Channel Wetland on Grosse Ile is a wooded area, but it is not large enough to represent a significant forest resource. No significant oil or gas resources are known to be present on the island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Trenton Channel Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Trenton Channel Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Trenton Channel Wetland.

RESEARCH PROJECTS

LH 002

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

PHYSIOGRAPHIC SETTING LH 003

Setting

Elba Island Wetland is located on the shoreline of Grosse Ile and on small islands in the channel separating Grosse Ile from Elba Island, in the Detroit River, within Grosse Ile Township of Wayne County, Michigan. The wetland lies approximately 1.5 miles from Gibraltar, Michigan. This Riverine wetland is non-wooded (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Topography

Elba Island Wetland has very little relief and lies at an elevation of 570 feet above mean sea level, two feet below the approximate mean elevation of Lake Erie. The surrounding area rises gently and affords protection to the many canals and basins of the wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Elba Island Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in Elba Island Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine- to fine-textured (Larson, 1977).

Hydrology

Elba Island Wetland lies between Grosse Ile and Elba Island in the Detroit River (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Elba Island Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1°F based on the normal period from 1941-1970. The mean monthly low for January is 21.9°F and the mean monthly high for July is 83.6°F. The average annual precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing

season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Elba Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Elba Island Wetland.

Fish

Common species which utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may utilize Elba Island Wetland. General information regarding fishes associated with wetlands along the Detroit River is discussed under Round Island Wetland and is also applicable to Elba Island Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish populations in this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of Elba Island, the fauna consisted of a tubificid worm aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Elba Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in

Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Elba 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 Elba 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 Elba Island Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Elba 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 LH 003

Population

Elba Island Wetland is located in Grosse Ile Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-4 indicates that Wayne County underwent a rapid decline in population, while Grosse Ile Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-4. Population Data for the Vicinity of Elba Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Grosse Ile Township	9,303	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within Elba Island and the surrounding area is institutional and residential. The wetland is adjacent to Grosse Ile Naval Air Station and is under federal ownership. The wetland is bordered by roads and crossed by a bridge. The location of the wetland suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Elba Island Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Elba Island Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974).

No significant forest, oil or gas 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 Elba Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Elba Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Elba Island Wetland.

RESEARCH PROJECTS LH 003

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

PHYSIOGRAPHIC SETTING LH 004

Setting

Calf Island Wetland is located on the shoreline of Calf Island, in the Detroit River, within Grosse Ile Township of Wayne County, Michigan. The wetland lies approximately 0.6 mile from Gibraltar, Michigan. This Palustrine wetland is non-wooded (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Topography

Calf Island Wetland has very little relief and lies at an elevation of 570 feet above mean sea level, two feet below the approximate mean elevation of Lake Erie. Calf Island adjoins the wetland and is composed of rolling mounds with a relief of ten feet (U.S.G.S. Rockwood, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Calf Island Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in Calf Island Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine- to fine-textured (Larson, 1977).

Hydrology

Calf Island Wetland lies on Calf Island in the middle of Trenton Channel where it enters the Detroit River (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Calf Island Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 21.9^{o}F and the mean monthly high for July is 83.6^{o}F. The average annual precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing

season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Calf Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Calf Island Wetland.

Fish

Common species which utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may utilize Calf Island Wetland. General information regarding fishes associated with wetlands along the Detroit River is discussed under Round Island Wetland and is also applicable to Calf Island Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish populations in this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of Calf Island, the fauna consisted of a snail aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Calf Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in

Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Calf 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 Calf 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 Calf Island Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Calf 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 LH 004

Population

Calf Island Wetland is located in Grosse Ile Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-5 indicates that Wayne County underwent a rapid decline in population, while Grosse Ile Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-5. Population Data for the Vicinity of Calf Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Grosse Ile Township	9,303	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within Calf Island Wetland and the rest of the island is rural open space. The wetland is under undetermined ownership, but its location suggests that it may be subject to severe development pressure (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Calf Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present on Calf Island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Calf Island Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Calf Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Calf Island Wetland.

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

PHYSIOGRAPHIC SETTING LH 005

Setting

Stony Island Wetland is located on the shoreline of Stony Island in the Detroit River, within Grosse Ile Township of Wayne County, Michigan. The wetland lies approximately 2.9 miles from Trenton, Michigan. This Riverine wetland is partially wooded (U.S.G.S. quadrangle maps, Wyandotte, Michigan-Ontario, 1973; Rockwood, Michigan-Ontario, 1973).

Topography

Stony Island Wetland has a relief of five feet and lies at an elevation of 575 feet above mean sea level, which is about three feet above the approximate mean elevation of Lake Erie. The area surrounding the wetland contains rolling beach ridges (U.S.G.S. quadrangle maps, Wyandotte, Michigan-Ontario, 1973; Rockwood, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Stony Island Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in Stony Island Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine- to fine-textured (Larson, 1977).

Hydrology

Stony Island Wetland lies on Stony Island in the Detroit River (U.S.G.S. quadrangle maps, Rockwood, Michigan-Ontario, 1973; Wyandotte, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Stony Island Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 21.9^{o}F and the mean monthly high for July is 83.6^{o}F. The average annual precipitation is 31.69 inches, with a mean monthly

precipitation of 1.91 inches in January and 3.10 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Stony Island Wetland (U.S.G.S. quadrangle maps, Rockwood, Michigan-Ontario, 1973; Wyandotte, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Stony Island Wetland.

Fish

Test netting in the vicinity of Stony Island yielded 45 species of fishes (Table 1-6), the most abundant of which were northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), bowfin (Amia calva), carp (Cyprinus carpio), goldfish (Carassius auratus), carp x goldfish hybrids, goldenshiner (Notemigonus crysoleucas), blacknose shiner (Notropis heterolepis), white sucker (Catostomus commersoni), brook silverside (Labidesthes sicculus), rock bass (Ambloplites rupestris), pumpkinseed (Lepomis gibbosus), black crappie (Pomoxis nigromaculatus), and yellow perch (Perca flavescens). Age and growth studies of the game species in Table 1-6 indicated that these species had growth rates similar to the state-wide averages for these species in Michigan, and it was concluded that the Stony Island and Sugar Island areas of the Detroit River supported a valuable recreational fishery (Cooper, 1952). However, these results are not current, and some changes in angler use and species composition of the fish fauna in the Stony Island vicinity are to be expected. General information regarding fishes which currently utilize the coastal wetlands along the Detroit River is discussed under Round Island Wetland and is applicable to Stony Island Wetland. A list of fish species which commonly utilize the coastal wetlands of Michigan appears in Appendix A-1. The literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or commercial use of the fish fauna in Stony Island Wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the

Table 1-6. Fishes Collected in Test Netting Surveys in the Vicinity of Stony and Sugar Islands, Detroit River, Michigan[a]

Common name and use category[b]	Common name and use category[b]
Game Species	**Forage Species**
northern pike	spottail shiner
muskellunge	common shiner
largemouth bass	sand shiner
smallmouth bass	mimic shiner
rock bass	emerald shiner
white crappie	blacknose shiner
black crappie	goldenshiner
bluegill	bluntnose minnow
pumpkinseed	river chub
white bass	hornyhead chub
walleye	banded killifish
yellow perch	brook silverside
	trout-perch
Coarse Species	blackside darter
	channel darter
gizzard shad	logperch
carp	johnny darter
goldfish	least darter
carp x goldfish hybrids	
white sucker	**Obnoxious Species**
spotted sucker	
northern hogsucker	bowfin
shorthead redhorse	longnose gar
brown bullhead	silver lamprey
black bullhead	
yellow bullhead	
stonecat	
freshwater drum	

[a] Cooper (1952)
[b] Use category as judged by Cooper (1952)

vicinity of Stony Island, the fauna consisted of a snail aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Stony Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Stony Island Wetland.

Avifauna

This wetland is valuable as a nesting area for great egrets (Casmerodius albus) (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 of Stony 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 Stony Island Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Stony 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 LH 005

Population

Stony Island Wetland is located in Grosse Ile Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-7 indicates that Wayne County underwent a rapid decline in population, while Grosse Ile Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-7. Population Data for the Vicinity of Stony Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Grosse Ile Township	9,303	12.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly residential. Several artificial fills provide protection of the shore from the north and east, and form several basins. Three partially submerged vessels and some ruins lie offshore. The wetland is under undetermined ownership, and there is no basis for an evaluation of development pressures (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Stony Island Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Stony Island Wetland include limestone, dolomite and salt; however, the small size and low lying land

of Stony Island make these natural resources of little commercial value to the area (Great Lakes Basin Commission, 1974).

No significant forest, oil, or gas resources are known to be present on Stony Island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Stony Island Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Stony Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Stony Island Wetland.

RESEARCH PROJECTS LH 005

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

NO. 2 DRAIN WETLAND

PHYSIOGRAPHIC SETTING LH 006

Setting

No. 2 Drain Wetland is located on the shoreline of the Detroit River, in Brownstown Township of Wayne County, Michigan, 0.2 mile from the community of Gibraltar. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Topography

No. 2 Drain Wetland has a relief of five feet and a maximum elevation of 575 feet above mean sea level, which is about three feet above the approximate mean elevation of Lake Erie. The surrounding area is flat coastal plain (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which No. 2 Drain Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

The Pewamo-Blount Soil Association is present in No. 2 Drain Wetland. These soils are nearly level and gently sloping, very poorly drained to somewhat poorly drained, and have a subsoil that is moderately fine- to fine-textured (Larson, 1977).

Hydrology

No. 2 Drain flows through No. 2 Drain Wetland. The wetland is adjacent to Trenton Channel where the channel enters the Detroit River (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for No. 2 Drain Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1°F based on the normal period from 1941-1970. The mean monthly low for January is 21.9°F and the mean monthly high for July is 83.6°F. The average annual precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in

1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of No. 2 Drain Wetland (U.S.G.S. quadrangle maps, Rockwood, Michigan-Ontario, 1973).

BIOTIC SETTING LH 006

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 No. 2 Drain Wetland.

Fish

Common species which utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may utilize No. 2 Drain Wetland. General information regarding fishes associated with wetlands along the Detroit River is discussed under Round Island Wetland and is also applicable to No. 2 Drain Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish populations in this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of No. 2 Drain, the fauna consisted of a tubificid worm aggregation; the taxa of this aggregation are listed in Appendix B-1 in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 No. 2 Drain Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in

Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in No. 2 Drain Wetland.

Avifauna

Blue-winged teal (Anas discors), belted kingfishers (Megaceryle alcyon), great blue herons (Ardea herodias), black-crowned night herons (Nycticorax nycticorax), herring gulls (Larus argentatus), Caspian terns (Sterna caspia), spotted sandpipers (Actitis macularia), red-tailed hawks (Buteo jamaicensis) and an osprey (Pandion haliaetus) were observed in this wetland in 1975 by Michigan Department of Natural Resources personnel (1975-1977). The osprey and the Caspian tern are currently on the Michigan list of threatened species.

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 of No. 2 Drain 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 No. 2 Drain Wetland.

Endangered Species

Caspian terns and an osprey, both threatened species in Michigan, and black-crowned night herons, now listed as rare, were observed in this wetland in 1975 (Michigan Department of Natural Resources, 1975-1977).

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 No. 2 Drain Wetland by the literature search.

Health

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

Population

No. 2 Drain Wetland is located partly in Brownstown Township and partly within the city of Trenton in Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-8 indicates that Wayne County underwent a rapid decline in population, while Brownstown Township and Trenton (city) both experienced rapid growth in population, between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo a slow decline in population in the future.

Table 1-8. Population Data for the Vicinity of No. 2 Drain Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
Brownstown Township	8,696	22.7	--
City of Trenton	28,432	17.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. Two prominent drain systems traverse the wetland. One passes through and empties into Lake Erie, and the other forms a basin area in the interior of the wetland during normal water levels. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressures (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of No. 2 Drain Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of No. 2 Drain Wetland include limestone, dolomite, and salt (Great Lakes Basin Commission, 1974). A quarry for crushed and broken stone is located near the wetland (Great Lakes Basin Commission, 1974).

No significant forest, oil, or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A power plant with associated substation and power lines is located approximately 0.5 mile north of No. 2 Drain Wetland (U.S.G.S. quadrangle map, Rockwood, Michigan-Ontario, 1973).

Pollution Sources

Chrysler Corporation's Chemical Division holds a NPDES permit to discharge into the Mongaugon Drain which flows to the Detroit River. This may have an impact on No. 2 Drain Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution in this wetland.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of No. 2 Drain Wetland.

RESEARCH PROJECTS

LH 006

The literature search identified no on-going or impending research projects pertaining to No. 2 Drain Wetland.

GRASSY ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 007

Setting

Grassy Island Wetland is located on Grassy Island in the Detroit River, within Wyandotte Township of Wayne County, Michigan. The wetland lies on the Detroit River shoreline and is approximately 0.6 mile from Lincoln Park, Michigan. This Riverine wetland is non-wooded (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Topography

Grassy Island Wetland has a relief of five feet and a maximum elevation of 575 feet above mean sea level, which is about three feet above the approximate mean elevation of the Detroit River. The wetland is essentially the extant area of Grassy Island which lies between the two channels of the Detroit River (U.S.G.S. quadrangle map, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Grassy Island Wetland lies is characterized by waterlaid moraines. Rock occurring at or near the surface is of the Devonian period and the Detroit River formation (Martin, 1955).

Soils

Larson (1977) did not provide soil information for Grassy Island Wetland.

Hydrology

Grassy Island Wetland is on Grassy Island which lies in the Detroit River (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973). 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 Detroit River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Grassy Island Wetland is located at Detroit Metropolitan Airport, Michigan. The average annual temperature is 49.1°F based on the normal period from 1941-1970. The mean monthly low for January is 21.9°F and the mean monthly high for July is 83.6°F. The average annual precipitation is 31.69 inches, with a mean monthly precipitation of 1.91 inches in January and 3.10 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 26 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Grassy Island Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

BIOTIC SETTING LH 007

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 Grassy Island Wetland.

Fish

Common species which utilize the coastal wetlands of Michigan are listed in Appendix A-1, and some of these species may utilize Grassy Island Wetland. General information regarding fishes associated with wetlands along the Detroit River is discussed under Round Island Wetland and is also applicable to Grassy Island Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish populations in this wetland.

Invertebrates

Hunt (1962) studied the occurrence, density and ecology of invertebrates in the lower Detroit River in the vicinity of Grosse Ile. The fauna of the general area included tubificid worms, snails, and fingernail clams. In the vicinity of Grassy Island, the fauna consisted of a snail aggregation; the taxa of this aggregation are listed in Appendix B-1in order of abundance. Appendix B-2 lists the species of snails and fingernail clams which were collected by Hunt (1962).

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 Grassy Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Wayne County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and

distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Grassy 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 of Grassy 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 Grassy Island Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Grassy 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 LH 007

Population

Grassy Island Wetland is located in Wyandotte Township of Wayne County, Michigan. The county is densely populated, having a density of 4,162 persons per square mile. Table 1-9 indicates that Wayne County and Wyandotte Township experienced rapid declines in population between 1970 and 1975. Projections for 1990 indicate that Wayne County is expected to undergo slow population decline in the future.

Table 1-9. Population Data for the Vicinity of Grassy Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Wayne County	2,517,726	-5.7	2,182,761
City of Wyandotte	38,508	-6.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The northern section of the island is bounded by artificial fill which forms an interior enclosed basin. The island contains one lighted navigational aid. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressures (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Grassy Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in Grassy Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Grassy Island Wetland (U.S.G.S. quadrangle map, Wyandotte, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Grassy Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Grassy Island Wetland.

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

PHYSIOGRAPHIC SETTING LH 008-009

Setting

The Clinton River Wetland Complex is located along the shoreline of Lake St. Clair in Harrison Township of Macomb County, Michigan, at St. Clair Haven. Black Creek Area Wetland lies on the shorelines of Lake St. Clair and the mouth of Black Creek, which is directly connected to Lake St. Clair. Belvidere Bay wetland lies on the shoreline of Belvidere Bay, which is directly connected to Lake St. Clair, and on Grass Island in Lake St. Clair. None of the wetlands in this Palustrine complex are wooded (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973).

Topography

The Clinton River Wetland Complex has very little relief and lies at an elevation of 577 feet above mean sea leel, which is one to two feet above the approximate mean elevation of Lake St. Clair. The Great Lakes Basin Commission (1975) has described the shoreline as artificial fill. The surrounding terrain is essentially flat coastal plain (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which the Clinton River Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Lenawee-Corunna-Lamson Soil Association is present in the Clinton River Wetland Complex. These soils are nearly level, are poorly drained and have a moderately fine-textured to moderately coarse-textured subsoil (Larson, 1977).

Hydrology

Black Creek flows through Black Creek Area Wetland but no streams flow through Belvidere Bay Wetland (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973). 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 Black Creek may be found in Twenter, et al. (1975).

Climate

The closest weather station providing climatic data for the Clinton River Wetland Complex is located in Grosse Point Farms, Michigan. The average monthly temperature was 50.8°F in 1975.* The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (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 Clinton River Wetland Complex (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973).

BIOTIC SETTING LH 008-009

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 Clinton River Wetland Complex.

Fish

The Michigan Water Resources Commission (1973) and U.S. Army Corps of Engineers (1976) have conducted surveys in the lower Clinton River and the Clinton River Federal Navigation Channel, which indicated the presence of gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), northern pike (Esox lucius), carp (Cyprinus carpio), goldfish (Carassius auratus), quillback (Carpiodes cyprinus), silver redhorse (Moxostoma anisurum), white crappie (Pomoxis annularis), white bass (Morone chrysops), pumpkinseed (Lepomis gibbosus), rock bass (Ambloplites rupestris), bluegill (Lepomis macrochirus), largemouth bass (Micropterus salmoides), walleye (Stizostedion vitreum), and yellow perch (Perca flavescens). The lower Clinton River was a degraded habitat dominated by carp, quillback, goldfish, and gizzard shad, with other species few in number (Michigan Water Resources Commission, 1973). The mouth of the river contained larger numbers of perch and alewife (U.S. Army Corps of Engineers, 1976), indicating possibly better water quality conditions. Commercial fishing on the United States side of Lake St. Clair has been closed since the 1930's (Jaworski and Raphael, 1978), and no commercial operations are likely to be encountered in the Clinton River Wetland Complex. Lake St. Clair is the most valuable of the Michigan Great Lakes areas for non-salmonid recreational fishing, accounting for 33 percent of the total catch and 48 percent of the total fishing effort expended. The primary species caught or sought include walleye, yellow perch, centrarchid panfish, largemouth bass, smallmouth bass (Micropterus dolomieui), and northern pike (Jaworski and Raphael, 1978), in

addition to so-called rough species such as carp (Cyprinus carpio), bullheads (Ictalurus spp.) and channel catfish (Ictalurus punctatus). It is likely that some recreational fishing occurs in the vicinity of Black Creek Area Weltand. In addition to species mentioned above, other species known to utilize coastal wetlands in Michigan (Appendix C-1) may utilize Black Creek Area Wetland.

A search of the literature provided no site-specific data pertaining to spawning and hatching areas, seasonal locations and abundance, life histories, or food sources of the fish populations in the Clinton River 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 Clinton River Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Macomb County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Black Creek Area Wetland or Belvidere Bay Wetland.

Avifauna

Species observed during a 1975 bird survey in Belvidere Bay Wetland are listed in Table 1-10. Data pertaining to seasonal abundance, density, and productivity of waterfowl in Black Creek Area Wetland in 1975 are presented in Table 1-11. Dabbling ducks, particularly mallards (Anas platyrhynchos), American coots (Fulica americana), terns and shorebirds utilize the area for nesting, feeding and resting during spring, summer and fall. In addition, shore birds use the wetland during migration, and geese have been observed feeding and resting there. This wetland and adjacent land was being destroyed at the time of the bird survey in 1975.

Table 1-10. Birds Observed in Belvidere Bay Wetland on April 25, 1975[a]

Common name	Common name
mallard	American bittern
ring-necked duck	herring gull
greater scaup	common tern
red-breasted merganser	red-winged blackbird
horned grebe	common grackle
pied-billed grebe	killdeer
belted kingfisher	

[a] Taken from Michigan Department of Natural Resources, Environmental Areas Survey, 1975.

The literature search provided no site-specific information pertaining to recreational and commercial use, health, life histories, relationship to water levels, or major food sources for the birds of the two wetlands of the Clinton River Wetland Complex or to their seasonal abundance, density, and productivity in Belvidere Bay Wetland.

Mammals

Virginia opossum (Didelphis virginiana), woodchuck (Marmota monax), muskrat (Ondatra zibethicus), red fox (Vulpes vulpes), raccoon (Procyon lotor), long-tailed weasel (Mustela frenta), mink (M. vison), and striped skunk (Mephitis mephitis) have been observed on the two wetlands of the Clinton River Wetland Complex (U.S. Army Corps of Engineers, 1976.

The literature search provided no site-specific information pertaining to 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

Common terns (Sterna hirunda), a species endangered in Michigan, and American bitterns (Botaurus lentiginosus), which are rare, were among the birds observed in Belvidere Bay Wetland during a survey in 1975 (Michigan Department of Natural Resources, 1975).

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Clinton River Wetland Complex by the literature search.

Table 1-11. Seasonal Abundance, Density and Productivity of Waterfowl in Black Creek Area Wetland[a]

Waterfowl Use / Species	Production		Fall Migration			Spring Migration		
	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Spring Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	60	0.6	4000	2000	9		1500	800	3	
black duck			400	200	9		100	100	3	
gadwall										
mottled duck										
green-winged teal										
Am. wigeon										
blue-winged/ cinnamon teal	40	0.4								
northern shoveler										
pintail										
wood duck	30	0.3								
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	130	1.3	4400	2200			1600	900		
redhead										
canvasback										
scaups										
redneck										
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers	0	0	0	0			0	0		
other ducks										

-continued-

Table 1-11. (concluded)

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Production: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Spring Migration: Avg Peak Pop.	Spring Migration: Avg Spring Pop.	Spring Migration: Avg Duration (no. weeks)	Spring Migration: Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada										
black brant										
brant										
TOTAL geese	0	0	0	0			0	0		
Swans										
whistling										
other										
TOTAL swans	0	0	0	0			0	0		
TOTAL waterfowl	130	1.3	4400	2200			1600	900		

[a]Taken from Michigan Department of Natural Resources, 1975

Health

The available information is not sufficient to allow an evaluation of the environmental quality of these wetlands. However, considerable land fill surrounds this wetland complex.

CULTURAL SETTING

LH 008-009

Population

The Clinton River Wetland Complex is located in Harrison Township of Macomb County, Michigan. The county is densely populated, having a density of 1,395 persons per square mile. Table 1-12 indicates that Macomb County and Harrison Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Macomb County is expected to undergo moderate population growth in the future.

Table 1-12. Population Data for the Vicinity of the Clinton River Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Macomb County	669,813	7.0	798,154
Harrison Township	20,038	6.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex is rural open space, and the surrounding area is predominantly residential. Considerable artificial land fill, which forms canals and a basin containing piers and other structures, surrounds the wetland complex. One major road and several secondary roads traverse the area. The wetlands are under undetermined ownership, but their location suggests that they are subject to severe development pressure (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973).

Recreation

The southern extension of Black Creek Area Wetland is within the boundaries of Metropolitan Beach Park. There are a golf course and picnic areas within the park, and a boardwalk along a sand beach. No information about any other recreational facilities was located.

Mineral, Energy, and Forest Resources

Salt is a potential mineral resource in the vicinity of the Clinton River Wetland Complex (Great Lakes Basin Commission, 1974). No significant forest, oil, or gas resources are known to be present.

Public Utilities and Facilities

Boat ramps are located approximately 0.7 mile east of the Clinton River Wetland Complex (U.S.G.S. quadrangle map, Mt. Clemens East, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to the Clinton River Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are two archaeological sites (#20-MB-208, #20-MB-209) in the vicinity of the Clinton River Wetland Complex. These are habitation and circular enclosure type sites which were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

Selfridge Field is located within 500 ft. of the Clinton River Wetland Complex. It was Michigan's first airport and served as a training base during World War I (County Inventory).

RESEARCH PROJECTS

LH 008-009

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

MARSAC POINT WETLAND

PHYSIOGRAPHIC SETTING — LH 010

Setting

Marsac Point Wetland is located on the shoreline of Anchor Bay which is directly connected to Lake St. Clair, in Ira Township of St. Clair County, Michigan, at Marsac Point. The wetland lies approximately 400 feet from the boundary of the community of New Baltimore. This Lacustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Topography

Marsac Point Wetland has very little relief and lies at an elevation between 575 and 580 feet above mean sea level, a few feet above the approximate mean elevation of Lake St. Clair. The Great Lakes Basin Commission (1975) has described the surrounding area which is predominantly flat, as artificial fill (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Marsac Point Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Coldwater formation (Martin, 1955).

Soils

The Allendale-Latty Soil Association is present in Marsac Point Wetland. These soils are nearly level to gently sloping, are poorly drained, and have a sandy to clayey subsoil (Landtiser, 1974).

Hydrology

Marsac Creek, an intermittent stream, flows by Marsac Point Wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973). 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 Marsac Creek may be found in Twenter, et al. (1975).

Climate

The closest weather station providing climatic* data for Marsac Point Wetland is located in Grosse Point Farms, Michigan. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Marsac Point Wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

BIOTIC SETTING LH 010

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 Marsac Point Wetland.

Fish

Commercial fishing on the United States side of Lake St. Clair has been discontinued since the 1930's and no commercial operations are likely to be encountered in Marsac Point Wetland. Lake St. Clair is the most valuable of the Michigan Great Lakes areas for non-salmonid recreational fishing, accounting for 33 percent of the total catch and 48 percent of the total fishing effort expended. The primary species caught or sought include walleye (*Stizostedion vitreum*), yellow perch (*Perca flavescens*), centrarchid panfish, large mouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), and northern pike (*Esox lucius*) (Jaworski and Raphael, 1978), in addition to so-called rough species such as carp (*Cyprinus carpio*), bullheads (*Ictalurus* spp.), and channel catfish (*Ictalurus punctatus*). It is likely that some recreational fishing occurs in the vicinity of Marsac Point Wetland. In addition to species mentioned above, other species known to utilize coastal wetlands in Michigan (Appendix A-1), may utilize Marsac Point Wetland. However, the literature search yielded no site-specific data pertaining to major species, species composition, spawning and hatching areas, seasonal distribution 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 Marsac Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Marsac 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 Marsac Point Wetland.

Mammals

A general discussion of Lake St. Clair estuary (U.S. Fish and Wildlife Service, 1970) states that the mammalian species of economic importance inhabiting the Lake St. Clair fringe areas are muskrat (Ondatra zibethicus), raccoon (Procyon lotor), weasel (Mustela spp.), mink (M. vison), and striped skunk (Mephitis mephitis). 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, food sources, or relationship to water levels of the mammals inhabiting Marsac Point Wetland.

Endangered Species

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Marsac Point Wetland by the literature search.

Health

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

Population

Marsac Point Wetland is located in Ira Township of St. Clair county, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-13 indicates that St. Clair County and Ira Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-13. Population Data for the Vicinity of Marsac Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Ira Township	4,412	22.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Marsac Point Wetland.

Mineral, Energy, and Forest Resources

Sand is a potential mineral resource in the vicinity of Marsac Point Wetland. Sand pits are located one-half mile inland from the wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

A small (one-half square mile) wooded wetland area lies to the northwest of the wetland. Potential energy resources in the vicinity include oil and gas (Great Lakes Basin Commission, 1974). Present oil and gas drilling operations are located approximately three miles inland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Marsac Point Wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Marsac Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Marsac Point Wetland.

RESEARCH PROJECTS LH 010

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

SWAN CREEK WETLAND

PHYSIOGRAPHIC SETTING

LH 011

Swan Creek Wetland is located approximately 0.2 mile from the shoreline of Anchor Bay, which is directly connected to Lake St. Clair, in Ira Township of St. Clair County, Michigan, at Fair Haven. This Palustrine wetland occupies a predominantly non-wooded site, but has a wooded area in the northwestern section (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Topography

Swan Creek Wetland has a relief of five feet and lies at an elevation of 580 feet above mean sea level, which is 5 feet above the approximate mean elevation of Lake St. Clair. The Great Lakes Basin Commission (1975) has described the area as wetlands. The surrounding area is predominantly flat coastal plain (U.S.G.S. Baltimore, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Swan Creek Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Coldwater formation (Martin, 1955).

Soils

The Allendale-Latty Soil Association is present in the Meldrum Drain Branch of Swan Creek Wetland. These soils are nearly level to gently sloping, are poorly drained, and have a sandy to clayey subsoil.

The Latty Soil Association is present in the Swan Creek Branch of Swan Creek Wetland. These soils are nearly level, very poorly drained, and have a clayey subsoil (Landtiser, 1974).

Hydrology

The wetland is located at the junction of Swan Creek, Mildrum Drain, and the subsequent canal that is continuous with Lake St. Clair (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973). 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 Swan Creek and Meldrum Drain may be found in Twenter et al. (1975).

Climate

The closest weather station providing climatic data for Swan Creek Wetland is located in Grosse Point Farms, Michigan*. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a

precipitation of 2.36 inches in January and 1.81 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Swan Creek Wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

BIOTIC SETTING LH 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 Swan Creek Wetland.

Fish

Commercial fishing on the United States side of Lake St. Clair has been discontinued since the 1930's and no commercial operations are likely to be encountered in Swan Creek Wetland. Lake St. Clair is the most valuable of the Michigan Great Lakes areas for non-salmonid recreational fishing, accounting for 33 percent of the total catch and 48 percent of the total fishing effort expended. The primary species caught or sought include walleye (Stizostedion vitreum), yellow perch (Perca flavescens), centrarchid panfish, large mouth bass (Micropterus salmoides), and smallmouth bass (Micropterus dolomieui), and northern pike (Esox lucius) (Jaworski and Raphael, 1978), in addition to so-called rough species such as carp (Cyprinus carpio), bullheads (Ictalurus spp.), and channel catfish (Ictalurus punctatus). It is likely that some recreational fishing occurs in the vicinity of Swan Creek Wetland. In addition to species mentioned above, other species known to utilize coastal wetlands in Michigan (Appendix A-1), may utilize Swan Creek 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 Swan Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Swan 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 Swan Creek Wetland.

Mammals

A general discussion of Lake St. Clair estuary (U.S. Fish and Wildlife Service, 1970) states that the mammalian species of economic importance inhabiting the Lake St. Clair fringe areas are muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), weasel (*Mustela* spp.), mink (*M. vison*), and striped skunk (*Mephitis mephitis*). 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, food sources, or relationship to water levels of the mammals inhabiting Swan Creek Wetland.

Endangered Species

The lake sturgeon (*Acipenser fulvescens*), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 Swan Creek Wetland by the literature search.

Health

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

Population

Swan Creek Wetland is located in Ira Township of St. Clair county, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-14 indicates that St. Clair County and Ira Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-14. Population Data for the Vicinity of Swan Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Ira Township	4,412	22.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under undetermined ownership, but its location suggests that it is subject to heavy development pressure (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Swan Creek Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Swan Creek Wetland include sand and gravel and oil and gas are potential energy resources (Great Lakes Basin Commission, 1974). No significant forest resources are present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Swan Creek Wetland (U.S.G.S. quadrangle map, New Baltimore, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Swan Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Five known archaeological sites (20-SC-1, 20-SC-20, 20-SC-23, 20-SC-24, 20-SC-29) are in the vicinity of Swan Creek Wetland (Peebles and Black, 1976). They are primarily habitation type sites.

There are no known historical sites within 500 ft. of Swan Creek Wetland.

RESEARCH PROJECTS LH 011

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

ST. CLAIR FLATS WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 012-014

Setting

The St. Clair Flats Wetland Complex is located along the shoreline of Lake St. Clair in Clay Township of St. Clair County, Michigan. Bouvier Bay Wetland lies on the shoreline of Bouvier Bay, which is directly connected to Lake St. Clair, and is approximately 4.1 miles from New Baltimore, Michigan. Dickinson Island Area Wetland lies on Dickinson, McDonald, North, Middle, and Green Islands in Lake St. Clair, within the St. Clair Flats State Wildlife Area, and extends from the shoreline to approximately 0.2 mile lakeward. Harsens Island Wetland is located on Harsens and Bruchner Islands in Lake St. Clair, also within the St. Clair Flats State Wildlife Area, and extends from the shoreline approximately 0.2 mile lakeward.

This Palustrine-Lacustrine-Riverine wetland complex is predominantly non-wooded, except for part of Harsens Island Area Wetland (U.S.G.S quadrangle maps, St. Clair Flats, Michigan-Ontario, 1973; Algonac, Michigan-Ontario,1973; Marine City, Michigan-Ontario, 1973; and New Baltimore, Michigan, 1973).

Topography

The St. Clair Flats Wetland Complex has a relief of four feet and lies at an elevation of 579 feet above mean sea level, which is four feet above the approximate mean elevation of Lake St. Clair. The Great Lake Basin Commission (1975) has described the area as wetlands. The surrounding terrain is flat coastal plain which rises as it progresses inland. (U.S.G.S. quadrangle maps, New Baltimore, Michigan, 1968; Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973; St. Clair Flats, Michigan-Ontario, 1968).

Surficial Geology

The surficial geology of the area in which the St. Clair Flats Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Latty Soil Association is present in the northernmost section of Bouvier Bay Wetland. These soils are nearly level, very poorly drained and have a clayey subsoil. The Bach Soil Association is present in the remainder of the St. Clair Flats Wetland Complex. These soils are nearly level, very poorly drained, dominantly high in lime and have a loamy subsoil (Landtiser, 1974).

Hydrology

Beaubien Creek, Beaverdam Drain, Swartout Creek, and many channels of the St. Clair River flow through the St. Clair Flats Wetland Complex (U.S.G.S.

quadrangle maps, New Baltimore, Michigan, 1973; St. Clair Flats, Michigan-Ontario, 1968; Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973). 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 Beaubien Creek and Swartout Creek may be found in Twenter et al. (1975). Additional information regarding the St. Clair River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for the St. Clair Flats Wetland Complex is located in Grosse Point Farms, Michigan*. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (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 St. Clair Flats Wetland Complex (U.S.G.S. quadrangle maps, New Baltimore, Michigan, 1973; St. Clair Flats, Michigan-Ontario, 1968; Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

BIOTIC SETTING

LH 012-014

Vegetation

Jaworski and Raphael (1976) provides information regarding the major species composition of various plant zones found in the St. Clair Flats, as well as a brief summary of the relationship between water levels and plant zones. While this information is not wetland specific, it is applicable to the entire complex and presents a good characterization of the vegetation occurring in the St. Clair Delta. On the various islands of the delta five major plant zones occur. These include, from driest to wettest habitat: oak-ash hardwood forest, dogwood-grass zone, sedge marsh, cattail marsh, and bulrush marsh. Other easily identifiable plant zones which are small and limited in distribution include canal-pond-abandoned channel aquatic plant zones, lake and bay bottom communities, and reed grass zones.

Oak-ash hardwood forest occurs in the upper portion of Dickenson, Harsens, Squirrel, Walpole, and St. Anne Islands. Major species of this forest include red ash (*Fraxinus pennsylvanica*) and swamp white oak (*Quercus bicolor*). Associated species occurring in this forest include pin oak (*Quercus palustris*), burr oak (*Quercus macrocarpa*), shagbark hickory (*Carya ovata*) and cottonwood (*Populus deltoides*).

The dogwood-grass zone occurs as a transition zone between the forest and the wetter sedge marsh. Infrequent flooding and human disturbance (burning and mowing) may prevent this zone from reverting to hardwood forest. Major species composing this zone include blue-joint grass (Calamagrostis canadensis), soft rush (Juncus effusus), quaking aspen (Populus tremuloides), gray dogwood (Cornus racemosa), and red osier (Cornus stolonifera). Associated species of this zone include fowl meadow grass (Poa palustris), marsh fern (Dryopteris thelypteris), spike rush (Eleocharis erythropoda), swamp milkweed (Asclepias incarnata), silverweed (Potentilla anserina), vetch (Vicia angustifolia), cottonwood, silky willow (Salix sericea), swamp rose (Rosa palutris), wild grape (Vitis palmata), and hawthorn (Crateagus sp.).

The sedge marsh comprises a narrow zone located between the dogwood-grass zone and the cattail marsh, as well as along eroding lake and bay shorelines, particularly on the American side of the delta. This plant zone may also occur along lower distributary channels and on old shorelines now stranded in the cattail marsh. The sedge marsh occurs in wet sites which are occasionally flooded; however, permanent water depth does not exceed ten inches. Major species of the sedge marsh include blue-joint grass and sedges (Carex stricta var. strictior, C. lasiocarpa, C. sartwellii, C. lanuginosa, C. lacustris). On eroding shorelines nightshade (Solanum sp.) and common comfrey (Symphytum officinale) may also occur.

The cattail marsh is a broad zone located on lower portions of the delta where permanent water depths exceed six inches. Zones of cattail also occur on inundated shoulders of river chanels, on lower ends of distributary channels and on crevasses. Pure stands of cattail are associated with peaty or clayey sediments in the St. Clair delta. The major species present is narrow-leaved cattail (Typha angustifolia). In small open water areas with very shallow water within the cattail marsh, duckweeds (Lemna minor, Spirodela polyrhiza), water milfoil (Myriophyllum alterniflorum), and bladderwort (Utricularia vulgaris) are abundant.

The bulrush marsh is prevalent inside the abandoned river channels and in the cattail marsh where open water and sandy sediments occur. Water depths in the bulrush range from two to four feet. The major species of the bulrush marsh is hard-stem bulrush (Scirpus acutus). Buttonbush (Cephalanthus occidentalis) occurs as an associate in the bulrush marshes.

The canal-pond-abandoned channel aquatic plant zones occur in artificial canals, openings in the marshes, and abandoned river channels, where water depths range from one to three feet. While communities vary in composition, the most frequently occurring species are duckweed, pickerel weed (Pontederia cordata), elodea (Elodea canadensis), smartweed (Potamogeton amphibium) and water milfoil. Associated species include yellow pond lily (Nuphar rubrodiscum) white water lily and slender pondweed (Potamogeton pusillus), as well as green algae (Cladophora sp.).

The lake and bay bottom communities occur along low wave energy lake bottoms and nearshore environments of the bays such as Little Muscamoot Bay. Water depths range from one to five feet. Major species occurring in this zone include wild celery (Vallisneria americana), pickerel weed, yellow pond lily,

smartweed, water milfoil, narrow-leaved cattail, hard-stem bulrush, and three square (Scirpus americanus).

The reed grass zone consists of small, scattered clumps of reed grass throughout the delta at or just below the water level. Reed grass zones are especially prevalent in Middle, South and Bassett Channels.

The literature search provided no site-specific information concerning density and productivity of the vegetation in the three wetlands comprising the St. Clair Flats Wetland Complex.

Fish

Major game fish species which furnish a recreational fishery in Bouvier Bay Wetland, known also as St. John's Marsh, include northern pike (Esox lucius), largemouth bass (Micropterus salmoides), yellow perch (Perca flavescens), bullheads (Ictalurus spp.), and various panfish (Lepomis spp.) (Pospichal, 1977). Recreational fishing is popular from shore sites as well as from boats in the shallow bays and channels of St. John's Marsh (Appendix A-2). Other fish species known to utilize coastal wetlands in Michigan, listed in Appendix A-1, may also occur in St. John's Marsh. Northern pike, muskellunge (Esox masquinongy), smallmouth bass (Micropterus dolomieui), largemouth bass, walleye (Stizostedion vitreum), yellow perch, and bluegill (Lepomis macrochirus) are known to spawn in this marsh (Michigan Department of Natural Resources, 1976). One-half the Michigan recreational muskellunge catch occurs in Lake St. Clair (Jaworski and Raphael, 1978), and the marshy channels of the St. Clair Delta, including St. John's Marsh, are probably major spawning areas for that species. The commercial fishery on the United States side of Lake St. Clair has been discontinued since the 1930's, and no commercial operations are likely to be encountered in St. John's Marsh. Within the St. Clair Flats State Wildlife Area on Dickenson Island and on Harsens Island "superb" recreational fishing is available for muskellunge, northern pike, walleye, yellow perch, smallmouth bass, channel catfish (Ictalurus punctatus), bullheads, bluegill, other sunfishes (Lepomis spp.), crappie (Pomoxis spp.) rock bass (Ambloplites rupestris), white bass (Morone chrysops), lake sturgeon (Acipenser fulvescens), coho salmon (Oncorhynchus kisutch), steelhead trout (Salmo gairdneri), and other species. The area is also a prolific producer of bait minnows. Bow and arrow fishing for carp (Cyprinus carpio) is a popular springtime activity, which generates possibly 3-5,000 angler-days of recreation per year (Pospichal, 1977). Species which spawn or have nursery areas in Dickenson Island Area Wetland include northern pike, carp, smallmouth bass, bluegill, largemouth bass (Micropterus salmoides), rock bass, yellow perch, suckers (Catostomidae spp.) (Jaworski and Raphael, 1978; U.S. Army Corps of Engineers, 1974), and probably also muskellunge. Walleye migrate through the North Channel from spawning areas in the Thames River, Ontario, and Lake Erie, furnishing a productive recreational fishery in this area. Lake sturgeon are also reportedly taken in a deep hole in the North Channel. Trout stocking in this hole has been suggested to the Lake St. Clair Advisory Committee. The west end of Dickenson Island at the Snibora Channel is also a popular fishing area for white bass, largemouth and smallmouth bass, northern pike, and muskellunge (U.S. Army Corps of Engineers, 1974). Some of the major recreational fishing areas of Dickenson and Harsens Islands are shown in Appendix A-2. Since commercial fishing has been

discontinued on the United States side of Lake St. Clair since the 1930's, no commercial operations, other than collection of bait minnows, is likely to be encountered in Dickenson Island Area Wetland or Harsens Island Wetland. Other fish species known to utilize the coastal wetlands of Michigan, (Appendix A-1) probably also utilize these two wetlands.

The literature search provided no site-specific data pertaining to seasonal distribution and abundance, life histories, food sources, or commercial use of the fish populations in the three wetlands of the St. Clair Flats Wetland Complex.

Invertebrates

Wolcott (1903) reported three species of water mites (Acari), Limnesia histrionica, L. maculata, and L. paucispina, from Lake St. Clair. More recent information on the distribution of water mites in the littoral zone of the lake is available in Modlin et al. (1973). A list of the species collected and their relative abundance appears in Appendix B-3. Piona, Hygrobates, Limnesia, and Lebertia were the most abundant genera collected. A list of naiad molluscs compiled by Goodrich et al. (1932) for Lake St. Clair is presented in Appendix B-4. Berry (1943) reported the molluscs, Amnicola binneyana, A. lustrica, A. limosa, from this area. All or some of these species may occur in the St. Clair Flats Wetland Complex. However, 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 these wetlands.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histoires, major food sources, or relationship to water levels of the reptiles and amphibians in the St. Clair Flats Wetland Complex.

Avifauna

A list of waterfowl, marshbirds and raptors which were observed by Pospichal (1977) in Bouvier Bay Wetland is presented in Table 1-15. The yellow-headed blackbird (Xanthocephalus xanthocephalus) and the cattle egret (Bubulcus ibis), rare species for the area, were sighted. Short-eared owls (Asio flammeus) and rough-legged hawks (Buteo lagopus) are known to winter here. Mallards (Anas platyrhynchos), black ducks (A. rubripes), pintails (A. acuta), American wigeon (A. americana), blue-winged teal (A. discors), wood ducks (Aix sponsa), northern shovelers (Anas clypeata), scaup (Aythya spp.), canvasbacks (Aythya valisineria), ruddy ducks (Oxyura jamaicensis), hooded mergansers

(Lophodytes cucullatus), and Canada geese (Branta canadensis) are species from Table 1-15 that nest locally. This wetland is also a significant breeding ground for redheads (Aythya americana) and American coots (Fulica americana) and is used by other waterfowl during spring and fall migration. Information on the seasonal abundance, density and productivity of waterfowl in this wetland is presented in Table 1-16. The species and numbers of waterfowl in 1974 in St. Johns Marsh, which is part of Bouvier Bay Wetland, are recorded in Table 1-17. Additional estimates on density and productivity of waterfowl are available in Jaworski and Raphael (1978).

A list of birds observed during a survey of Dickenson Island Area Wetland on April 23, 1975 by Michigan Department of Natural Resources personnel appears in Table 1-15. American coots, dabbling ducks, and diving ducks were observed nesting here and feeding and resting during migration. Mergansers and geese use the area for feeding and resting during spring and fall migration. It is also heavily utilized by shorebirds for staging and during migration (Michigan Department of Natural Resources, 1975-1977). The species and numbers of waterfowl observed on Dickenson Island during the 1974 fall migration are recorded in Table 1-17. Additional information on density and productivity of waterfowl in this area is available in Jaworski and Raphael (1978). Johnston (1959) reported 400 pairs of great blue herons (Ardea herodias) and 25 black-crowned night herons (Nycticorax nycticorax) nesting in a rookery on Dickenson Island in 1959. Great egrets (Casmerodius albus) were observed nesting in the same rookery in 1954 and 1956, but none were seen in 1959.

Harsens Island Area Wetland was surveyed in the vicinity of the State Game Area by Michigan Department of Natural Resources personnel (1975-1977). The species which were observed are listed in Table 1-15. Mallards, blue-winged teal, greater scaup (Aythya marila), common goldeneyes (Bucephala clangula), buffleheads (B. albeola), belted kingfishers (Megaceryle alcyon), herring gulls (Larus argentatus), eastern meadowlarks (Sturnella magna), red-winged blackbirds (Agelaius phoeniceus), common grackles (Quiscalus quiscula) and marsh hawks (Circus cyaneus) were sighted around Gull Island. The State Game Area and Gull Island are utilized as nesting and feeding grounds, and as staging and resting areas during migration, by various species. The interior wetlands of Harsens Island produce significant numbers of mallards, redheads, ring-necked ducks (Aythya collaris) and blue-winged teal. The area is also used by redheads, ring-necked ducks and scaup for resting and feeding during spring migration (Michigan Department of Natural Resources, 1975-1977). Species specific information on seasonal abundance, density, and productivity of waterfowl on Harsens Island in 1975 is presented in Table 1-18. Additional information on density and productivity of waterfowl in this area is available in Jaworski and Raphael (1978). The species and numbers of waterfowl observed on the island during the 1974 fall migration are recorded in Table 1-18.

Average annual waterfowl harvest data for 1974-1975 in the St. Clair Flats State Wildlife Area, which includes Dickenson Island Area Wetland and Harsens Island Area Wetland, appear in Table 1-19. Table 1-20 compares the number of waterfowl hunting permit applications in the wildlife area in 1976 to the number allowed; only 26% of all requests were accommodated.

Table 1-15. Birds Observed in the Three Wetlands in St. Clair Flats Wetland Complex

Common name	Bouvier Bay Wetland[a]	Dickinson Island Area Wetland[b]	Harsen's Island Area Wetland[b]
whistling swan	X		X
Canada goose	X		X
snow goose	X		
blue goose	X		
mallard	X	X[d]	X
black duck	X	X[d]	
gadwall	X	X[d]	
pintail	X	X[d]	
American wigeon	X	X[d]	
green-winged teal	X	X[d]	
blue-winged teal	X	X[d]	X
northern shoveler	X	X[d]	X
wood duck	X	X[d]	X
redhead	X	X[d]	X
ring-necked duck	X	X[d]	X
canvasback	X		X
greater scaup	X	X	X
lesser scaup	X	X	X
common goldeneye			X
bufflehead	X		X
ruddy duck	X		
hooded merganser	X	X[d]	
common merganser	X		X
horned grebe			X
pied-billed grebe	X[c]		
belted kingfisher	X		
long-billed marsh wren	X		
short-billed marsh wren	X		
great blue heron	X	X	X
green heron	X		
cattle egret	X		
great egret	X		
black-crowned night heron	X		
least bittern	X		
American bittern	X		
king rail	X		
Virginia rail	X		
sora	X		X
common gallinule	X		
American coot	X	X	
herring gull	X[c]	X	X
ring-billed gull	X		
Forster's tern	X[c]		

-continued-

Table 1-15. concluded

Common name	Bouvier Bay Wetland[a]	Dickinson Island Area Wetland[b]	Harsen's Island Area Wetland[b]
common tern	X	X	X
black tern	X		
eastern meadowlark		X	
yellow-headed blackbird	X		
red-winged blackbird	X	X	X
common grackle		X	
common snipe	X		
American woodcock		X	
Cooper's hawk	X		
red-tailed hawk	X	X	
rough-legged hawk	X	X	
marsh hawk	X		X

[a]Taken from Popsichal, 1977
[b]Taken from Michigan Department of Natural Resources, Environmental Areas Survey, 1975
[c]Taken from Michigan Department of Natural Resources, Environmental Assessment, 1977
[d]Taken from Michigan Department of Natural Resources, Dickinson Island Waterfowl Management Project, 1975

Table 1-16. Seasonal Abundance, Density and Productivity of Waterfowl in Bouvier Bay Wetland[a]

Waterfowl Use	Production		Fall Migration[b]				Spring Migration			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Spring Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	40	0.39	5000	2000	10		3000	2000	3	
black duck	2	0.02	500	500	10		500	200	3	
gadwall										
mottled duck										
green-winged teal			500	200	10		500	200	3	
Am. wigeon			1000	500	10		1000	700	3	
blue-winged/ cinnamon teal	45	0.42	2000	1000	10		1000	900	4	
northern shoveler										
pintail	2	0.02	1000	500	10		1000	700	3	
wood duck	5	0.05	400	100	4		200	200	4	
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	94	0.90	10400	4800			7200	4900		
redhead	4	0.04					2000	1000	4	
canvasback							1000	500	4	
scaups							5000	3000	5	
redneck			500	200	10		500	200	3	
goldeneye/ bufflehead							400	200	4	
ruddy duck	2	0.02					100	100	3	
TOTAL sub-divers	6	0.06	500	200			9000	5000		
other ducks										
TOTAL ducks	100	0.96	10900	5000			16200	9900		

-continued-

Table 1-16. concluded

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Production: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Spring Migration: Avg Peak Pop.	Spring Migration: Avg Spring Pop.	Spring Migration: Avg Duration (no. weeks)	Spring Migration: Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada	2	0.02								
black brant										
brant										
TOTAL geese	2	0.02	0	0	0		0	0	0	
Swans										
whistling										
other										
TOTAL swans	0	0	0	0	0		0	0	0	
TOTAL waterfowl	102	0.98	10900	5000	0		16200	9900	0	

[a] Taken from Michigan Department of Natural Resources, 1975
[b] Fall use influenced by various human activities.

Table 1-17. Species Composition of Waterfowl Observed During Fall Migration on Lake St. Clair, October 7 Through December 3, 1974[a]

Species	Harsens Island	Dickinson Island	St. Johns Marsh
mallard	19,550	137	1,354
black duck	4,900	20	35
American wigeon	0	0	0
pintail	650	0	31
blue-winged teal	0	0	247
green-winged teal	95	0	27
Total Dabblers[b]	25,195	157	1,739
canvasback	0	950	0
redhead	0	10	0
scaup	0	0	0
goldeneye	0	865	0
bufflehead	0	205	1
Total Divers[b]	0	2,030	1
American coots	90	12	360
swans	0	0	0
GRAND TOTALS	25,285	2,199	2,100

Source: Permanent Files, Wildlife Division, Michigan Department of Natural Resources

[a]Taken from Jaworski et al., 1978
[b]includes all identified ducks

Table 1-18. Seasonal Abundance, Density and Productivity of Waterfowl in the Interior Wetlands of Harsen's Island[a]

Waterfowl Use	Production		Fall Migration[b]				Spring Migration			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Spring Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	60	0.56	1500	500	10		1000	500	5	
black duck	5	0.05	100	100	10		100	100	5	
gadwall										
mottled duck										
green-winged teal			200	100	10		100	100	4	
Am. wigeon	1	0.01								
blue-winged/ cinnamon teal	15	0.14	1500	500	4		1000	500	5	
northern shoveler	3	0.03	100				100	100	5	
pintail	4	0.04	100	100	9		100	100	5	
wood duck	2	0.02	200	100	4		100	100	5	
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	90	0.85	3700	1400			2500	1500		
redhead	10	0.09	200		10		1000	500	4	
canvasback							200	100	4	
scaups							2000	1000	5	
redneck			300	100	10		1500	700	5	
goldeneye/ bufflehead							100	100	5	
ruddy duck										
TOTAL sub-divers	10	0.09	500	100			3900	2400		
other ducks										

-continued-

Table 1-18. concluded

Waterfowl Use	Production			Fall Migration			Spring Migration		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Spring Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada	3	0.02	100		10		100			
black brant										
brant										
TOTAL geese	3	0.02	100				100			
Swans										
whistling										
other										
TOTAL swans	0	0	0	0	0		0	0	0	
TOTAL waterfowl	103	0.96	4300	1500	0		6500	3900	0	

[a] Taken from Michigan Department of Natural Resources, 1975
[b] Fall use influenced by various human activities.

Table 1-19. Average Species Composition of Retrieved Ducks in St. Clair Flats State Game Area (1974-1975)[a]

Species	St. Clair Flats SGA	
	Annual Harvest	% of Total
mallards, including domestic	4,362	76.30
scaup	34	0.60
wood duck	28	0.49
black duck and hybrids	498	8.71
green-winged teal	173	3.03
ring-neck duck	78	1.36
bufflehead	18	0.31
blue-winged teal	71	1.24
redhead[b]	4	0.07
goldeneye	9	0.16
American wigeon	138	2.41
canvasback[b]	0	0.00
pintail	242	4.23
merganser	19	0.33
scoter	0	0.00
ruddy duck	3	0.05
oldsquaw	0	0.00
gadwall	30	0.53
northern shoveler	10	0.18
TOTAL	5,717	100.00%

Source: Mississippi Flyway Retrieved Harvest Data, 1965, 1974; and Pospichal (1975 and 1974).

[a] Taken from Jaworski et al., 1978
[b] redhead and canvasback harvests are now restricted in most states

Table 1-20. Comparison of Number of Applications to Number of Available Waterfowl Hunting Reservations at St. Clair Flats State Wildlife Area, 1976[a]

Date	St. Clair Flats WA	
	Reservations	Applications[b]
October 6	55	565
October 7 (am)	60	71
October 7 (pm)	60	53
October 8 (am)	60	40
October 8 (pm)	60	35
October 9 (am)	60	128
October 9 (pm)	60	70
October 10 (am)	60	81
October 10 (pm)	60	56
TOTALS	535	1,099

Source: Permanent Files, Wildlife Division, Michigan DNR

[a]Taken from Jaworski et al., 1978
[b]Each application represents a potential party of 2.5 people.

The literature search provided no site-specific information pertaining to commercial use, life histories, relationship to water levels, or major food sources of the birds utilizing the three wetlands of the St. Clair Flats Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus), red fox (Vulpes vulpes), raccoon (Procyon lotor), mink (Mustela vison), and striped skunk (Mephitis mephitis) can be found on St. John's Marsh, a portion of Bouvier Bay Wetland (Pospichal, 1977). Furbearers are trapped on portions of this wetland (Pospichal, 1977).

Eleven species of mammals can be found on Dickenson Island Area Wetland and Harsens Island Area Wetland (Table 1-21). Muskrat are abundant on these two wetlands of the St. Clair Flats Wetland Complex (U.S. Army Corps of Engineers, 1974), and muskrat trapping is an important activity on both wetlands (Pospichal, 1977). The number of muskrat harvested was 2332 in the 1971-1972 season and 6024 in the 1974-1975 season. Limited hunting of white-tailed deer (Odocoileus virginianus) and upland small game occurs on these two wetlands.

Table 1-21. Mammalian Species on Dickenson Island Area Wetland and Harsens Island Area Wetland[a]

Common name	Common name
Virginia opossum	red fox
eastern cottontail	raccoon
woodchuck	mink
fox squirrel	striped skunk
gray squirrel	white-tailed deer
muskrat	

[a] U.S. Army Corps of Engineers, 1974; U.S. Fish and Wildlife Service, 1977; Pospichal, 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 the three wetlands of the St. Clair Flats Wetland Complex.

Endangered Species

Among the birds recorded in the St. Clair Flats Wetland Complex (Table 1-15), the common tern (Sterna hirundo) is an endangered species in Michigan. The marsh hawk and the Cooper's hawk (Accipiter cooperii) are on the state threatened species list; the black-crowned night heron and the American bittern (Botaurus lentiginosus) are rare in Michigan.

The lake sturgeon (Acipenser fulvescens), a fish species threatened in Michigan, is known to spawn in the coastal wetlands of Lake St. Clair (Jaworski and Raphael, 1978). However, 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 St. Clair Flats Wetland Complex by the literature search.

Health

The available information indicates that the environmental quality of the St. Clair Flats Wetland Complex is good.

CULTURAL SETTING LH 012-014

Population

The St. Clair Flats Wetland Complex is located in Clay Township of St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-22 indicates that St. Clair County and Clay Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-22. Population Data for the Vicinity of the St. Clair Flats Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Clay Township	7,146	12.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and the surrounding area is rural open space. The complex contains one primary, one secondary and several unimproved roads. Artificial land fill has created numerous canals and associated structural development. The wetlands are under state ownership. The location

of the wetland complex suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, New Baltimore, Michigan, 1973; Marine City, Michigan-Ontario, 1973; St. Clair Flats, Michigan Ontario, 1968; Algonac, Michigan-Ontario, 1973).

Recreation

Portions of the St. Clair Flats Wetland Complex are within the boundaries of the St. Clair Flats Wildlife Area, but no information on recreational facilities was found.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the St. Clair Flats Wetland Complex include sand and gravel (Great Lakes Basin Commission, 1974). Several sand pits are located inland from the complex.

Potential energy resources in the vicinity include oil and gas (Great Lakes Basin Commission, 1974). Present oil and gas wells begin approximately one mile inland from the wetlands.

No significant forest resources are present.

Public Utilities and Facilities

A water tank is located in the northeastern section of Bouvier Bay Wetland (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to the St. Clair Flats Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (#20-SC-2) in the vicinity of the St. Clair Flats Wetland Complex. This cemetery site was reported first by Hinsdale in 1931 and subsequently by Quimby in 1938 (Peebles and Black, 1976).

There are no known historical sites within 500 ft. of the St. Clair Flats Wetland Complex.

RESEARCH PROJECTS LH 012-014

The literature search identified no on-going or impending research projects pertaining to the St. Clair Flats Wetland Complex.

POINTE AUX TREMBLE WETLAND

PHYSIOGRAPHIC SETTING LH 015

Setting

Pointe aux Tremble Wetland lies in North Channel of the St. Clair River, which is connected to Lake St. Clair through Middle Channel, at Pointe aux Tremble, Michigan, within Clay Township of St. Clair County. It is a non-wooded Riverine System (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

Topography

Pointe aux Tremble Wetland is partially submerged and lies at an elevation of 575 feet above mean sea level, which corresponds to the approximate mean elevation of Lake St. Clair. The Great Lakes Basin Commission (1975) described the area as wetlands. The surrounding terrain is flat coastal plain which slopes gently upward as it progresses inland (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Pointe aux Tremble Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Bach Soil Association is present in Pointe aux Tremble Wetland. These soils are nearly level, very poorly drained, dominantly high in lime and have a loamy subsoil (Landtiser, 1974).

Hydrology

No streams flow through Pointe aux Tremble Wetland, but it is partially submerged in the St. Clair River (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973). 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. Clair River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Pointe aux Tremble Wetland is located in Grosse Point Farms, Michigan*. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July.

The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Pointe aux Tremble Wetland (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

BIOTIC SETTING LH 015

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 Pointe aux Tremble Wetland.

Fish

The fish and fisheries of Pointe aux Tremble Wetland are probably very similar to those of the St. Clair Flats 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 this wetland.

Invertebrates

Wolcott (1903) reported three species of water mites (Acari), Limnesia histrionica, L. maculata, and L. paucispina, from Lake St. Clair. More recent information on the distribution of water mites in the littoral zone of the lake is available in Modlin et al. (1973). A list of the species collected and their relative abundance appears in Appendix B-3. Piona, Hygrobates, Limnesia, and Lebertia were the most abundant genera collected. A list of naiad molluscs compiled by Goodrich et al. (1932) for Lake St. Clair is presented in Appendix B-4. Berry (1943) reported the molluscs, Amnicola binneyana, A. lustrica, and A. limosa, from this area. All or some of these species may occur in Pointe aux Tremble Wetland.

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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general,

most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pointe aux Tremble 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 Pointe aux Tremble 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 Pointe aux Tremble 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 Pointe aux Tremble 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 LH 015

Population

Pointe aux Tremble Wetland is located in Clay Township of St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-23 indicates that St. Clair County and Clay Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-23. Population Data for the Vicinity of Pointe aux Tremble Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Clay Township	7,146	12.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pointe aux Tremble Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pointe aux Tremble Wetland include sand and gravel (Great Lakes Basin Commission, 1974). Numerous sand pits are located inland from the wetland.

Potential energy resources in the vicinity include oil and gas (Great Lakes Basin Commission, 1974). No significant forest resources are present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Pointe aux Tremble Wetland (U.S.G.S. quadrangle maps, Algonac, Michigan-Ontario, 1973; Marine City, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Pointe aux Tremble Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Pointe aux Tremble Wetland.

RESEARCH PROJECTS LH 015

The literature search identified no on-going or impending research projects pertaining to Pointe aux Tremble Wetland.

POINTE AUX CHENES WETLAND

PHYSIOGRAPHIC SETTING

LH 016

Setting

Pointe aux Chenes Wetland is located on the North Channel shoreline of the St. Clair River at Point aux Chenes, Michigan 0.3 mile from the city of Algonac, within Clay Township of St. Clair County. It is a non-wooded, Palustrine System (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Topography

Pointe aux Chenes Wetland has very little relief and lies at an elevation of 576 feet above mean sea level, which is about one foot above the approximate mean elevation of Lake St. Clair. The Great Lakes Basin Commission (1975) describes the area as a wetland. The surrounding terrain is flat (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Pointe aux Chenes Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Bach Soil Association is present in Pointe aux Chenes Wetland. These soils are nearly level, very poorly drained, dominantly high in lime and have a loamy subsoil (Landtiser, 1974).

Hydrology

There are no streams flowing through Pointe aux Chenes Wetland, but it is adjacent to the St. Clair River (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973). 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. Clair River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Pointe aux Chenes Wetland is located in Grosse Point Farms, Michigan. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July.

The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Pointe aux Chenes Wetland (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

BIOTIC SETTING LH 016

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 Pointe aux Chenes Wetland.

Fish

The fish and fisheries of Pointe aux Chenes Wetland are probably very similar to those of the St. Clair Flats 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 this wetland.

Invertebrates

Wolcott (1903) reported three species of water mites (Acari), Limnesia histrionica, L. maculata, and L. paucispina, from Lake St. Clair. More recent information on the distribution of water mites in the littoral zone of the lake is available in Modlin et al. (1973). A list of the species collected and their relative abundance appears in Appendix B-3. Piona, Hygrobates, Limnesia, and Lebertia were the most abundant genera collected. A list of naiad molluscs compiled by Goodrich et al. (1932) for Lake St. Clair is presented in Appendix B-4. Berry (1943) reported the molluscs, Amnicola binneyana, A. lustrica, and A. limosa, from this area. All or some of these species may occur in Pointe aux Chenes Wetland.

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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in

lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pointe aux Chenes 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 Pointe aux Chenes 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 Pointe aux Chenes 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 Pointe aux Chenes Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Algonac Waste and Water Treatment Plant holds an NPDES permit to discharge into the St. Clair River via a channel. This may have an impact on the wetland.

CULTURAL SETTING LH 016

Population

Pointe aux Chenes Wetland is located in Clay Township of St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-24 indicates that St. Clair County and Clay Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-24. Population Data for the Vicinity of Pointe aux Chenes Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Clay Township	7,146	12.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. Canals transect the wetland. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pointe aux Chenes Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pointe aux Chenes Wetland include sand and gravel (Great Lakes Basin Commission, 1974). Numerous sand pits are located inland from the wetland.

Potential energy resources in the vicinity include oil and gas (Great Lakes Basin Commission, 1974). No significant forest resources are present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Pointe aux Chenes Wetland (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Pollution Sources

Algonac Waste and Water Treatment Plant holds a NPDES permit to discharge into the St. Clair River via a channel. This may have an impact on Point aux Chenes Wetland. No published, site-specific information was located through the literature search pertaining to non-point sources of pollution in this wetland.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Pointe aux Chenes Wetland.

RESEARCH PROJECTS LH 016

The literature search identified no on-going or impending research projects pertaining to Pointe aux Chenes Wetland.

RUSSELL ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 017

Setting

Russell Island Wetland is located in North Channel, which is directly connected to Lake St. Clair through Middle Channel, within Clay Township of St. Clair county, Michigan at Russell Island. The wetland extends approximately 0.1 mile from the Russell Island shoreline and lies 0.2 mile from Algonac, Michigan. This Riverine wetland is non-wooded (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Topography

Russell Island Wetland is partially submerged and lies at an elevation of 575 feet above mean sea level, which is the approximate mean elevation of Lake St. Clair. The surrounding area on the island consists of low mounds (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Russell Island Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Bach Soil Association is present in Russell Island Wetland. These soils are nearly level, very poorly drained, dominantly high in lime and have a loamy subsoil (Landtiser, 1974).

Hydrology

Russell Island Wetland lies in the St. Clair River (U.S.G.S. Quadrangle Map, Algonac, Michigan-Ontario, 1973). 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. Clair River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Russell Island Wetland is located in Grosse Point Farms, Michigan*. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July.

The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

Russell Island, and some smaller islands contiguous to the wetland, provide a buffer to the current of the St. Clair River.

BIOTIC SETTING LH 017

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 Russell Island Wetland.

Fish

The fish and fisheries of Russell Island Wetland are probably very similar to those of the St. Clair Flats 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 this wetland.

Invertebrates

Wolcott (1903) reported three species of water mites (Acari), Limnesia histrionica, L. maculata, and L. paucispina, from Lake St. Clair. More recent information on the distribution of water mites in the littoral zone of the lake is available in Modlin et al. (1973). A list of the species collected and their relative abundance appears in Appendix B-3. Piona, Hygrobates, Limnesia, and Lebertia were the most abundant genera collected. A list of naiad molluscs compiled by Goodrich et al. (1932) for Lake St. Clair is presented in Appendix B-4. Berry (1943) reported the molluscs, Amnicola binneyana, A. lustrica, and A. limosa, from this area. All or some of these species may occur in Russell Island Wetland.

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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in

lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Russell 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 Russell 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 Russell 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 Russell 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 LH 017

Population

Russell Island Wetland is located in Clay Township of St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-25 indicates that St. Clair County and Clay Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-25. Population Data for the Vicinity of Russell Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Clay Township	7,146	12.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under undetermined ownership, but the location of the wetland suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Russell Island Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Russell Island Wetland include sand and gravel, and oil and gas are potential energy resources (Great Lakes Basin Commission, 1974). No significant forest resources are present on the island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Russell Island Wetland (U.S.G.S. quadrangle map, Algonac, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Russell Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Russell Island Wetland.

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

ALGONAC WETLAND

PHYSIOGRAPHIC SETTING

LH 018

Setting

Algonac Wetland is located approximately 0.2 mile from the shoreline of the St. Clair River in Clay Township of St. Clair County, Michigan at the community of Algonac. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

Topography

Algonac Wetland has a relief of five feet and lies at an elevation of 580 feet above mean sea level, five feet above the level of Lake St. Clair. The surrounding area is predominantly flat (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Algonac Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Boyer-Wasepi-Spinks Soils Association is present in Algonac Wetland. These soils are nearly level to gently sloping, well-drained to somewhat poorly drained, dominantly sandy, and have a sandy to loamy subsoil (Landtiser, 1974).

Hydrology

Marine City Drain and two intermittent streams flow through Algonac Wetland (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973). 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 Algonac Wetland is located in Grosse Point Farms, Michigan*. The average monthly temperature was 50.8°F in 1975. The mean daily low for January was 24.4°F and the mean daily high for July was 85.4°F. The annual precipitation was 36.74 inches, with a precipitation of 2.36 inches in January and 1.81 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 13 and the first killing frost on November 14 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Algonac Wetland (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Algonac Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Algonac 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Algonac Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Algonac Wetland.

Avifauna

Data pertaining to the seasonal abundance, density, and productivity of waterfowl in the St. Clair River are presented in Appendix D-1. It may be used extensively by canvasbacks (*Aythya valisineria*) as a staging area and wintering grounds because of open water created by thermal discharges. The species in Appendix D-1 may utilize Algonac Wetland.

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

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 Algonac 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 Algonac 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 LH 018

Population

Algonac Wetland is located in Clay Township of St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-26 indicates that St. Clair County and Clay Township experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

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

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Clay Township	7,146	12.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

Recreation

The northern end of Algonac Wetland is within Algonac State Park. Picnicking, camping, hiking, fishing, hunting, and snowmobiling are recreational activities permitted in the park.

Mineral, Energy, and Forest Resources

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

Potential energy resources in the vicinity include oil and gas (Great Lakes Basin Commission, 1974). There are oil and gas wells approximately one mile to the north of the wetland.

A wooded area of approximately one square mile exists to the north of the wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Algonac Wetland (U.S.G.S. quadrangle map, Marine City, Michigan-Ontario, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Algonac Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (#20-SC-4) in the vicinity of Algonac Wetland (Peebles and Black, 1976). The site is a habitation type.

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 018

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

CUTTLE CREEK AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 019

Setting

Cuttle Creek Area Wetland is located approximately 0.1 mile from the shoreline of the St. Clair River in Marysville Township of St. Clair County, Michigan, 0.5 mile from the town of Marysville. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Topography

Cuttle Creek Area Wetland has a relief of five feet and lies at an elevation of 595 feet above mean sea level, which is about 20 feet above the approximate mean elevation of the St. Clair River. The surrounding area slopes upward from the St. Clair River as it progresses inland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Cuttle Creek Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Hoytville-Allendale-Nappanee Soil Association is present in Cuttle Creek Area Wetland. These soils are nearly level to gently sloping, poorly drained, and have a clayey to sandy subsoil (Landtiser, 1974).

Hydrology

No streams flow through Cuttle Creek Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973). 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 Cuttle Creek Area Wetland is located in Port Huron, Michigan*. The average monthly temperature was 48.7°F in 1975. The mean daily low for January was not reported, but the mean daily high for July was 83.7°F. The annual precipitation was 33.33 inches. July precipitation was 3.29 inches and January precipitation was not reported. The growing season is approximately six months long, with the last killing frost

(28°F) in 1975 occurring on April 17 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Cuttle Creek Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Cuttle Creek Area Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Cuttle Creek 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Cuttle Creek Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Cuttle Creek Area Wetland.

Avifauna

Data pertaining to the seasonal abundance, density, and productivity of waterfowl in the St. Clair River are presented in Appendix D-1. It may be used extensively by canvasbacks (Aythya valisineria) as a staging area and wintering grounds because of open water created by thermal discharges. The species in Appendix D-1 may utilize Cuttle Creek Area Wetland.

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

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 Cuttle Creek 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 Cuttle Creek 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, four NPDES permit holders discharge into the St. Clair River. The effluents may effect Cuttle Creek Area Wetland.

CULTURAL SETTING LH 019

Population

Cuttle Creek Area Wetland is located in the city of Marysville in St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-27 indicates that St. Clair County and Marysville (city) experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-27. Population Data for the Vicinity of Cuttle Creek Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Marysville (city)	6,268	11.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is adjoined by a railroad siding, a hard surface road, and several buildings. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Cuttle Creek Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Cuttle Creek Area Wetland include salt, sand, and gravel (Great Lakes Basin Commission, 1974). A sand pit and salt wells are located in the surrounding area.

No significant forest, oil, or gas 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 Cuttle Creek Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Pollution Sources

The Marysville River Road Water Filtration Plant, the Marysville Waste and Water Treatment Plant, Chrysler Corporation Parts Division, and the St. Clair Rubber Company, Michigan Avenue Plant hold NPDES permits to discharge into the St. Clair River. These effluents may affect Cuttle Creek Area Wetland. No published, site-specific information was located through the literature search pertaining to non-point sources of pollution in this wetland.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Cuttle Creek Area Wetland.

RESEARCH PROJECTS LH 019

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

PORT HURON AREA WETLAND

PHYSIOGRAPHIC SETTING LH 020

Setting

Port Huron Area Wetland is located approximately 200 feet from the shoreline of the St. Clair River in Marysville Township of St. Clair County, Michigan, 0.5 mile from the town of Marysville. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Topography

Port Huron Area Wetland has a relief of five feet and a maximum elevation of 585 feet above mean sea level (ten feet above the approximate mean elevation of the St. Clair River). The surrounding area slopes upward irregularly from the St. Clair River inland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Surficial Geology

The surficial geology of the area in which Port Huron Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Antrim formation (Martin, 1955).

Soils

The Hoytville-Allendale-Nappanee Soil Association is present in Port Huron Area Wetland. These soils are nearly level to gently sloping, poorly drained, and have a clayey to sandy subsoil (Landtiser, 1974).

Hydrology

No streams flow through Port Huron Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973). 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 Port Huron Area Wetland is located in Port Huron, Michigan*. The average monthly temperature was 48.7°F in 1975. The mean daily low for January was not reported, but the mean daily high for July was 83.7°F. The annual precipitation was 33.33 inches. July precipitation was 3.29 inches and January precipitation was not reported. The growing season is approximately six months long, with the last killing frost

(28°F) in 1975 occurring on April 17 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

*Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Port Huron Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

BIOTIC SETTING LH 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 Port Huron Area Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Port Huron 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Port Huron Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and dunes, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in St. Clair County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Port Huron Area Wetland.

Avifauna

Data pertaining to the seasonal abundance, density, and productivity of waterfowl in the St. Clair River are presented in Appendix D-1. It may be used extensively by canvasbacks (Aythya valisineria) as a staging area and wintering grounds because of open water created by thermal discharges. The species in Appendix D-1 may utilize Port Huron Area Wetland.

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

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 Port Huron 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 Port Huron 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, four NPDES permit holders discharge into the St. Clair River, and these effluents may effect Port Huron Area Wetland.

CULTURAL SETTING LH 020

Population

Port Huron Area Wetland is located in the city of Marysville in St. Clair County, Michigan. The county is moderately populated, having a density of 178 persons per square mile. Table 1-28 indicates that St. Clair County and Marysville (city) experienced rapid rates of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in St. Clair County.

Table 1-28. Population Data for the Vicinity of Port Huron Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
St. Clair County	130,749	9.6	199,666
Marysville (city)	6,268	11.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. A railroad track is close to the wetland, as is a hard surface road. The wetland is under undetermined ownership, but its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Port Huron Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Port Huron Area Wetland include salt, sand, and gravel (Great Lakes Basin Commission, 1974). A sand pit and salt wells are located in the surrounding area.

No significant forest, oil, or gas resources are known to be present in the vicinity of the wetland.

Public Utilities and Facilities

A sewage disposal plant, a gaging station, waterworks, and a municipal park are located approximately 0.5 mile north of Port Huron Area Wetland (U.S.G.S. quadrangle map, Port Huron, Michigan-Ontario, 1973).

Pollution Sources

The Marysville River Road Water Filtration Plant, the Marysville Waste and Water Treatment Plant, Chrysler Corporation Parts Division, and the St. Clair Rubber Company, Michigan Avenue Plant hold NPDES permits to discharge into the St. Clair River. These effluents may affect Port Huron Area Wetland. No published, site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Port Huron Area Wetland.

RESEARCH PROJECTS LH 020

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

Table 1-29. Data Gaps-Lake Section 1

Data Gap*		Wetland Number	001	002	003	004	005	006	007	008-009	010	011	012-014	015	016	017	018	019	020
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 2

INTRODUCTION

Lake Section 2 extends from the Sanilac-Huron County line north to Albert Sleeper State Park in Huron County. The region features primarily low, flat topography. The predominant shore type along this 52 mile stretch is erodible low plain. Non-erodible low plains, low dunes, and erodible high bluffs also occur in this lake section.

Figures 2-1 and 2-2 show the approximate location of the 19 wetlands in Lake Section 2. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 2-1. The wetlands of Lake Section 2 lie at elevations ranging from 580 to 600 feet above mean sea level. These wetlands are all classified as Palustrine-Lacustrine Systems.

Available information related to physiographic and cultural features of these 19 wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to biotic characteristics of many of these wetlands.

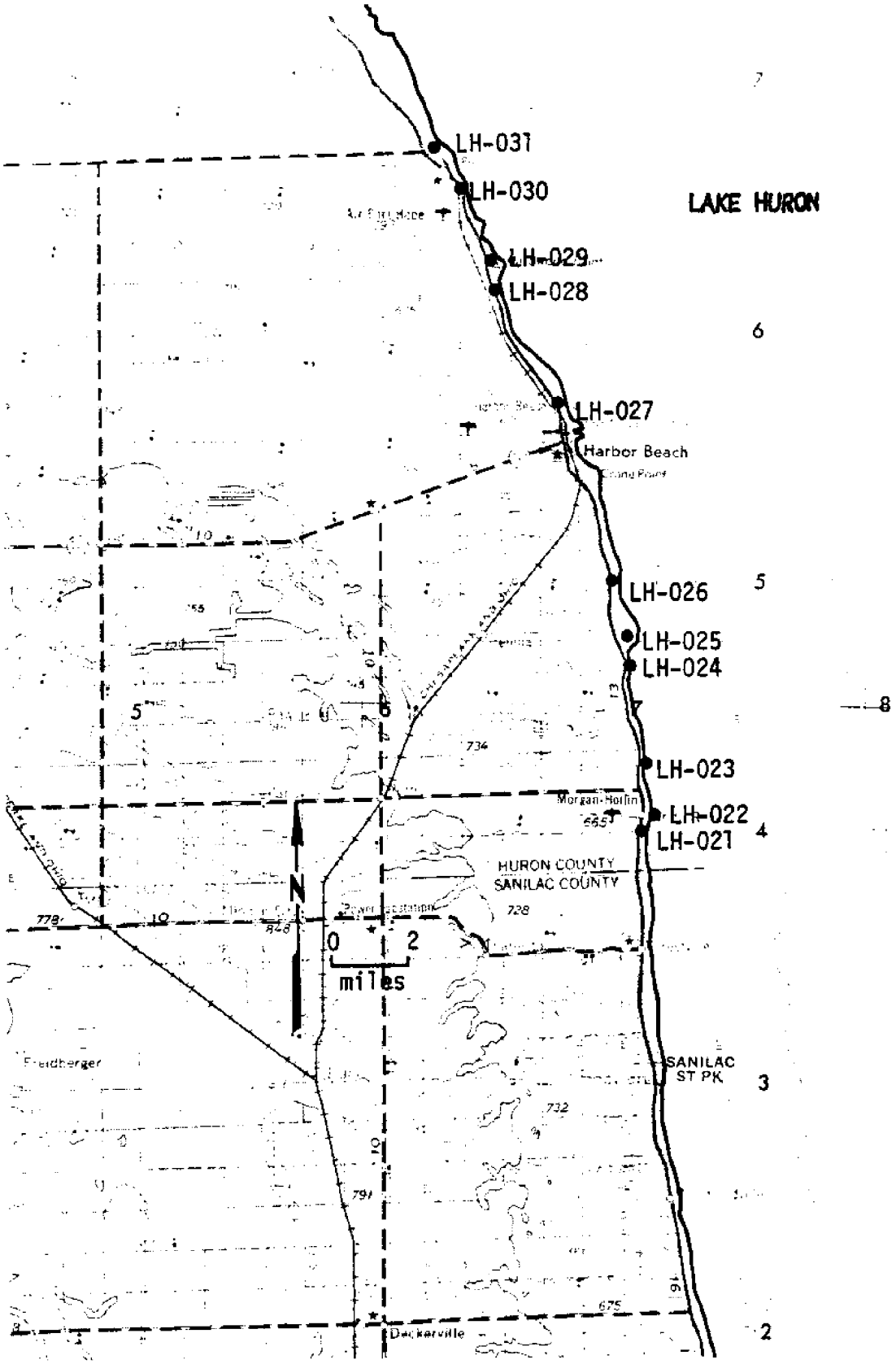


Figure 2-1. Lake Section 2 - Harbor Beach Area

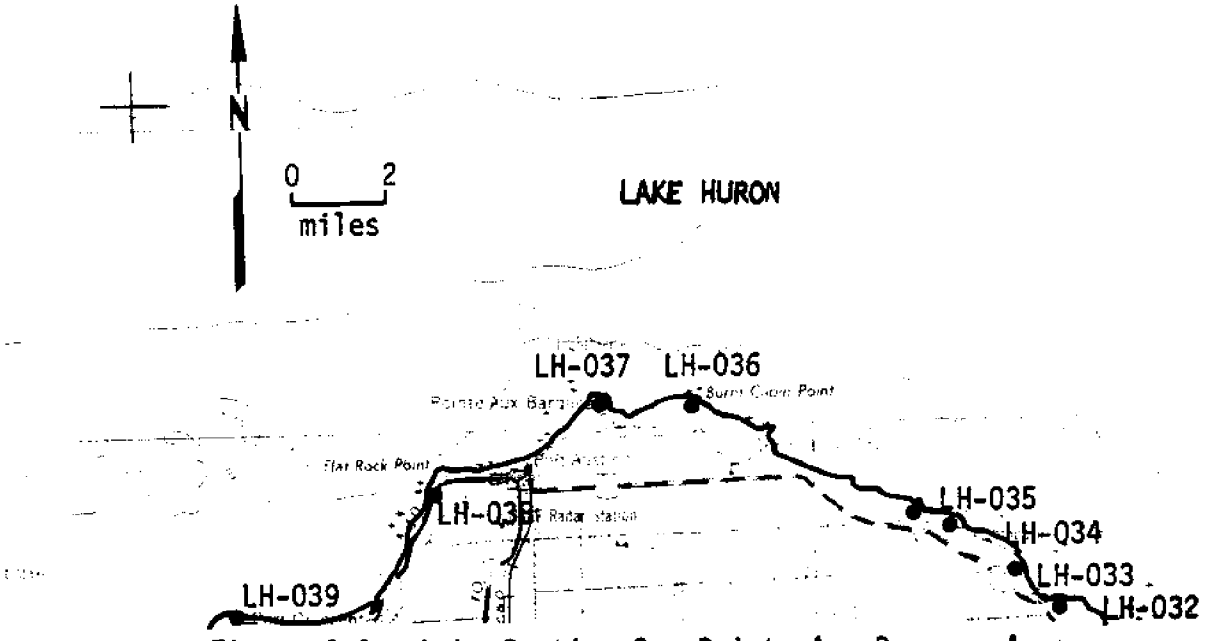


Figure 2-2. Lake Section 2 - Pointe Aux Barques Area

Table 2-1. Location, Acreage, and Classification of Wetlands in Lake Section 2

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 020	Port Huron Area Wetland	42°54'00"	83°28'20"	5	P
	WHITE ROCK AREA WETLAND COMPLEX				
LH 021	White Rock Area Wetland #1	43°42'17"	82°36'28"	5	L
LH 022	White Rock Area Wetland #2	43°42'40"	82°36'20"	23	L
LH 023	White River Area Wetland	43°43'31"	82°36'40"	9	L
LH 024	Purdy Bay Wetland	43°45'36"	82°37'01"	65	L
LH 025	Wagener County Park Wetland	43°46'30"	82°37'10"	10	P
LH 026	North Sharpe Bay Wetland	43°48'02"	82°37'30"	5	P
LH 027	Old Shore Road Area Wetland	43°52'05"	82°39'27"	105	P-L
LH 028	St. Margaret Mission Wetland	43°52'53"	82°40'34"	75	P
LH 029	Hardwood Point Wetland	43°55'04"	82°41'31"	195	P-L
LH 030	Port Hope Wetland	43°56'40"	82°42'27"	10	P-L
LH 031	Gore Township Wetland	43°58'11"	82°43'30"	167	L
LH 032	Whiskey Harbor Wetland	43°59'35"	82°44'47"	40	L
LH 033	North Gore Township Wetland	44°00'15"	82°45'49"	235	P-L
LH 034	Bald Eagle Point Area Wetland	44°01'48"	82°49'07"	120	P-L
LH 035	Willow Creek Wetland	44°02'09"	82°50'18"	272	P-L
LH 036	Burnt Cabin Point Wetland	44°03'54"	82°55'31"	245	P-L
LH 037	Pointe aux Barques	44°03'21"	82°58'25"	360	P-L
LH 038	Flat Rock Point Area Wetland	44°02'06"	83°01'43"	97	P
LH 039	Hat Point Wetland	43°59'44"	83°07'17"	865	P

[a] P=palustrine

WHITE ROCK AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 021-022

Setting

The White Rock Area Wetland Complex is located within Lake Huron in Sherman Township of Huron County, Michigan. The wetland complex extends lakeward for approximately 0.1 mile from the shoreline and lies 2.6 miles from Forestville, Michigan. This Lacustrine complex is non-wooded (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Topography

The White Rock Area Wetland Complex is partially submerged at an elevation of 580 feet above mean sea level, corresponding to the approximate mean lake elevation of Lake Huron. The Great Lakes Basin Commission (1975) describes the adjacent shoreline as erodible high bluff. The coastline rises fairly rapidly, after a flat wide beach area, and levels off at fifty feet above the lake (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Surficial Geology

The surficial geology of the area in which the White Rock Area Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through the White Rock Area Wetland Complex (U.S.G.S. quadrangle map, Forestville, Michigan, 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 this wetland.

Climate

The closest weather station providing climatic data for the White Rock Area Wetland Complex is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly

precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost ($28^{o}F$) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the White Rock Area Wetland Complex (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

BIOTIC SETTING LH 021-022

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 White Rock Area Wetlands #1 and #2.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize White Rock Area Wetlands #1 and #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 these wetlands.

Invertebrates

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 White Rock Area Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in White Rock Area Wetlands #1 and #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 the White Rock 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 White Rock 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 Rock 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 LH 021-022

Population

The White Rock Area Wetland Complex is located in Sherman Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-2 indicates that Huron County experienced rapid population growth, and the population of Sherman Township remained stable, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-2. Population Data for the Vicinity of the White Rock Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sherman Township	1,202	-0.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. A primary road parallels the coast on top of the bluff. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of the White Rock Area Wetland Complex.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of the White Rock Area Wetland Complex.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the White Rock Area Wetland Complex (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to the White Rock 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 or archaeological features are present within 500 feet of the White Rock Area Wetland Complex.

RESEARCH PROJECTS

LH 021-022

The literature search identified no on-going or impending research projects pertaining to the White Rock Area Wetland Complex.

WHITE RIVER AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 023

Setting

White River Area Wetland is located within Lake Huron in Sherman Township of Huron County, Michigan. The wetland extends lakeward for approximately 0.1 mile from the shoreline and lies 4.0 miles from Forestville, Michigan. This Lacustrine System is non-wooded (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Topography

White River Area Wetland is partially submerged and lies at an elevation of 580 feet above sea level, the approximate mean elevation of Lake Huron. The Great Lakes Basin Commission (1975) has classified the adjacent shoreline as erodible high bluff. The surrounding area is a narrow beach, from which the coastline rises fairly rapidly (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Surficial Geology

The surficial geology of the area in which White River Area Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through White River Area Wetland (U.S.G.S. quadrangle map, Forestville, Michigan, 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 this wetland.

Climate

The closest weather station providing climatic data for White River Area Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of White River Area Wetland (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

BIOTIC SETTING LH 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 White River Area Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize White River 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in White River Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in White 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 White 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 White 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 White 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

LH 023

Population

White River Area Wetland is located in Sherman Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-3 indicates that Huron County experienced rapid population growth, and the population of Sherman Township remained stable, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-3. Population Data for the Vicinity of White River Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sherman Township	1,202	-0.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A levee supporting a primary road runs along the coast adjacent to 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, Forestville, Michigan, 1963).

Recreation

No known state or federal recreational facilities are present in the vicinity of White River Area Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of White River Area Wetland.

Public Utilities and Facilities

A roadside park is located approximately 0.2 mile southwest of White River Area Wetland (U.S.G.S. quadrangle map, Forestville, Michigan, 1963).

Pollution Sources

There are no NPDES permit holders adjacent to White River Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are no known historical sites within 500 feet of White River Area Wetland.

There is one known archaeological site (#20-HU-39) in the vicinity of White River Area Wetland. This site features a habitation area and a sacred treaty rock (Peebles and Black, 1976).

RESEARCH PROJECTS LH 023

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

PURDY BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 024

Setting

Purdy Bay Wetland is located within Purdy Bay, which is directly connected to Lake Huron through Sharpe Bay, in Sherman Township of Huron County, Michigan. The wetland extends lakeward for approximately 50 feet from the shoreline and is 5.0 miles from Harbor Beach, Michigan. This Lacustrine System is non-wooded (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Topography

Purdy Bay Wetland is a submerged wetland at the approximate mean water level of Lake Huron (580 feet above sea level). The Great Lakes Basin Commission (1975) has classified the shoreline as erodible high bluff. The adjacent coastline is low and flat for a distance of 500-1000 feet and then rises quickly (U.S.G.S. quadrangle map, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Purdy Bay Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

One intermittent stream flows through Purdy Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970). 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 Purdy Bay Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Purdy Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

BIOTIC SETTING LH 024

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 Purdy Bay Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Purdy 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-specifit data pertaining to seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Purdy Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Purdy 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 Purdy 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 Purdy 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 Purdy 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 LH 024

Population

Purdy Bay Wetland is located in Sherman Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-4 indicates that Huron County experienced rapid population growth, and the population of Sherman Township remained stable between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-4. Population Data for the Vicinity of Purdy Bay Wetland

	Estimated population 1975[a]	Estimated % Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sherman Township	1,202	-0.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A primary road and housing are adjacent to 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, Harbor Beach, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Purdy Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Purdy Bay Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Purdy Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Purdy Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Purdy Bay Wetland.

RESEARCH PROJECTS LH 024

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

WAGENER COUNTY PARK WETLAND

PHYSIOGRAPHIC SETTING

LH 025

Setting

Wagener County Park Wetland is located approximately 0.2 mile from the shoreline of Purdy Bay, which is directly connected to Lake Huron through Sharpe Bay, within Sand Beach and Sherman Townships of Huron County, Michigan. This wooded, Palustrine wetland lies 4.5 miles from Harbor Beach, Michigan (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Topography

Wagener County Park Wetland has a relief of five feet and lies at an elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) described the shoreline as erodible plain. The surrounding area is gently rolling with an overall grade upward from the shore inland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Wagener County Park Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through Wagener County Park Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970). 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 Wagener County Park Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing

season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Wagener County Park Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

BIOTIC SETTING LH 025

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 Wagener County Park Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Wagener County Park 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Wagener County Park Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Wagener County Park 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 Wagener County Park 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 Wagener County Park 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 Wagener County Park 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 LH 025

Population

Wagener County Park Wetland is located in Sherman and Sand Beach Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-5 indicates that Huron County and Sand Beach Township experienced rapid population growth, and the population of Sherman Township remained stable, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-5. Population Data for the Vicinity of Wagener County Park Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sherman Township	1,202	-0.2	--
Sand Beach Township	1,479	11.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One light-duty road crosses the wetland. The wetland is under state ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Recreation

The southern end of Wagener County Park Wetland is included in Wagener County Park. Public access to the water is available, but no information concerning recreational facilities was located.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Wagener County Park Wetland.

Public Utilities and Facilities

Wagener County Park is located adjacent to Wagener County Park Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Wagener County Park Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Wagener County Park Wetland.

The literature search identified no on-going or impending research projects pertaining to Wagener County Park Wetland.

NORTH SHARPE BAY WETLAND

PHYSIOGRAPHIC SETTING LH 026

Setting

North Sharpe Bay Wetland is located on the shoreline of Sharpe Bay, which is directly connected to Lake Huron, within Sand Beach Township of Huron County, Michigan. This non-wooded Palustrine wetland lies approximately 2.7 miles from Harbor Beach, Michigan (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Topography

North Sharpe Bay Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has classified the shoreline as non-erodible low bluff. The surrounding area rises slightly as it progresses inland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which North Sharpe Bay Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

One intermittent stream flows through North Sharpe Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970). 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 Sharpe Bay Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of North Sharpe Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

BIOTIC SETTING LH 026

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 Sharpe Bay Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize North Sharpe 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in North Sharpe Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North Sharpe 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 North Sharpe 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 North Sharpe 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 North Sharpe 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

LH 026

Population

North Sharpe Bay Wetland is located in Sand Beach Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-6 indicates that Huron County and Sand Beach Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-6. Population Data for the Vicinity of North Sharpe Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sand Beach Township	1,479	11.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under private ownership, and its

location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of North Sharpe Bay Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of North Sharpe Bay Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of North Sharpe Bay Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to North Sharpe Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of North Sharpe Bay Wetland.

RESEARCH PROJECTS LH 026

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

OLD SHORE ROAD AREA WETLAND

PHYSIOGRAPHIC SETTING LH 027

Setting

Old Shore Road Area Wetland is located along the shoreline of Lake Huron within Sand Beach and Rubicon Townships of Huron County, Michigan, 0.7 mile from the community of Harbor Beach. The various component parts of the wetland lie from approximately 300 feet inland to 0.1 mile lakeward from the shoreline. This Palustrine-Lacustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Topography

Old Shore Road Area Wetland has an overall relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). Part of the wetland is submerged. The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is primarily low and flat (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Old Shore Road Area Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Two intermittent streams flow through Old Shore Road Area Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970). 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 Old Shore Road Area Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975

occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Old Shore Road Area Wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

BIOTIC SETTING LH 027

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 Old Shore Road Area Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Old Shore Road 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Old Shore Road Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Old Shore Road Area Wetland.

Avifauna

Mallards (Anas platyrhynchos), great blue herons (Ardea herodias), great egrets (Casmerodius albus), red-winged blackbirds (Agelaius phoeniceus),

killdeer (Charadrius vociferus) and American woodcock (Philohela minor) were observed in this wetland during a survey conducted on July 30, 1975 by Michigan Department of Natural Resources personnel (1975-1977).

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 Old Shore Road 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 Old Shore Road 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 Old Shore Road 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 LH 027

Population

Old Shore Road Area Wetland is located in Sand Beach and Rubican Townships of Huron County, Michigan. Huron County is sparsely populated, having a density of 44 persons per square mile. Table 2-7 indicates that Huron County, Sand Beach Township, and Rubicon Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-7. Population Data for the Vicinity of Old Shore Road Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Sand Beach Township	1,479	11.2	--
Rubicon Township	873	8.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Some artificial fill and minor canal work adjoins the wetland. One hard surface and one unimproved road pass through the wetland. U.S. Route 25 and a railroad track are nearby. The wetland is under private ownership but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Old Shore Road Area Wetland.

Mineral, Energy, and Forest Resources

Oil is a potential resource in the vicinity of Old Shore Road Area Wetland (Dorr and Eschman, 1970). An oil well is located approximately one and one-half miles inland from the wetland.

No significant mineral, forest, or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A radio tower and North Park are located approximately 0.3 mile southwest of Old Shore Road Area Wetland. There are a waterworks and a park 0.3 mile southeast of the wetland (U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Old Shore Road Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Old Shore Road Area Wetland.

RESEARCH PROJECTS LH 027

The literature search identified no on-going or impending research projects pertaining to Old Shore Road Area Wetland.

ST. MARGARET MISSION WETLAND

PHYSIOGRAPHIC SETTING

LH 028

St. Margaret Mission Wetland is located along the western shoreline of Lake Huron in Rubicon Township of Huron County, Michigan. This non-wooded Palustrine wetland extends from the shoreline approximately 0.1 mile lakeward and lies 2.0 miles from Harbor Beach, Michigan (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Topography

St. Margaret Mission Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). Parts of the wetland are submerged. The Great Lakes Basin Commission (1975) classified the shoreline as erodible low plain. The surrounding area is predominantly flat, with an interior bluff (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which St. Margaret Mission Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

One intermittent stream flows through St. Margaret Mission Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970). 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 St. Margaret Mission Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of St. Margaret Mission Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

BIOTIC SETTING LH 028

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 St. Margaret Mission Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize St. Margaret Mission 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in St. Margaret Mission Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in St. Margaret Mission 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 St. Margaret Mission 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 St. Margaret Mission 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 St. Margaret Mission Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, there is artificial fill in the vicinity which may effect the quality of the wetland.

CULTURAL SETTING LH 028

Population

St. Margaret Mission Wetland is located in Rubicon Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-8 indicates that Huron County and Rubicon Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-8. Population Data for the Vicinity of St. Margaret Mission Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Rubicon Township	873	8.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There is artificial fill in the area; canals cross the wetland and U.S. Route 25 is adjacent to it. The wetland is under private ownership but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of St. Margaret Mission Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of St. Margaret Mission Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of St. Margaret Mission Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to St. Margaret Mission Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of St. Margaret Mission Wetland.

RESEARCH PROJECTS LH 028

The literature search identified no on-going or impending research projects pertaining to St. Margaret Mission Wetland.

HARDWOOD POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 029

Setting

Hardwood Point Wetland is located along the western shoreline of Lake Huron in Rubicon Township of Huron County, Michigan. This partially wooded, Palustrine-Lacustrine wetland occupies both wooded and non-wooded sites(U.S.G.S. quadrangle map, Harbor Beach, Michigan, 1970).

Topography

Hardwood Point Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (10 feet above the approximate mean elevation of Lake Huron). Parts of the wetland are submerged. The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises slightly as it progresses inland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Hardwood Point Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Ocha Creek flows through Hardwood Point Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970). 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 Hardwood Point Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Hardwood Point Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

BIOTIC SETTING LH 029

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 Hardwood Point Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Hardwood Point 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Hardwood Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Hardwood Point Wetland.

Avifauna

Bird surveys were conducted in this wetland in 1975 and 1976 by the Michigan Department of Natural Resources. The area was used for nesting, feeding, resting, staging, and during migration by the species listed in Table 2-9.

Table 2-9. Birds Observed in Hardwood Point Wetland and Vicinity on April 28, 1975 and September 13, 1976[a]

Common name	Common name
Canada goose	herring gull
mallard	ring-billed gull
blue-winged teal	killdeer
great blue heron	red-tailed hawk
green heron	American kestrel

[a] Michigan Department of Natural Resources

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 Hardwood 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 Hardwood 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 Hardwood 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, dredging takes place adjacent to the wetland and may have some effect on the wetland.

CULTURAL SETTING LH 029

Population

Hardwood Point Wetland is located in Rubicon Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-10 indicates that Huron County and Rubicon Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-10. Population Data for the Vicinity of Hardwood Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Rubicon Township	873	8.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Dredging for canals and basins has taken place and housing development and a trailor park adjoin 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, Port Hope, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Hardwood Point Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Hardwood Point Wetland include sand and gravel (Great Lakes Basin Commission, 1974), but no significant forest, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Hardwood Point Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Hardwood Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Hardwood Point Wetland.

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

PORT HOPE WETLAND

PHYSIOGRAPHIC SETTING LH 030

Port Hope Wetland is located within Lake Huron in Rubicon Township of Huron County, Michigan, approximately 0.2 mile from the community of Port Hope. This Palustrine-Lacustrine wetland occupies a non-wooded site(U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Topography

Port Hope Wetland has little total relief; it consists of partially submerged wetland and low lying spits with an elevation slightly above the approximate mean elevation on Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises gently from the beach inland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Port Hope Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Diamond Creek, an intermittent stream, flows through Port Hope Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970). 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 Port Hope Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Port Hope Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

BIOTIC SETTING LH 030

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 Port Hope Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Port Hope 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Port Hope Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Port Hope 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 Port Hope 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 Port Hope 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 Port Hope 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 LH 030

Population

Port Hope Wetland is located in Rubicon Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-11 indicates that Huron County and Rubicon Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-11. Population Data for the Vicinity of Port Hope Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Rubicon Township	873	8.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. A campground, a secondary road, a railroad siding, and a few buildings are adjacent to the 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, Port Hope, Michigan, 1970).

Recreation

The northern part of Port Hope wetland is in Stafford County Park. Camp sites are provided in the park, and other recreational facilities may be available.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Port Hope Wetland.

Public Utilities and Facilities

Stafford County Park is located 0.1 mile north of Port Hope Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Port Hope Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Port Hope Wetland.

RESEARCH PROJECTS LH 030

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

GORE TOWNSHIP WETLAND

PHYSIOGRAPHIC SETTING LH 031

Setting

Gore Township Wetland is located along the western shoreline of Lake Huron in Gore Township of Huron County, Michigan, 0.6 mile from the community of Port Hope. The various component parts of the wetland extend from the shoreline to approximately 0.1 mile lakeward. This Lacustrine System occupies a predominantly non-wooded site, with some wooded areas in the southern section (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Topography

Gore Township Wetland has a relief of twenty feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises gently as it progresses inland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Gore Township Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Berea-Bedford-Sunbury formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Three intermittent streams flow through Gore Township Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970). 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 Gore Township Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Gore Township Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

BIOTIC SETTING LH 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 Gore Township Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Gore Township 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Gore Township Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Gore 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 Gore 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 Gore 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 Gore 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 LH 031

Population

Gore Township Wetland is located in Gore Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-12 indicates that Huron County experienced rapid growth, while Gore Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-12. Population Data for the Vicinity of Gore Township Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Gore Township	116	-8.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Paved roads and a few structures are adjacent to 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, Port Hope, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Gore Township Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Gore Township Wetland.

Public Utilities and Facilities

Stafford County Park is located approximately 0.2 mile south of George Township Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Gore Township Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Gore Township Wetland.

RESEARCH PROJECTS LH 031

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

WHISKEY HARBOR WETLAND

PHYSIOGRAPHIC SETTING

LH 032

Setting

Whiskey Harbor Wetland is located within Whiskey Harbor, which is directly connected to Lake Huron, in Gore Township of Huron County, Michigan. This non-wooded lacustrine wetland lies approximately 3.6 miles from the community of Port Hope (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Topography

Whiskey Harbor Wetland is partially submerged. Landed portions lie just above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises gently as it progresses inland (U.S.G.S. quadrangle maps, Port Hope, Michigan, 1970; Redman, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Whiskey Harbor Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through Whiskey Harbor Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970). 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 Whiskey Harbor Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Whiskey Harbor Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

BIOTIC SETTING LH 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 Whiskey Harbor Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Whiskey Harbor 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Whiskey Harbor Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whiskey Harbor Wetland.

Avifauna

Canada geese (Branta canadensis), mallards (Anas platyrhynchos), pintails (A. acuta), common goldeneyes (Bucephala clangula), common mergansers (Mergus merganser), herring gulls (Larus argentatus), ring-billed gulls (Larus delawarensis), red-winged blackbirds (Agelaius phoeniceus), and red-tailed

hawks (Buteo jamaicensis) have been recorded in this wetland by Michigan Department of Natural Resources personnel (1975-1977).

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 Whiskey Harbor Wetland.

Mammals

Muskrat (Ondatra zibethicus), red fox (Vulpes vulpes), and raccoon (Procyon lotor) have been observed on Whiskey Harbor Wetland (Michigan Department of Natural Resources, open file report). However, the literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density and productivity, recreational and commercial use, life histories, major food sources, and relationship to water levels of the mammals inhabiting Whiskey Harbor 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 Whiskey Harbor 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 LH 032

Population

Whiskey Harbor Wetland is located in Gore Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-13 indicates that Huron County experienced rapid growth, while Gore Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-13. Population Data for the Vicinity of Whiskey Harbor Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Gore Township	116	-8.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One unpaved road crosses 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, Port Hope, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Whiskey Harbor Wetland.

Mineral, Energy, and Forest Resources

A small potential forest resource consisting of approximately one-half square mile exists to the south of Whiskey Harbor Wetland.

No significant mineral, oil, or gas 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 Whiskey Harbor Wetland (U.S.G.S. quadrangle map, Port Hope, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Whiskey Harbor Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Whiskey Harbor Wetland.

RESEARCH PROJECTS LH 032

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

NORTH GORE TOWNSHIP WETLAND

PHYSIOGRAPHIC SETTING

LH 033

Setting

North Gore Township Wetland is located along the western shoreline of Lake Huron in Gore and Huron Townships of Huron County, Michigan, 3.9 miles from the community of Harbor Beach. This Palustrine-Lacustrine wetland lies approximately 0.2 mile from the Lake Huron shoreline and extends 0.1 mile lakeward (U.S.G.S. quadrangle maps, Huron City, Michigan, 1970; Redman, Michigan, 1970; Port Hope, Michigan, 1970).

Topography

North Gore Township Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is a bluff 30 feet high, with irregular small hills beyond (U.S.G.S. quadrangle maps, Port Hope, Michigan, 1970; Redman, Michigan, 1970; Huron City, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which North Gore Township Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

One intermittent stream flows into North Gore Township Wetland (U.S.G.S. quadrangle maps, Huron City, Michigan, 1970; Redman, Michigan, 1970; Port Hope, Michigan, 1970). 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 Gore Township Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing

season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of North Gore Township Wetland (U.S.G.S. quadrangle maps, Huron City, Michigan, 1970; Redman, Michigan, 1970; Port Hope, Michigan, 1970).

BIOTIC SETTING LH 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 North Gore Township Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize North Gore Township 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in North Gore Township Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North Gore Township Wetland.

Avifauna

Canada geese (Branta canadensis), mallards (Anas platyrhynchos), pintails (A. acuta), common goldeneyes (Bucephala clangula), common mergansers (Mergus merganser), herring gulls (Larus argentatus), ring-billed gulls (Larus delawarensis), red-winged blackbirds (Agelaius phoeniceus), and red-tailed hawks (Buteo jamaicensis) were observed in this wetland during a survey conducted by the Michigan Department of Natural Resources personnel (1975-1977). 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 North Gore 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, major food sources, or relationship to water levels of the mammals inhabiting North Gore 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 North Gore 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 LH 033

Population

North Gore Township Wetland is located in Gore and Huron Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-14 indicates that Huron County experienced rapid growth, while Gore Township underwent a rapid decline and Huron Township experienced slow population growth, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-14. Population Data for the Vicinity of North Gore Township Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Gore Township	116	-8.7	--
Huron Township	347	2.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Two light-duty roads cross 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, Huron City, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of North Gore Township Wetland.

Mineral, Energy, and Forest Resources

A potential forest resource consisting of approximately one square mile exists in North Gore Township Wetland.

No significant mineral, oil, or gas 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 North Gore Township Wetland (U.S.G.S. quadrangle maps, Port Hope, Michigan, 1970; Huron City, Michigan, 1970; Redman, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to North Gore Township Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of North Gore Township Wetland.

RESEARCH PROJECTS LH 033

The literature search identified no on-going or impending research projects pertaining to North Gore Township Wetland.

BALD EAGLE POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LH 034

Setting

Bald Eagle Point Area Wetland is located along the western shoreline of Lake Huron, within Huron and Port Austin Townships of Huron County, Michigan, at Bald Eagle Point. Most of the wetland lies approximately 500 feet from the Lake Huron shoreline, although a part extends into the lake, 0.1 mile from Huron City, Michigan. This Palustrine-Lacustrine System is partially wooded (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

Topography

Bald Eagle Point Area Wetland has a relief of 20 feet, and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non erodible low bluff. The surrounding area is a bluff 30 feet high, with irregular small hills beyond (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Bald Eagle Point Area Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through Bald Eagle Point Area Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970). 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 Bald Eagle Point Area Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing

frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Bald Eagle Point Area Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

BIOTIC SETTING LH 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 Bald Eagle Point Area Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Bald Eagle Point 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Bald Eagle Point Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bald Eagle 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 Bald Eagle 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 Bald Eagle 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 Bald Eagle 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 LH 034

Population

Bald Eagle Point Area Wetland is located in Huron and Port Austin Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-15 indicates that Huron County and Port Austin Township experienced rapid growth, while Huron Township underwent slow population growth, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-15. Population Data for the Vicinity of Bald Eagle Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Huron Township	347	2.1	--
Port Austin Township	1,846	16.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is traversed by one hard surface road and contains a trailor park. U.S. Route 25 parallels the wetland at the bluff elevation. 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 City, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bald Eagle Point Area Wetland.

Mineral, Energy, and Forest Resources

A small potential forest resource consisting of approximately one-half square mile exists in Bald Eagle Point Area Wetland. No significant mineral, oil, or gas 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 Bald Eagle Point Area Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Bald Eagle Point Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (#20-HU-11) in the vicinity of Bald Eagle Point Area Wetland. This site features a habitation area which was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 034

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

WILLOW CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 035

Setting

Willow Creek Wetland is located along the western shoreline of Lake Huron in Port Austin Township of Huron County, Michigan. The partially wooded, Palustrine-Lacustrine wetland extends from approximately 400 feet inland to 300 feet lakeward, and is 0.2 mile from Huron City (U.S.G.S. quadrangle map , Huron City, Michigan, 1970).

Topography

Willow Creek Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises irregularly from the wetland inland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Willow Creek Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Willow Creek flows through, and two intermittent unamed streams flow into, Willow Creek Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970). 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 Willow Creek Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{o}F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Willow Creek Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

BIOTIC SETTING LH 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 Willow Creek Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Willow Creek 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Willow Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Willow 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 Willow 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 Willow 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 Willow 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 LH 035

Population

Willow Creek Wetland is located in Port Austin Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-16 indicates that Huron County and Port Austin Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-16. Population Data for the Vicinity of Willow Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Port Austin Township	1,846	16.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A housing development with associated paved roads borders the wetland on the east. 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 City, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Willow Creek Wetland.

Mineral, Energy, and Forest Resources

A small potential forest resource consisting of approximately one-half square mile exists in the eastern portion of Willow Creek Wetland.

No significant mineral, oil, or gas 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 Willow Creek Wetland (U.S.G.S. quadrangle map, Huron City, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Willow Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (#20-HU-40) in the vicinity of Willow Creek Wetland. This site is composed of various mounds as reported by Smith in 1901 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 035

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

BURNT CABIN POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 036

Setting

Burnt Cabin Point Wetland is located along the western shoreline of Lake Huron in Port Austin Township of Huron County, Michigan, 2.3 miles from the town of Port Austin. The various component parts of this partially wooded Palustrine Lacustrine wetland extend from approximately 400 feet inland to 0.1 mile lakeward (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Topography

Burnt Cabin Point Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has classified the shoreline as non-erodible low bluff. The surrounding area is a bluff 30 feet high, with irregular terrain (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Burnt Cabin Point Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Two intermittent streams flow into Burnt Cabin Point Wetland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970). 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 Burnt Cabin Point Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Burnt Cabin Point Wetland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

BIOTIC SETTING LH 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 Burnt Cabin Point Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Burnt Cabin Point 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 seasonal distribution and abundance, density and productivity, food sources, or relationship to water levels of the invertebrates present in Burnt Cabin Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Burnt Cabin 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 Burnt Cabin 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 Burnt Cabin 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 Burnt Cabin 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 LH 036

Population

Burnt Cabin Point Wetland is located in Port Austin Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-17 indicates that Huron County and Port Austin Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-17. Population Data for the Vicinity of Burnt Cabin Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Port Austin Township	1,846	16.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. An old railroad grade and an unimproved road traverse the wetland.

Several quarries lie in close proximity. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Recreation

The northeast part of Burnt Cabin Point Wetland has been designated as a public use area. No formal name was found.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Burnt Cabin Point Wetland include sand, gravel, and stone. There are several quarries in the surrounding area.

A potential forest resource consisting of approximately three-fourths square mile exists in the western component of the wetland, but no significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A public use are is located within Burnt Cabin Point Wetland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Burnt Cabin Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are two known archaeological sites (#20-HU-18, 20-HU-19) in the vicinity of Burnt Cabin Point Wetland. The sites consist of a habitation area and a mound which were first reported by Hinsdale in 1931(Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 036

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

POINTE AUX BARQUES WETLAND

PHYSIOGRAPHIC SETTING LH 037

Setting

Pointe aux Barques Wetland is located on the western shoreline of Lake Huron in Port Austin Township of Huron County, Michigan, at Point aux Barques, 0.9 mile from the town of Port Austin. The various component parts of this partially wooded, Palustrine-Lacustrine wetland extends from approximately 300 feet inland to 300 feet lakeward (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Topography

Pointe aux Barques Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) describes the shoreline as low dunes. The surrounding area is undulating, with a steady rise inland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Pointe aux Barques Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Baranski Drain flows by Pointe aux Barques Wetland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970). 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 Pointe aux Barques Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Pointe aux Barques Wetland (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

BIOTIC SETTING LH 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 Pointe aux Barques Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A-3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis) and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon marinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyprinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland-utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Pointe aux Barques Area Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal locations and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in this wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Pointe aux Barques Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but

typical Lake Huron open water species and inland water species from other taxa were also present. Appendix C-1 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also lists taxa collected from Saginaw Bay.

The literature search provided no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in this wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pointe aux Barques 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 Pointe aux Barques 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 Pointe aux Barques 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 Pointe aux Barques Wetland by the literature search.

Health

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

Population

Pointe aux Barques Wetland is located in Port Austin Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-18 indicates that Huron County and Port Austin Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-18. Population Data for the Vicinity of Pointe aux Barques Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Port Austin Township	1,846	16.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. An old railroad grade and an unimproved road traverse the wetland. A water tank and several buildings are adjacent to it. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pointe aux Barques Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pointe aux Barques Wetland include sand and gravel. There is a sand pit south of the wetland.

The wetland represents a potential forest resource of approximately one square mile. No significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A radio tower is located approximately 0.4 mile west of Pointe aux Barques Wetland. A filtration plant lies 0.5 mile west of the wetland, and there is a water tank 300 feet to the east (U.S.G.S. quadrangle map, Port Austin East, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Pointe aux Barques Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are three known archaeological sites (#20-HU-40, 20-HU-53, 20-HU-58) in the vicinity of Pointe aux Barques Wetland. The sites consist of a habitation area and various mounds as reported by Smith in 1901 and by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 037

The literature search identified no on-going or impending research projects pertaining to Pointe aux Barques Wetland.

FLAT ROCK POINT AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 038

Setting

Flat Rock Point Area Wetland is located approximately 0.2 mile from the northeastern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Port Austin and Hume Townships of Huron County, Michigan, 0.4 mile from the town of Port Austin. This Palustrine System is partially wooded (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970).

Topography

Flat Rock Point Area Wetland has a relief of five feet and lies at an elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as low sand dunes. The surrounding area is irregular, with a steady slope upward progressing inland (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Flat Rock Point Area Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

One intermittent stream flows through Flat Rock Point Area Wetland (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970). 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 Flat Rock Point Area Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{0}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{0}F and the mean monthly high for July is 79.9^{0}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing

season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Flat Rock Point Area Wetland (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970).

BIOTIC SETTING LH 038

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 Flat Rock Point Area Wetland.

Fish

The fish fauna of the sand dune region of Huron County, Michigan, was surveyed by Leathers (1911). This region extends along the Saginaw Bay shore from approximately Flat Rock Point to Sand Point and inland approximately one half mile to two miles. It includes Flat Rock Point Area Wetland (LH 038), Hat Point Area Wetland (LH 039), Albert Sleeper State Park Wetland (LH 040), Caseville Township Wetland (LH 041), and the Sand Point Wetland Complex (LH 042-045). Although Leathers (1911) cited several site-specific records of fishes in this area, these data are out-dated and of limited value in discussing fishes of these coastal wetlands today. However, Leathers' general habitat association discussions about the fishes he collected are probably still relevant. Fish habitats in the region were classified as follows: shallow lakes or wetlands without outlets or inlets in sandy depressions or between sand ridges, flowing water habitats which drain into Saginaw Bay (e.g., Pigeon River and Mud Creek), county drainage ditches, sheltered embayments on Saginaw Bay (e.g., Turtle Bay on the south shore of Sand Point), and open nearshore waters of Saginaw Bay. The shallowest isolated ponds and palustrine wetlands were probably subject to winterkill conditions and had no connections to Saginaw Bay through which fish were able to immigrate or emigrate. Such habitats apparently contained only brown bullhead (Ictalurus nebulosus), tadpole madtom (Noturus gyrinus), and central mudminnow (Umbra limi). Deeper lentic habitats lacking inlets or outlets, such as nearby Rush Lake, supported a greater diversity of species, including the longnose gar (Lepisosteus osseus), yellow bullhead (Ictalurus natalis), brown bullhead, black bullhead (Ictalurus nebulosus), tadpole madtom, white sucker (Catostomus commersoni), bluntnose minnow (Pimephales notatus), creek chub (Semotilus atromaculatus), goldenshiner (Notemigonus crysoleucas), blacknose shiner (Notropis heterolepis), common shiner (Notropis cornutus), central mudminnow, grass pickerel (Esox americanus), northern pike (Esox lucius), rock bass (Ambloplites rupestris), pumpkinseed (Lepomis gibbosus), largemouth bass (Micropterus salmoides), yellow perch (Perca flavescens), and johnny darter (Etheostoma nigrum). Sheltered embayments, streams, and ditches contained most of the above species, in addition to bowfin (Amia calva), channel catfish (Ictalurus punctatus),

quillback (Carpiodes cyprinus), golden redhorse (Moxostoma aureolum), spotfin shiner (Notropis spilopterus), banded killifish (Fundulus diaphanus), black crappie (Pomoxis nigromaculatus), smallmouth bass (Micropterus dolomieui), walleye (Stizostedion vitreum), logperch (Percina caprodes), blackside darter (Percina maculata), and Iowa darter (Etheostoma exile). However, the unsheltered nearshore zone of Saginaw Bay supported fewer species, including white sucker, spottail shiner (Notropis hudsonius), common shiner, rosyface shiner (Notropis rubellus), trout-perch (Percopsis omiscomaycus), rock bass, pumpkinseed, largemouth bass, walleye, yellow perch, logperch, blackside darter, johnny darter, and mottled sculpin (Cottus bairdi). The longnose sucker (Catostomus catostomus), stonecat (Noturus flavus), freshwater drum (Aplodinotus grunniens), and several salmonids (which probably made little use of wetlands) were also probably common in the nearshore zone (Leathers, 1911). Most of the species listed above were relatively common to abundant at the time of Leathers' survey, but golden redhorse, creek chub, spotfin shiner, black crappie, and mottled sculpin were uncommon to rare. The present fish fauna of this region is not documented in the literature, but it is probably similar to that of 1911, given changes due to siltation, wetland draining, and over-exploitation by commercial fishing of some species. A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Area Wetland (LH 037), and a list of all species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of fishes in Flat Rock Point Area Wetland.

Invertebrates

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 Flat Rock Point Area Wetland.

Reptiles and Amphibians

An old but detailed biological survey of the coastal sand dune region of Huron County between Flat Rock Point and Sand Point included a list of reptiles and amphibians and a discussion of habitat with respect to herpetofauna (Ruthven, 1911). Ruthven's report included no site-specific information relevant to any single coastal wetland in this region, but his definitive species habitat descriptions allow extrapolations concerning the herpetofauna of this wetland to be made with some confidence. A discussion of Ruthven's observations appears in Appendix C-2. Ruthven et al. (1928) later presented a list of species recorded in Huron County, (Appendix C-1). The literature search yielded no site-specific information pertaining to seasonal abundance and distribution, recreational and commercial use, life histories, or relationship to water levels of the reptiles and amphibians in Flat Rock 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 Flat Rock 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 Flat Rock 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 Flat Rock 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 LH 038

Population

Flat Rock Point Area Wetland is located in Port Austin and Hume Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-19 indicates that Huron County, Port Austin Township, and Hume Township all experienced a rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-19. Population Data for the Vicinity of Flat Rock Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Port Austin Township	1,846	16.2	--
Hume Township	617	7.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. Two hard surface roads and a housing development bisect the wetland and State Route 25 is nearby. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Flat Rock Point Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Flat Rock Point Area Wetland include sand and gravel. A sand pit is located to the east of the wetland.

The wetland is mostly wooded, but is not large enough to represent a significant forest resource. No significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

Jenks County Park is located approximately 500 feet west of the southernmost extension of Flat Rock Point Area Wetland (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Flat Rock Point Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (#20-HU-5) in the vicinity of Flat Rock Point Area Wetland. The site consists of a cemetery first reported by Quimby in 1937 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 038

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

HAT POINT WETLAND

PHYSIOGRAPHIC SETTING LH 039

Setting

Hat Point Wetland is located approximately 0.3 mile from the northeastern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Hume and Lake Townships of Huron County, Michigan, 5.6 miles from the town of Port Austin. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle maps, Port Austin West, Michigan, 1970; Kinde West, Michigan, 1970; Rush Lake, Michigan, 1970).

Topography

Hat Point Wetland has a relief of ten feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) describes the shoreline as low dunes. The surrounding area consists of undulating ridges on a generally rising slope inland (U.S.G.S. quadrangle map, Port Austin West, Michigan, 1970; Kinde West, Michigan, 1970; Rush Lake, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Hat Point Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

The Pinnebog River flows through Hat Point Wetland (U.S.G.S. quadrangle maps, Kinde West, Michigan, 1970; Port Austin West, Michigan, 1970; Rush Lake, Michigan, 1970). 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 Hat Point Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five

and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Hat Point Wetland (U.S.G.S. quadrangle maps, Kinde West, Michigan, 1970; Port Austin West, Michigan, 1970; Rush Lake, Michigan, 1970).

BIOTIC SETTING LH 039

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 Hat Point Wetland.

Fish

The fish fauna of the sand dune region of Huron County, Michigan, was surveyed by Leathers (1911) and is discussed under Flat Rock Point Area Wetland (LH 038). The sand dune region includes Hat Point Wetland. A general discussion of fishery resources of Saginaw Bay is presented under Pointe aux Barques Area Wtland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recrational and commercial use of the fish fauna in Hat Point Wetland.

Invertebrates

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 Hat Point Wetland.

Reptiles and Amphibians

An old but detailed biological survey of the coastal sand dune region of Huron County between Flat Rock Point and Sand Point included a list of reptiles and amphibians and a discussion of habitat with respect to herpetofauna (Ruthven, 1911). Ruthven's report included no site-specific information relevant to any single coastal wetland in this region, but his definitive species habitat descriptions allow extrapolations concerning the herpetofauna of this wetland to be made with some confidence. A discussion of Ruthven's observations appears in Appendix C-2. Ruthven et al. (1928) later presented a list of species recorded in Huron County, (Appendix C-1). The literature search yielded no site-specific information pertaining to seasonal abundance and distribution, recreational and commercial use, life histories, or relationship to water levels of the reptiles and amphibians in Hat 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 Hat Point Wetland.

Mammals

A survey of the mammals of the sand dune region of Saginaw Bay's south shore (Ruthven, 1911) provides information concerning mammalian species which historically were found in the region and indicates which them may presently be found there (Appendix E-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, food sources, or relationship to water levels of the mammals inhabiting Hat 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 Hat 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 LH 039

Population

Hat Point Wetland is located in Hume and Lake Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 2-20 indicates that Huron County, Hume Township, and Lake Township all experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 2-20. Population Data for the Vicinity of Hat Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Hume Township	617	7.7	--
Lake Township	600	12.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is traversed by two hard surface roads and contains a trailer park. State Route 25 is adjacent to 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, Port Austin West, Michigan, 1970; Kinde West, Michigan, 1970; Rush Lake, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Hat Point Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Hat Point Wetland include sand and gravel. There are sand pits in the surrounding area.

The wetland and the immediately surrounding area is predominantly wooded, representing a potential forest resource. No significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

Philip County, Oak Beach County, and Thompson County Parks are located approximately 0.2 mile north of Hat Point Wetland (U.S.G.S. quadrangle maps, Rush Lake, Michigan, 1970; Port Austin West, Michigan, 1970; Kinde West, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Hat Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features present within 500 feet of Hat Point Wetland.

RESEARCH PROJECTS LH 039

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

Table 2-21. Data Gaps-Lake Section 2

Data Gap*		Wetland Number	021-022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039
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 Albert Sleeper State Park to the Arenac-Iosco county line. Saginaw Bay, Huron Bay, and the coast of Arenac County lie within Lake Section 3. The region features flat or somewhat irregular low coastal plain. Erodible low plain is also prevalent along this 130 mile stretch of shoreline.

Figures 3-1, 3-2, and 3-3 show the approximate location of the 22 coastal wetlands in Lake Section 3. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 3-1. The wetlands of Lake Section 3 lie at elevations between 580 and 605 feet above sea level. These wetlands are all classified as Palustrine, Lacustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 22 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.

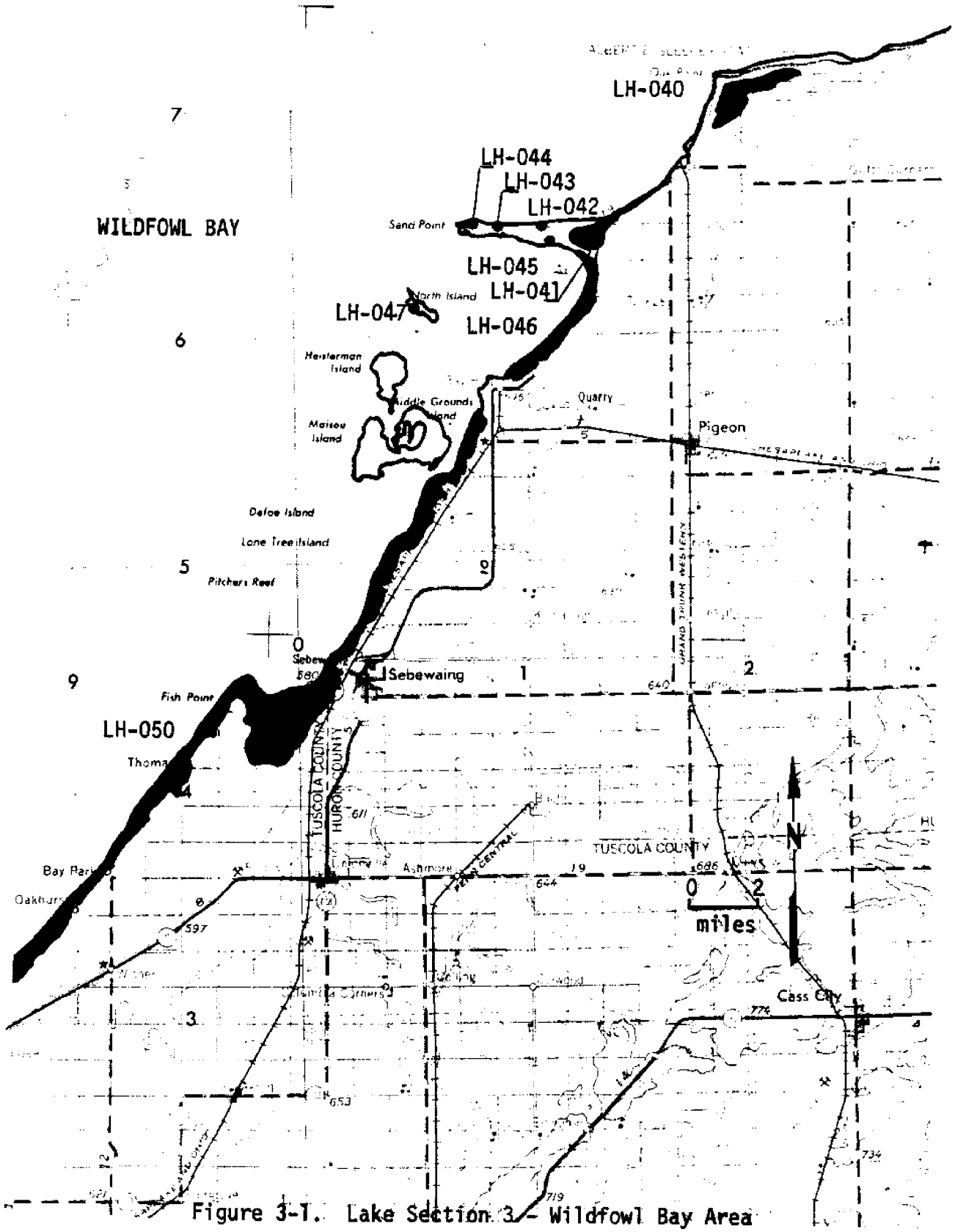


Figure 3-1. Lake Section 3 - Wildfowl Bay Area

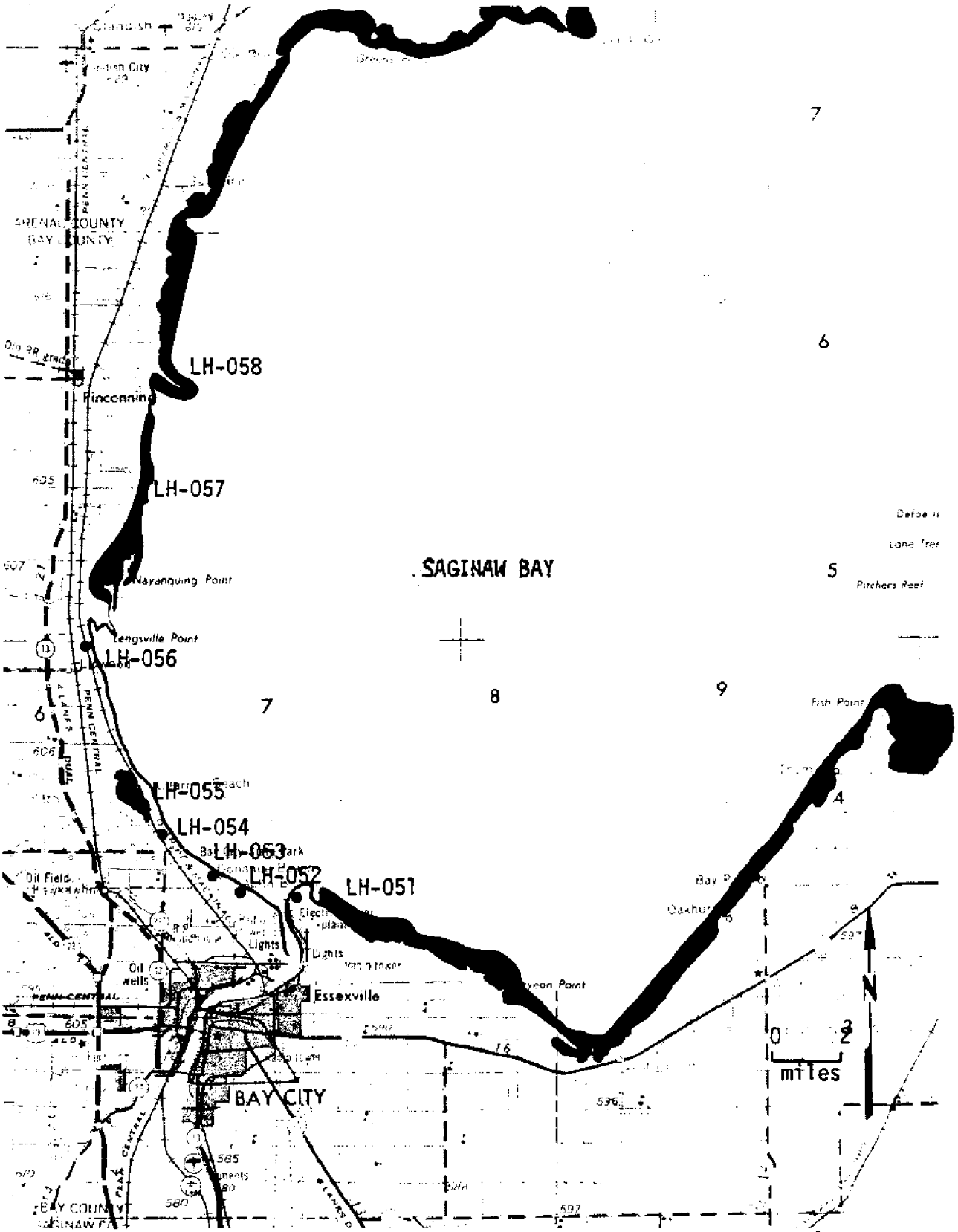


Figure 3-2. Lake Section 3 - Saginaw Bay Area

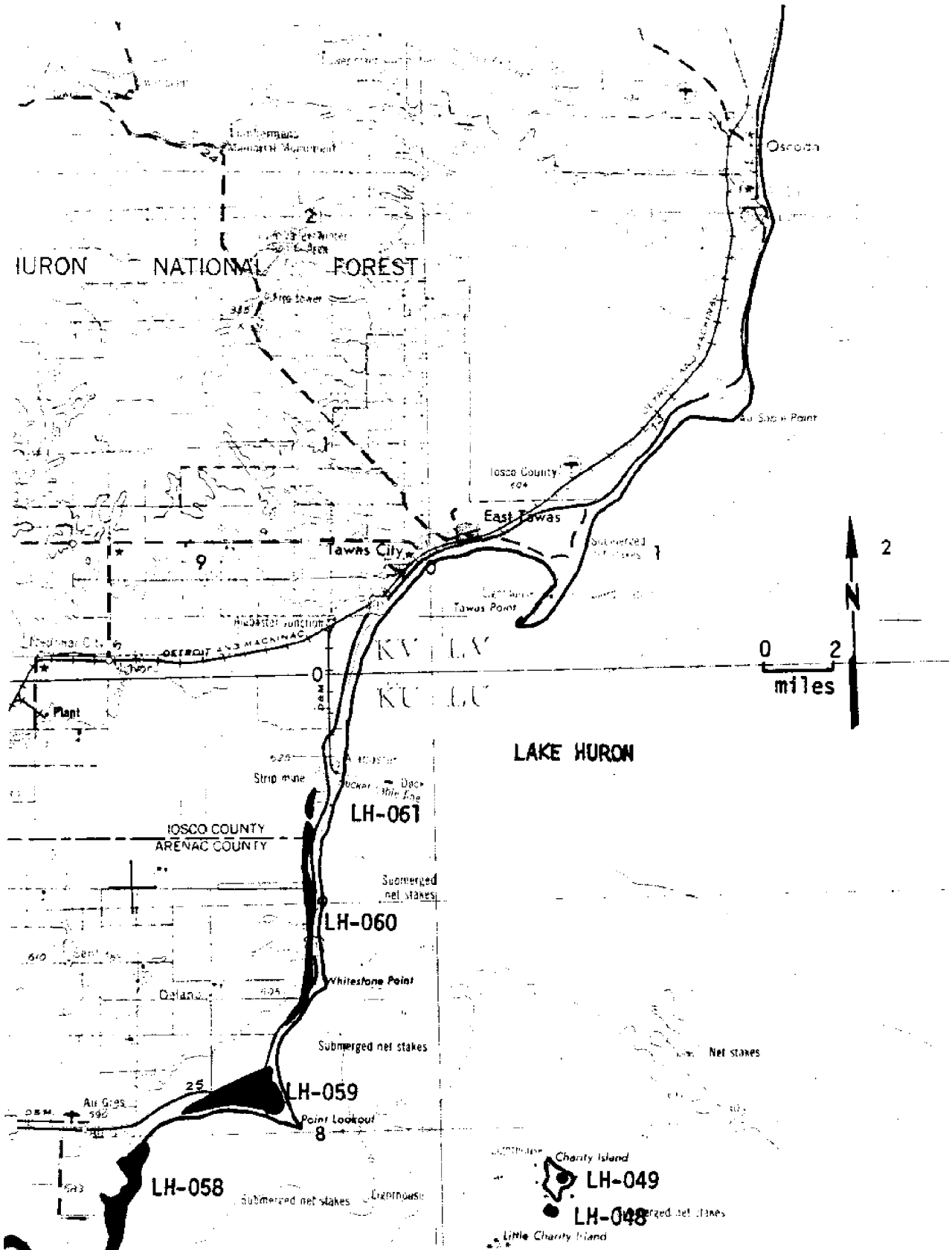


Figure 3-3. Lake Section 3 - East Tawas Point Area

Table 3-1. Location, Acreage, and Classification of Wetlands in Lake Section 3

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 040	Albert Sleeper State Park Wetland	43°58'17"	83°13'58"	1730	P
LH 041	Caseville Township Wetland	43°54'39"	83°18'18"	1640	P-L
	SAND POINT WETLAND COMPLEX				
LH 042	Sand Point Wetland #1	43°54'38"	83°21'56"	10	P
LH 043	Sand Point Wetland #2	43°54'43"	83°23'10"	2	P
LH 044	Sand Point Wetland #3	43°54'59"	83°24'11"	5	P
LH 045	Sand Point Wetland #4	43°54'20"	83°21'19"	10	L
LH 046	Wildfowl Bay Wetland	43°52'28"	83°20'25"	317	P-L
LH 047	North Island Wetland	43°52'45"	83°25'39"	60	L
LH 048	South Gull Island Wetland	44°01'04"	83°26'28"	2	L
LH 049	Charity Island Wetland	44°01'54"	83°26'11"	8	P
LH 050	East Saginaw Bay Coastal Wetland	43°40'58"	83°34'04"	16,730	P-L-R
LH 051	Windy Point Wetland	43°39'13"	83°50'37"	30	L
LH 052	Aplin Beach Wetland	43°39'09"	83°51'53"	97	L
LH 053	Lagoon Beach Wetland	43°39'46"	83°53'25"	37	L
LH 054	Tobico Lagoon Wetland	43°40'21"	83°54'33"	20	P
LH 055	Tobico Marsh	43°41'45"	83°55'59"	565	P-L
LH 056	Linwood Area Wetland	43°44'05"	83°56'49"	85	P-L
LH 057	Nayanguing Point Wildlife Area Wetland	43°49'50"	83°55'04"	2135	L
LH 058	West Saginaw Bay Wetland	44°00'50"	83°45'05"	7235	P-L
LH 059	Schnitzelbank Creek Wetland	44°04'06"	83°37'27"	2640	P-L
LH 060	Whitestone Point Area Wetland	44°06'53"	83°34'20"	537	P
LH 061	Pine Wood Park Area Wetland	44°10'25"	83°33'46"	85	P

[a]P=palustrine

ALBERT SLEEPER STATE PARK WETLAND

PHYSIOGRAPHIC SETTING LH 040

Setting

Albert Sleeper State Park Wetland is located approximately 500 feet from the northeastern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Lake and Caseville Townships of Huron County, Michigan, in Albert Sleeper State Park at Caseville. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Rush Lake, Michigan, 1970).

Topography

Albert Sleeper State Park Wetland 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 Great Lakes Basin Commission (1975) has described the shoreline in the area as low dunes. The surrounding area consists of low sand beach ridges formed by constructive wave action (U.S.G.S. quadrangle maps, Rush Lake, Michigan, 1970; Caseville, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Albert Sleeper State Park Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through Albert Sleeper State Park Wetland (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Rush Lake, Michigan, 1970). 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 Albert Sleeper State Park Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{0}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{0}F and the mean monthly high for July is 79.9^{0}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing

frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 14 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Albert Sleeper State Park Wetland (U.S.G.S. quadrangle maps, Rush Lake, Michigan, 1970; Caseville, Michigan, 1970).

BIOTIC SETTING LH 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 Albert Sleeper State Park Wetland.

Fish

The fish fauna of the sand dune region of Huron County, Michigan, which includes Albert Sleeper State Park Wetland, was surveyed by Leathers (1911) and is discussed under Flat Rock Point Area Wetland (LH 038). A general discussion of fishery resources of Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Albert Sleeper State Park Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Albert Sleeper State Park Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution. density and productivity, major food sources, or relationship to water levels of the invertebrates present in Albert Sleeper State Park Wetland.

Reptiles and Amphibians

An old but detailed biological survey of the coastal sand dune region of Huron County between Flat Rock Point and Sand Point included a list of reptiles and amphibians and a discussion of habitat with respect to herpetofauna (Ruthven, 1911). Ruthven's report included no site-specific information relevant to any single coastal wetland in this region, but his definitive species habitat descriptions allow extrapolations concerning the herpetofauna of this wetland to be made with some confidence. A discussion of Ruthven's observations appears in Appendix C-2. Ruthven et al. (1928) later presented a list of species recorded in Huron County (Appendix C-1). The literature search yielded no site-specific information pertaining to seasonal abundance and distribution, recreational or commercial use, life histories, or relationship to water levels of the reptiles and amphibians in Albert Sleeper State Park 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 Albert Sleeper State Park Wetland.

Mammals

A survey of the mammals of the sand dune region of Saginaw Bay's south shore (Ruthven, 1911) provides information concerning mammalian species which historically were found in the region and indicates which of them may presently be found there (Appendix E-2). However, the literature search yielded no site-specific information pertaining to species composition, seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting Albert Sleeper State Park 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 Albert Sleeper State Park Wetland by the literature search.

Health

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

Population

Albert Sleeper State Park Wetland is located in Lake and Caseville Townships of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 3-2 indicates that Huron County, Lake Township, and Caseville Township all experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 3-2. Population Data for the Vicinity of Albert Sleeper State Park Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Lake Township	600	12.8	--
Caseville Township	1,707	38.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural wooded space, and the surrounding area is predominantly residential on the lakeward side.

State Route 25, two unimproved roads, and one hard surface road pass throught the wetland. There are houses and a campground along the wetland borders. The wetland is under mixed private and state ownership (Albert Sleeper State Park), but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Rush Lake, Michigan, 1970).

Recreation

Much of the eastern portion of Albert Sleeper State Park Wetland lies within Albert Sleeper State Park. Recreational activities permitted in the park include swimming, picnicking, hiking, hunting, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Albert Sleeper State Park Wetland include sand and gravel. A sand pit is located nearby.

The wetland and the immediately surrounding area is predominantly wooded, representing a potential forest resource. No significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

Philip County Park lies approximately 0.3 mile north of the eastern extension of Albert Sleeper State Park Wetland, and a county park lies 0.2 mile to the east (U.S.G.S. quadrangle maps, Rush Lake, Michigan, 1970; Caseville, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Albert Sleeper State Park Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are seven known archaeological sites (# 20-HU-9, 20-HU-10, 20-HU-14, 20-HU-20, 20-HU-21, 20-HU-22, and 20-HU-57) in the vicinity of Albert Sleeper State Park Wetland. These sites consist of habitation areas and cemeteries, first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 040

The literature search identified no on-going or impending research projects pertaining to Albert Sleeper State Park Wetland.

CASEVILLE TOWNSHIP WETLAND

PHYSIOGRAPHIC SETTING LH 041

Setting

Caseville Township Wetland is located along the northeastern shoreline of Saginaw Bay, in Caseville Township of Huron County, Michigan at Caseville. This partially wooded, Lacustrine wetland extends from approximately 500 feet inland to 0.1 mile lakeward (U.S.G.S. quadrangle map, Caseville, Michigan, 1970).

Topography

Caseville Township Wetland has 25 feet of relief and a maximum elevation of 605 feet above mean sea level (25 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) describes the shoreline in the area as erodible low bluff. The surrounding area consists of irregular low lying terrain with some low sand ridges formed by wave action (U.S.G.S. quadrangle map, Caseville, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Caseville Township Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Bayport formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

McKinley Drain flows through Caseville Township Wetland (U.S.G.S. quadrangle map, Caseville, Michigan, 1970). 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 closeset weather station providing climatic data for Caseville Township Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8°F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 14 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Caseville Township Wetland (U.S.G.S. quadrangle map, Caseville, Michigan, 1970).

BIOTIC SETTING LH 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 Caseville Township Wetland.

Fish

The fish fauna of the sand dune region of Huron County, Michigan, which includes Caseville Township Wetland, was surveyed by Leathers (1911) and is discussed under Flat Rock Point Area Wetland (LH 038). A general discussion of fishery resources of Saginaw Bay is presented under Pointe aux Barques Area Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Caseville Township Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Caseville Township Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution. density and productivity, major food sources, or relationship to water levels of the invertebrates present in Caseville Township Wetland.

Reptiles and Amphibians

An old but detailed biological survey of the coastal sand dune region of Huron County between Flat Rock Point and Sand Point included a list of reptiles and amphibians and a discussion of habitat with respect to herpetofauna (Ruthven, 1911). Ruthven's report included no site-specific information relevant to any single coastal wetland in this region, but his definitive

species habitat descriptions allow extrapolations concerning the herpetofauna of this wetland to be made with some confidence. A discussion of Ruthven's observations appears in Appendix C-2. Ruthven et al. (1928) later presented a list of species recorded in Huron County (Appendix C-1). The literature search yielded no site-specific information pertaining to seasonal abundance and distribution, recreational or commercial use, life histories, or relationship to water levels of the reptiles and amphibians in Caseville Township Wetland.

Avifauna

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

Mammals

A survey of the mammals of the sand dune region of Saginaw Bay's south shore (Ruthven, 1911) provides information concerning mammalian species which historically were found in the region and indicates which of them may presently be found there (Appendix E-2). However, the literature search yielded no site-specific information pertaining to species composition, seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting Caseville 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 Caseville 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 LH 041

Population

Caseville Township Wetland is located in Caseville Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 3-3 indicates that Huron County and Caseville Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 3-3. Population Data for the Vicinity of Caseville Township Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Caseville Township	1,707	38.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is primarily rural open space, but a church and a housing development are within the wetland borders. State Route 25 passes through the wetland as do the housing development roads and one other hard surface road. The surrounding area is predominantly residential. McKinley Drain crosses 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, Caseville, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Caseville Township Wetland.

Mineral, Energy, and Forest Resources

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

The majority of the wetland is wooded, representing a potential forest resource. No significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A county park lies approximately 0.4 mile west of Caseville Township Wetland (U.S.G.S. quadrangle map, Caseville, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Caseville Township Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are two known archaeological sites (# 20-HU-51, 20-HU-52)in the vicinity of Caseville Township Wetland. The sites consist of a mound and a cemetery which were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 041

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

SAND POINT WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 042-045

Setting

The Sand Point Wetland Complex is located along the eastern shoreline of Saginaw Bay, which is directly connected to Lake Huron, in Caseville Township of Huron County, Michigan. Sand Point Wetland #1 lies approximately 0.1 mile from the Saginaw Bay shoreline and 4.5 miles from Caseville, Michigan. Sand Point Wetland #2 lies approximately 600 feet from the Saginaw Bay shoreline and 5.5 miles from Caseville. Sand Point Wetland #3 lies on the Saginaw Bay shoreline at Sand Point, Michigan. Sand Point Wetland #4 lies within Wildfowl Bay, which is directly connected to Saginaw Bay, and is approximately 4.5 miles from Caseville. This Palustrine-Lacustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Sand Point, Michigan, 1970; Caseville, Michigan, 1970).

Topography

The Sand Point Wetland Complex has a relief of five feet and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline in the area as erodible low bluff. The surrounding area is irregular, low-lying terrain (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Sand Point, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which the Sand Point Wetland Complex lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Bayport formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through the Sand Point Wetland Complex (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Sand Point, Michigan, 1970). 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 closeset weather station providing climatic data for the Sand Point Wetland Complex is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean

monthly low for January is 19.9°F and the mean monthly high for July is 79.9°F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 14 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Sand Point Wetland Complex (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Sand Point, Michigan, 1970).

BIOTIC SETTING LH 042-045

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 Sand Point Wetlands #1-#4.

Fish

The fish fauna of the sand dune region of Huron County, Michigan, which includes the Sand Point Wetland Complex, was surveyed by Leathers (1911) and is discussed under Flat Rock Point Area Wetland (LH 038). A general discussion of fishery resources of Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in the Sand Point Wetland Complex.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in the Sand Point Wetland Complex owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay. Berry (1943) reported three molluscs, Amnicola binneyana, A. lustrica and A. limosa, from this area.

The literature search yielded no site-specific information pertaining to seasonal distribution. density and productivity, major food sources, or relationship to water levels of the invertebrates present in the Sand Point Wetland Complex.

Reptiles and Amphibians

An old but detailed biological survey of the coastal sand dune region of Huron County between Flat Rock Point and Sand Point included a list of reptiles and amphibians and a discussion of habitat with respect to herpetofauna (Ruthven, 1911). Ruthven's report included no site-specific information relevant to any single coastal wetland in this region, but his definitive species habitat descriptions allow extrapolations concerning the herpetofauna of this wetland to be made with some confidence. A discussion of Ruthven's observations appears in Appendix C-2. Ruthven et al. (1928) later presented a list of species recorded in Huron County (Appendix C-1). The literature search yielded no site-specific information pertaining to seasonal abundance and distribution, recreational or commercial use, life histories, or relationship to water levels of the reptiles and amphibians in Sand Point 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 Sand Point Wetland Complex.

Mammals

A survey of the mammals of the sand dune region of Saginaw Bay's south shore (Ruthven, 1911) provides information concerning mammalian species which historically were found in the region and indicates which of them may presently be found there (Appendix E-2). However, the literature search yielded no site-specific information pertaining to species composition, seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting Sand Point Wetlands #1-#4.

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 Point 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 Sand Point Wetland Complex is located in Caseville Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 3-4 indicates that Huron County and Caseville Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 3-4. Population Data for the Vicinity of the Sand Point Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Caseville Township	1,707	38.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. Unimproved roads pass through two of the wetlands and one wetland is bounded by paved roads. The wetlands are under private ownership, and their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Sand Point, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Sand Point Wetland Complex.

Mineral, Energy, and Forest Resources

Sand is a potential mineral resource in the vicinity of the Sand Point Wetland Complex. No significant forest, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Sand Point Wetland Complex (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Sand Point, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to the Sand Point 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 or archaeological features are present within 500 feet of the Sand Point Wetland Complex.

RESEARCH PROJECTS

LH 042-045

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

WILDFOWL BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 046

Setting

Wildfowl Bay Wetland is located along the shoreline of Wildfowl Bay, which is directly connected to Lake Huron through Saginaw Bay, in McKinley Township of Huron County, Michigan. This partially wooded, Palustrine-Lacustrine wetland extends from the shoreline approximately 0.2 mile lakeward, and lies 3.5 miles from Caseville, Michigan (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Bay Port East, Michigan, 1970).

Topography

Wildfowl Bay Wetland has a relief of five feet and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as wetland. The surrounding terrain is flat with low coastal ridges inland (U.S.G.S. quadrangle maps, Bay Port East, Michigan, 1970; Caseville, Michigan, 1970).

Surficial Geology

The surficial geology of the area in which Wildfowl Bay Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Bayport formation (Martin, 1955).

Soils

No recent soil survey is available for Huron County.

Hydrology

Mud Creek Flows through Wildfowl Bay Wetland (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Bay Port East, Michigan, 1970). 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 closeset weather station providing climatic data for Wildfowl Bay Wetland is located in Harbor Beach, Michigan. The average annual temperature is 45.8^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 19.9^{o}F and the mean monthly high for July is 79.9^{o}F. The average annual precipitation is 33.35 inches, with a mean monthly precipitation of 2.33 inches in January and 3.10 inches in July. The growing season is approximately

five and one-half months long, with the last killing frost (28°F) in 1975 occurring on April 14 and the first killing frost on October 14 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Wildfowl Bay Wetland (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Bay Port East, Michigan, 1970).

BIOTIC SETTING LH 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 Wildfowl Bay Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Wildfowl Bay Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Wildfowl Bay Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Wildfowl Bay Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Wildfowl Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Wildfowl Bay Wetland.

Avifauna

A bird survey was conducted in this wetland between 1975 and 1977 by the Michigan Department of Natural Resources. The area was used for feeding, resting, staging, and during migration by the species listed in Table 3-5. Mallards (Anas platyrhynchos), blue-winged teal (A. discors), pintail (A. acuta), American woodcock (Philohela minor), and the long-billed marsh wren (cistothorus palustris) were observed nesting here. There was a rare sighting of 3 white-fronted geese (Anser albifrons) on April 11, 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 Wildfowl Bay Wetland.

Mammals

The Virginia opossum (Didelphis virginiana), eastern cottontail (Sylvilagus floridanus), squirrel (species unidentified), muskrat (Ondatra zibethicus), red fox (Vulpes vulpes), raccoon (Procyon lotor), striped skunk (Mephitis mephitis), and white-tailed deer (Odocoileus virginianus) have been observed on Wildfowl Bay Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 Wildfowl Bay Wetland.

Endangered Species

Common terns (Sterna hirundo), a species endangered in Michigan; Caspian terns (Sterna caspia) and Cooper's hawks (Accipiter cooperi), which are threatened; and sharp-shinned hawks (Accipiter striatus), rare in Michigan, have been observed in Wildfowl Bay Wetland in recent years (Michigan Department of Natural Resources Survey, 1975-1977).

Table 3-5. Birds Observed in Wildfowl Bay Wetland, 1975-1977[a]

Common name	Common name
whistling swan	sora
Canada goose	herring gull
mallard	ring-billed gull
black duck	common tern
green-winged teal	Caspian tern
blue-winged teal	black tern
American wigeon	red-winged blackbird
wood duck	common grackle
canvasback	semipalmated plover
common goldeneye	killdeer
bufflehead	common snipe
oldsquaw	spotted sandpiper
hooded merganser	greater yellowlegs
common merganser	lesser yellowlegs
red-breasted merganser	pectoral sandpiper
belted kingfisher	sharp-shinned hawk
long-billed marsh wren	Cooper's hawk
great blue heron	red-tailed hawk
green heron	broad-winged hawk
great egret	rough-legged hawk
Virginia rail	American kestrel

[a]Taken from Michigan Department of Natural Resources, Environmental Areas Survey, 1975 -- 1977.

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, the wetland supports a diversity of bird life.

CULTURAL SETTING LH 046

Population

Wildfowl Bay Wetland is located in McKinley Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 3-6 indicates that Huron County and McKinley Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 3-6. Population Data for the Vicinity of Wildfowl Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
McKinley Township	731	14.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is predominantly rural open space, but numerous dredged canals are contained within the wetland, and State Route 25 passes through the landed portion. Several unimproved and two hard surface roads have been built on the many spits. Some housing is present in the wetland and the surrounding area is predominantly residential. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Bay Port East, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Wildfowl Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Wildfowl Bay Wetland include limestone, sand, and gravel (Great Lakes Basin Commission, 1974), but since the wetland is situated along the shoreline of Wildfowl Bay, there is little potential for development of these natural resources. A limestone quarry and a sand pit are inland from the wetland.

A wooded area exists just inland from the shore, representing a potential forest resource. No significant oil or gas 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 Wildfowl Bay Wetland (U.S.G.S. quadrangle maps, Caseville, Michigan, 1970; Bay Port East, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Wildfowl Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

The Bay Port commercial fishing historic district is located within 500 ft. of Wildfowl Bay Wetland. Originally settled about 1885, Bay Port developed into one of the largest fresh water fishing ports in the world during the 1930's and 1940's (County Inventory).

There are six known archaeological sites (# 20-HU-1, 20-HU-41, 20-HU-43, 20-HU-44, 20-HU-50, 20-HU-56) in the vicinity of Wildfowl Bay Wetland. These sites consist of a circular enclosure, a cemetery, knapping sites, and habitation areas (Peebles and Black, 1976).

RESEARCH PROJECTS

LH 046

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

NORTH ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 047

Setting

North Island Wetland is located on North Island in Wildfowl Bay, which is directly connected to Lake Huron through Saginaw Bay, within Fairhaven Township of Huron County, Michigan. This partially wooded, Lacustrine wetland extends from the island shoreline approximately 0.1 mile lakeward, and lies 2.2 miles from Bridgeport, Michigan (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970).

Topography

North Island 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 Great Lakes Basin Commission (1975) has described the shoreline as wetland. The surrounding terrain is irregular (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970).

Surficial Geology

The literature search yielded no information regarding the surficial geology of North Island Wetland.

Soils

No recent soil survey is available for Huron County.

Hydrology

No streams flow through North Island Wetland (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970). 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 closeset weather station providing climatic data for North Island Wetland is located in Bay City, Michigan. The average annual temperature is 48.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3^{o}F and the mean monthly high for July is 83.5^{o}F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28^{o}F) in 1975 occurring on April 15 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 North Island Wetland (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970).

BIOTIC SETTING LH 047

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 Island Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to North Island Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in North Island Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in North Island Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in North Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that

may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Huron County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North 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 North Island Wetland.

Mammals

Muskrat (Ondatra zibethicus) have been observed on North Island Wetland (Michigan Department of Natural Resources, open file report).

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat trapping is an important activity on these wetlands, since they provide exceptionally good habitat for muskrat (Jaworski and Raphael, 1978). Only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), red fox (Vulpes vulpes), raccoon (Procyon lotor), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964.

The literature search yielded no site-specific information pertaining to 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 North 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 North Island Wetland by the literature search.

Health

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

Population

North Island Wetland is located in Fairhaven Township of Huron County, Michigan. The county is sparsely populated, having a density of 44 persons per square mile. Table 3-7 indicates that Huron County experienced a rapid rate of population growth, while Fairhaven Township underwent a moderate decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron County.

Table 3-7. Population Data for the Vicinity of North Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Fairhaven Township	1,066	-3.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The opposite side of the island contains several buildings and a dredged canal for a boat landing. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of North Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of North Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of North Island Wetland (U.S.G.S. quadrangle map, Sand Point, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to North Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of North Island Wetland.

RESEARCH PROJECTS LH 047

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

SOUTH GULL ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 048

Setting

South Gull Island Wetland is located on the shoreline of Gull Island in Saginaw Bay, which is directly connected to Lake Huron, within Whitney Township of Arenac County, Michigan. This non-wooded Lacustrine wetland is approximately 9.7 miles from Caseville, Michigan (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Topography

Gull Island has very little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) describes the shoreline as wetland. The island is predominantly sand beach and marsh (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Surficial Geology

The literature search yielded no information regarding the surficial geology of South Gull Island Wetland.

Soils

Redmond (1967) did not provide soil information for South Gull Island Wetland.

Hydrology

No streams flow through South Gull Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970). 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 closeset weather station providing climatic data for South Gull Island Wetland is located in Bay City, Michigan. The average annual temperature is 48.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3^{o}F and the mean monthly high for July is 83.5^{o}F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28^{o}F) in 1975 occurring on April 15 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 South Gull Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

BIOTIC SETTING LH 048

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 Gull Island Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to South Gull Island Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in South Gull Island Wetland.

Invertebrates

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

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Gull 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 South Gull 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 South Gull 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 South Gull 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

LH 048

Population

South Gull Island Wetland is located in Whitney Township of Arenac County, Michigan. The county is sparsely populated, having a density of 36 persons per square mile. Table 3-8 indicates that Arenac County experienced rapid population growth, while Whitney Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Arenac County.

Table 3-8. Population Data for the Vicinity of South Gull Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Whitney Township	669	-10.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is under undetermined ownership, but its location suggests

that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of South Gull Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of South Gull Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Gull Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to South Gull Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of South Gull Island Wetland.

RESEARCH PROJECTS LH 048

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

CHARITY ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 049

Setting

Charity Island Wetland is located on Charity Island in Saginaw Bay, which is directly connected to Lake Huron, within Whitney Township of Arenac County, Michigan. This wooded, Palustrine wetland lies approximately 300 feet from the island shoreline and is 9.8 miles from Caseville, Michigan (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Topography

Charity Island Wetland has 19 feet of relief and a maximum elevation of 599 feet above mean sea level (19 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) describes the shoreline as wetland. The island is irregular in topography (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Charity Island Wetland.

Soils

Redmond (1967) did not provide soil information for Charity Island Wetland.

Hydrology

No streams flow through Charity Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970). 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 Charity Island Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Charity Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

BIOTIC SETTING LH 049

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 Charity Island Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Charity Island Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Charity Island Wetland.

Invertebrates

Historical information on the molluscs of Charity Island is available in Walker (1915). Lymnea elodes, Aplexa hypnorum, and Sphaerium occidentalis were three wet habitat species collected. These as well as the other species listed may or may not occur in wetland habitat on Charity Island under present conditions. The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, life histories, major food sources, or relationship to water levels of the invertebrates present in Charity Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Charity Island Wetland.

Avifauna

Mallards (Anas platyrhynchos), wood ducks (Aix sponsa), ring-billed gulls (Larus delawarensis), red-winged blackbirds (Agelaius phoeniceus), and American woodcock (Philohela minor) were observed during a survey of Charity Island conducted on June 15, 1976 by Michigan Department of Natural Resources personnel. These species may occur in Charity Island Wetland.

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 Charity 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 Charity 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 Charity 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 LH 049

Population

Charity Island Wetland is located in Whitney Township of Arenac County, Michigan. The county is sparsely populated, having a density of 36 persons per square mile. Table 3-9 indicates that Arenac County experienced rapid population growth, while Whitney Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Arenac County.

Table 3-9. Population Data for the Vicinity of Charity Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Whitney Township	669	-10.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There are some ruins on the northern point of the island. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Recreation

No known state or federal recreational facilities are present in the vicinity of Charity Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Charity Island Wetland. Charity Island is wooded, but owing to its small size and location it is not considered suitable for significant development of forest resources.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Charity Island Wetland (U.S.G.S. quadrangle map, Charity Island, Michigan, 1970).

Pollution Sources

There are no NPDES permit holders adjacent to Charity Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Charity Island Wetland.

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

EAST SAGINAW BAY COASTAL WETLAND

PHYSIOGRAPHIC SETTING LH 050

Setting

East Saginaw Bay Coastal Wetland is located along the southern and eastern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Fairhaven, Hampton, Wisner, Huron, and Sebewaing Townships of Huron, Bay, and Tuscola Counties, Michigan. The wetland extends from approximately 2000 feet inland to 3.0 miles off shore. The largest population centers in the area are Sebewaing and Bay City. This Palustrine-Laucstrine-Riverine wetland occupies both wooded and non-wooded sites, and large portions of it are submerged in the bay (U.S.G.S. quadrangle maps, Bay Port West, Michigan, 1970; Sebewaing, Michigan, 1963; Fish Point, Michigan, 1973; Fairgrove, Michigan, 1973; Quanicassie, Michigan, 1973; Essexville, Michigan, 1973; and Bay City Northeast, Michigan, 1973).

Topography

East Saginaw Bay Coastal 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 Great Lakes Basin Commission (1975) has described this area as wetland. This large wetland area is bordered primarily by flat or somewhat irregular low coastal plain (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Bay Port West, Michigan, 1970; Sebewaing, Michigan, 1963; Fish Point, Michigan, 1973; Quanicassee, Michigan, 1973; Fairgrove, Michigan, 1973; Essexville, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which East Saginaw Bay Coastal Wetland lies is characterized by sand dunes, lake bed sand, and lake bed clay. Rock occurring at or near the surface is of the Mississippian period and the Bayport formation, and of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

No soil surveys were available for the section of East Saginaw Bay Coastal Wetland lying in Huron County.

The soils found in the Tuscola and Bay County sections of East Saginaw Bay Coastal Wetland are Coastal Beach and Marsh. These are nearly level, poorly drained soils of sand or sand over gravel, with a clayey subsoil (Deeter and Mathews, 1926; Wonser et al., 1931).

Hydrology

The following water courses flow through East Saginaw Bay Coastal Wetland: Stapleford Drain, Shebeon Creek, Henne Drain, Gettel Drain, Sebewaing River,

Werschley Drain, Armbuster Drain, Wiscoggin Drain, and the Quanicassee River. Also flowing through the wetlands are 23 unnamed water courses and three intermittent streams (U.S.G.S. quadrangle maps, Bay Port West, Michigan, 1970; Essexville, Michigan, 1973; Bay City Northeast, Michigan, 1973; Sebewaing, Michigan, 1963; Fish Point, Michigan, 1973; Fairgrove, Michigan, 1973; Quanicassee, Michigan, 1973). No additional information regarding these water courses could be found. The literature search located no sites-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 Saginaw Bay Coastal Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 East Saginaw Bay Coastal Wetland (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Bayport West, Michigan, 1970; Sebewaing, Michigan, 1963; Fish Point, Michigan, 1973; Quanicassee, Michigan, 1973; Fairgrove, Michigan, 1973; Essexville, Michigan, 1973).

BIOTIC SETTING LH 050

Vegetation

Reichard (1971) reported that emergent vegetation composed predominantly of cattail (*Typha* sp.) and bulrushes (*Scirpus* sp.) extends from 500 to 2000 feet off shore from the Quanicassee Wildlife Area, which constitutes part of East Saginaw Bay Coastal Wetland. Cattails occur near shore in the shallow water of the wet beach, and bulrushes extend into deeper water beyond the cattail zone. Vegetation of the dry beach consists primarily of ash (*Fraxinus* sp.), willow (*Salix* sp.), elm (*Ulmus* sp.), oak (*Quercus* sp.), and herbaceous vegetation. Cattails and alder (*Alnus* sp.) occur in lagoons immediately behind the beach ridge.

The literature search provided no site-specific information pertaining to density, productivity, or relationship to water levels of the vegetation of this wetland.

Fish

Trawling surveys to evaluate environmental effects of wastewater discharges by the Michigan Sugar Company in the nearshore vicinity of Sebewaing, including portions of East Saginaw Bay Coastal Wetland, indicated the presence of the following fish species: alewife (Alosa pseudoharengus), carp (Cyprinus carpio), common shiner (Notropis cornutus), goldenshiner (Notemigonus crysoleucas), unidentified bullhead (Ictalurus sp.), channel catfish (Ictalurus punctatus), yellow perch (Perca flavescens), johnny darter (Etheostoma nigrum), pumpkinseed (Lepomis gibbosus), largemouth bass (Micropterus salmoides), and black crappie (Pomoxis nigromaculatus). Yellow perch fed primarily on midge larvae, Gammarus sp., and fish. Some fish mortality was apparently caused by low dissolved oxygen concentrations in the Michigan Sugar Company wastewater discharge (Michigan Water Resources Commission, 1971). However, the literature search yielded no site-specific information pertaining to spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use at the fish fauna in East Saginaw Bay Coastal Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in East Saginaw Bay Coastal Wetland owing to its proximity to the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay. Berry (1943) reported the molluscs, Amnicola binneyana, A. lustrica, and A. limosa from this area.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, life histories, major food sources, or relationship to water levels of the invertebrates present in East Saginaw Bay Coastal Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Tuscola County, Huron County, and Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in East Saginaw Bay Coastal Wetland.

Avifauna

The part of this wetland known as the Wildfowl Bay State Wildlife Area was surveyed by the Michigan Department of Natural Resources from 1975 to 1977. Table 3-10 lists the species observed. There was a noteworthy sighting of three white-fronted geese (Anser albifrons) on April 11, 1977. Birds observed during a survey conducted in the coastal zone from Wildfowl Bay Wildlife Area to the Saginaw River are also listed in Table 3-10. The first nesting record in Michigan for the yellow-headed blackbird (Xanthocephalus xanthocephalus) was in the vicinity of Coryeon Point, Quanicassee Wildlife Area, in 1956 (Wolf et al., 1961). Table 3-11 summarizes spring waterfowl migrations in the area for 1967, 1969, 1971, and 1977. Data pertaining to the seasonal abundance, density, and productivity of waterfowl in the vicinity of Wildfowl Bay, Fish Point, and Quanicassee Wildlife Area in 1974 are presented in Tables 3-12, 3-13, and 3-14, respectively. Additional information on the density and productivity of waterfowl in 1975 in the vicinity of Sebewaing and the Quanicassee Wildlife Area is available in Jaworski and Raphael (1978). Miller (1949) determined brood density near Sebewaing to be 8.7 broods per square mile for four waterfowl species. The number of hunting permit requests for Fish Point State Wildlife Area in 1976 is shown in Table 3-15. Only 26% of the applications could be accommodated (Jaworski and Raphael, 1978). Data concerning the seasonal abundance, density and productivity, recreational use, relationship to water levels, and major food sources for the avifauna of the Quanicassee power plant site, which occupies part of this wetland, are available in Schinner and Cauley (1974), Koechlein (1973), and Reichard (1971). This Information may be applicable to the southern portion of East Saginaw Bay Coastal Wetland.

Mammals

The relative abundance of mammalian species observed on East Saginaw Bay Wetland has been determined (Table 3-16). Muskrats (Ondatra zibethicus) utilize this wetland extensively (Reichard, 1971). Bulrush (Scripus sp.) and cattails (Typha sp.) appear to be the major food items of muskrat on this wetland.

Table 3-10. Birds Observed in East Saginaw Bay Coastal Wetland[a]

Common name	Wildfowl Bay	Wildfowl Bay to Saginaw River
whistling swan	x	x
Canada goose	x	x
mallard	x	x
black duck		x
gadwall		x
pintail		x
green-winged teal	x	x
blue-winged teal	x	x
American wigeon	x	x
northern shoveler		x
wood duck	x	x
redhead		x
ring-necked duck		x
canvasback	x	
greater scaup		x
lesser scaup		x
common goldeneye	x	x
bufflehead	x	x
oldsquaw	x	
hooded merganser		x
common merganser	x	x
red-breasted merganser		x
horned grebe		x
pied-billed grebe		x
belted kingfisher	x	x
long-billed marsh wren	x	
short-billed marsh wren		x
great blue heron	x	x
green heron	x	x
great egret	x	x
American bittern		x
king rail		x
Virginia rail	x	x
sora	x	
common gallinule		x
American coot		x
herring gull	x	x
ring-billed gull	x	x
Bonaparte's gull		x
Forster's tern		x
common tern		x
caspian tern	x	
black tern	x	x

-continued-

Table 3-10. concluded

Common name	Wildfowl Bay	Wildfowl Bay to Saginaw River
eastern meadowlark		x
red-winged blackbird	x	x
common grackle	x	x
semipalmated plover	x	x
killdeer	x	x
black-bellied plover		x
American woodcock		x
common snipe	x	x
spotted sandpiper	x	x
solitary sandpiper		x
greater yellowlegs	x	x
lesser yellowlegs	x	x
pectoral sandpiper	x	x
dunlin		x
sharp-shinned hawk	x	x
Cooper's hawk	x	
red-tailed hawk	x	x
broad-winged hawk	x	x
rough-legged hawk	x	
marsh hawk		x
American kestrel	x	

[a]Taken from Michigan Department of Natural Resources, Environmental Areas Survey, 1975-1977.

Table 3-11. Aerial Survey of Spring Waterfowl Migrations Fish Point and Sebewaing Bay, 1967, 1969, 1971, 1977[a]

Species	1967		1969		1971		1977	
	Fish Pt.	Sebewaing	Fish Pt.	Sebewaing	Fish Pt.	Sebewaing	Fish Pt.	Sebewaing
mallard	0	37,500	6,000	0	2,000	0	300	300
black duck	0	0	1,200	0	0	0	300	300
pintail	3,000	40,500	6,000	0	0	0	0	100
teal	0	0	750	0	0	0	0	400
all dabblers[b]	3,000	93,000	16,450	0	2,000	0	1,400	2,400
lesser scaup	0	0	7,500	0	0	0	0	0
redhead	0	0	2,500	0	0	0	0	100
canvasback	0	0	750	0	0	0	0	0
all divers[b]	0	30,000	15,750	0	0	0	0	500
Canada geese	8,000	22,500	12,000	0	2,000	15,000	9,400	9,800
swans	2,000	4,500	0	0	80	6,000	0	75
TOTAL	13,000	150,000	44,200	0	4,080	21,000	10,800	12,775

Source: Consumers Power Co., 1974, Environmental Report; and Permanent File, Wildlife Division, Michigan Department of Natural Resources

[a] Taken from Jaworski and Raphael, 1978
[b] Includes additional duck species not listed above.

Table 3-12. Seasonal Abundance, Density and Productivity of Waterfowl in Wildfowl Bay[a]

Waterfowl Use	Production		Fall Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	80	0.7	15000	12000	12					
black duck	10	0.1	3000	400	12					
gadwall			100	100	4					
mottled duck										
green-winged teal	5	0.05	1000	1000	4					
Am. wigeon			500	400	4					
blue-winged/ cinnamon teal	50	0.4	500	1000	3					
northern shoveler			100							
pintail	1	0.01	10000	500	4					
wood duck	1	0.01	50	100	4					
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers			30250	19100	12					
redhead	20	0.15	500	100	6					
canvasback			300	100	4					
scaups			2000	100	2					
redneck			1000	100	4					
goldeneye/ bufflehead			500							
ruddy duck										
TOTAL sub-divers			4300	400	6					
other ducks										
TOTAL ducks	167	1.42	34550	19500	12					

-continued-

Table 3-12. concluded

Waterfowl Use	Production		Fall Migration			Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow			200	200	12					
Ross'										
white-fronted										
Canada	5	0.1	25000	8000	12					
black brant										
brant										
TOTAL geese	5	0.1	25200	8200	12					
Swans										
whistling			15	1000	4					
other										
TOTAL swans			15	1000	4					
TOTAL waterfowl	172	1.52	74750	28700	12					

[a]Taken from Michigan Department of Natural Resources, 1974.

Table 3-13. Seasonal Abundance, Density and Productivity of Waterfowl in the Vicinity of Fish Point and Sebewaing Bay[a]

Waterfowl Use	Production		Fall Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	40	0.3	1000	1000	6					
black duck	5	0.05	100	100	6					
gadwall										
mottled duck										
green-winged teal			100	200	4					
Am. wigeon										
blue-winged/ cinnamon teal	20	0.2	200	100	4					
northern shoveler										
pintail			1000	100	4					
wood duck										
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	65	0.55	2400	1500	6					
redhead	10	0.1	100	100	4					
canvasback										
scaups			500							
redneck										
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers	10	0.1	600	100	6					
other ducks										
TOTAL ducks	75	0.65	3600	1700						

-continued-

Table 3-13. concluded

Waterfowl Use	Production			Fall Migration			Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada										
black brant										
brant										
TOTAL geese	0	0	0	0	0					
Swans										
whistling			2000		4					
other										
TOTAL swans			2000							
TOTAL waterfowl	75	0.65	5000	1600	6					

[a]Taken from Michigan Department of Natural Resources, 1974.

Table 3-14. Seasonal Abundance, Density and Productivity of Waterfowl in the Vicinity of Quanicassee Wildlife Area[a]

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Fall Migration: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Wintering: Avg Peak Pop.	Wintering: Avg Wintering Population	Wintering: Avg Duration (no. weeks)	Wintering: Special or Unique Pops. or Species?
Ducks										
mallard	13	0.09	3100	1550	7		300	300	10	
black duck			900	450	7		200	200		
gadwall			200	100	4					
mottled duck										
green-winged teal			1700	850	4					
Am. wigeon			400	200	4					
blue-winged/ cinnamon teal	100	0.8	1500	750	4					
northern shoveler			100	50	4					
pintail			500	150	5					
wood duck			200	100	4					
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	113	0.89	8400	4200	5	0	500	500	10	0
redhead			200	100	4		warm water from power plants maintain open water.			
canvasback										
scaups			1300	650	4					
redneck			100	50	3					
goldeneye/ bufflehead							200	200		
ruddy duck										
TOTAL sub-divers	0	0.0	1600	800	4	0	200	200		
other ducks										
TOTAL ducks	113	0.89	10000	5000	4	0	700	700	10	0

-continued-

Table 3-14. concluded

Waterfowl Use	Production		Fall Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow			200	200	3					
Ross'										
white-fronted										
Canada			500	500						
black brant										
brant										
TOTAL geese	0	0	700	700	3	0	0	0	0	0
Swans										
whistling										
other										
TOTAL swans	0	0	0	0	0	0	0	0	0	0
TOTAL waterfowl	113	0.89	10700	5700			700	700		

[a]Taken from Michigan Department of Natural Resources, 1974.

Table 3-15. Comparison of Number of Applications to Number of Available Waterfowl Hunting Reservations at Fish Point, Nayanquing Point, and St. Clair Flats State Wildlife Areas, 1976[a]

Date	Fish Point SGA		Nayanquing Pt.WA		St. Clair Flats WA	
	Reserv.	Appl.[b]	Reserv.	Appl.[b]	Reserv.	Appl.[b]
October 6	55	685	30	362	55	565
October 7 (am)	55	430	35	115	60	71
October 7 (pm)	55	92	40	39	60	53
October 8 (am)	60	157	35	64	60	40
October 8 (pm)	60	49	35	42	60	35
October 9 (am)	60	383	35	163	60	128
October 9 (pm)	60	139	40	96	60	70
October 10 (am)	60	147	35	78	60	81
October 10 (pm)	60	106	40	35	60	56
TOTALS	525	2,188	325	994	535	1,099

Source: Permanent Files, Wildlife Division, Michigan DNR

[a]Taken from Jaworski and Raphael, 1978
[b]Each application represents a potential party of 2.5 people.

Table 3-16. The Relative Abundance of Mammalian Species on East Saginaw Bay Coastal Wetland[a]

Common name	Relative abundance[b]
Virginia opossum	P
eastern mole	C
star-nosed mole	C
eastern cottontail	C
eastern chipmunk	C
red squirrel	P
fox squirrel	P
white-footed mouse	C
meadow vole	C
muskrat	A
red fox	C
raccoon	C
mink	P
striped skunk	P
white-tailed deer	R

[a] Reichard, 1971
[b] R=rare, P=present, C=common, A=abundant

Muskrat trapping is a common activity on East Saginaw Bay Coastal Wetland (Consumers Power Company, undated). Wildfowl Bay Wildlife Area, Fish Point Wildlife Area, and Quanicassee Wildlife Area are part of this wetland and provide hunting opportunities for upland game (U.S. Fish and Wildlife Service, 1969).

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) provides information concerning the wetlands of Saginaw Bay. Only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasel (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptionally good habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to density and productivity, life histories, or relationship to water levels of the mammals inhabiting East Saginaw Bay Coastal Wetland.

Endangered Species

The osprey (Pandion haliaetus), marsh hawk (Circus cyaneus), Caspian tern (Sterna caspia), and Cooper's hawk (Accipiter cooperii) have been sighted in the area, and are included on the state threatened species list. The common tern (Sterna hirundo) is endangered in Michigan.

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 East Saginaw Bay Coastal Wetland by the literature search.

Health

East Saginaw Bay Coastal Wetland provides good habitat for birds and mammals. However, artificial fills are located in the area and there are four NPDES permit holders nearby.

CULTURAL SETTING LH 050

Population

East Saginaw Bay Coastal Wetland is an extensive wetland area that is located within Fairhaven and Sebewaing Townships of Huron County, Hampton Township of Bay County, and Wisner and Huron Townships of Tuscola County, Michigan. Huron County is sparsely populated, having a density of 44 persons per square mile; Bay County is moderately populated (269 persons per square mile); and Tuscola County is sparsely populated (66 persons per square mile). Table 3-17 indicates that population growth rates of the townships and counties concerned were highly variable for the period between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Huron and Tuscola Counties, while Bay County is expected to maintain a stable population.

Table 3-17. Population Data for the Vicinity of East Saginaw Bay Coastal Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Huron County	35,879	5.3	43,902
Fairhaven Township	1,066	-3.8	--
Sebewaing Township	3,293	4.2	--
Bay County	120,099	2.4	122,107
Hampton Township	8,674	26.3	--
Tuscola County	53,776	10.6	81,051
Wisner Township	883	-4.8	--
Huron Township	1,880	0.8	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Numerous dredgings and canals exist within the wetland, supporting such facilities as boat ramps. Artificial fill provides breakwaters for basins and shoreline protection. In the vicinity of Sebewaing, considerable residential and commercial development with associated structural development has taken place, including a small airport that is within 100 feet of the water's edge. A Chesapeake and Ohio Railroad track parallels the wetland. Several extensive interior basins of undetermined purpose lie close to shore north of Sebewaing. Large settling ponds exist in the Saginaw River area with what appears to be an associated offshore crib. One oil well is located near the Quanicassee Wildlife Area. The wetland is under state ownership, and it's location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, Sebewaing, Michigan, 1963; Bay City Northeast, Michigan, 1973; Essexville, Michigan, 1973, Quanicassee, Michigan, 1973; Fairgrove, Michigan, 1973; Fish Point, Michigan, 1973).

Recreation

Portions of East Saginaw Bay Coastal Wetland are included in Quanicassee Wildlife Area, Fish Point Wildlife Area, and Wildfowl Bay State Wildlife Area. Boat access is available at Wildfowl Bay State Wildlife Area, but other recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of East Saginaw Bay Coastal Wetland include sand and gravel. Several sand pits are located in the surrounding area. There are oil fields in the vicinity, with oil wells as close as 1,000 feet from the wetland on the west. No significant forest resources are present.

Public Utilities and Facilities

A water tank and a substation with associated power transmission lines are located approximately 0.5 mile southwest of East Saginaw Bay Coastal Wetland. Bay Park and a boat ramp lie within the wetland. A tower lies 0.4 mile south, and Vanderbilt Park lies 0.2 mile south of the wetland (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Fish Point, Michigan, 1973; Quanicassee, Michigan, 1973; Bay Port West, Michigan, 1970; Essexville, Michigan, 1973; Sebewaing, Michigan, 1963; Fairgrove, Michigan, 1973).

Pollution Sources

The following is a list of NPDES permit holders and discharge types that may affect East Saginaw Bay Coastal Wetland:

Permit Holders	Receiving Waters	Type of Discharge
Michigan Producers Dairy Company	Saginaw Bay via open ditch	cool water
Michigan Sugar Company	holding ponds to drainage ditch to Saginaw Bay	ash pond overflow; condenser water; process water discharge
Consumer Power Company D.E. Karn	Saginaw Bay via channel	ash pond overflow; condenser water
Weadlock Plant	Saginaw Bay via channel	ash pond overflow; condenser water

No site-specific information was located through the literature search pertaining to non-point sources of pollution in this wetland.

Historical and Archaeological Features

The Bay Port commercial fishing historic district is located within 500 feet of East Saginaw Bay Coastal Wetland. Originally settled about 1885, Bay Port developed into one of the largest fresh water fishing ports in the world during the 1930's and 1940's (County Inventory).

There are twenty known archaeological sites in the vicinity of East Saginaw Bay Coastal Wetland (# 20-HU-4, 20-HU-12, 20-HU-13, 20-HU-15, 20-HU-16, 20-HU-17, 20-HU-45, 20-HU-46, 20-HU-47, 20-HU-48, 2-HU-49, 2-HU-55, HU-A, 20-TU-6, 20-TU-47, 20-TU-48, 20-TU-49, 20-TU-50, 20-TU-51, and 20-TU-52). These sites consist of knapping and habitation areas, mounds, cemeteries, and one circular enclosure, and were first reported by Hinsdale in 1931 and by Smith in 1901. One Indian Mission has been reported by Dunbar in 1967 (Peebles and Black, 1976).

RESEARCH PROJECTS LH 050

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

WINDY POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 051

Setting

Windy Point Wetland is located along the southern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Hampton Township of Bay County, Michigan. The wetland extends 400 feet lakeward from the Saginaw Bay shoreline at the mouth of the Saginaw River, and lies approximately 0.8 mile from Aplin Beach, Michigan. This Lacustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Bay City Northeast, Michigan; 1973).

Topography

Windy Point Wetland is a partially submerged wetland at the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has classified the adjacent shoreline as erodible low plain. The surrounding area is flat (U.S.G.S. quadrangle map, Bay City Northeast, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Windy Point Wetland lies is characterized by lake bed clay. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

The soil found in Windy Point Wetland is Marsh, which consists of nearly level, poorly drained soils of sand or sand over gravel with a clayey subsoil (Wonser et al., 1931).

Hydrology

The Saginaw River flows by Windy Point Wetland (U.S.G.S. quadrangle map, Bay City Northeast, Michigan, 1973). The literture 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 Saginaw River may be found in Great Lakes Basin Commission (1975).

Climate

The closest weather station providing climatic data for Windy Point Wetland is located in Bay City, Michigan. The average annual temperature is 48.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3^{o}F and the mean monthly high for July is 83.5^{o}F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately

seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Windy Point Wetland (U.S.G.S. quadrangle map, Bay City Northeast, Michigan, 1973).

BIOTIC SETTING LH 051

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 Windy Point Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Windy Point Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Windy Point Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Windy Point Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay. Berry reported (1943) the molluscs, Amnicola binneyana, A. lustrica, and A. limosa near the mouth of the Saginaw River.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Windy Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Windy 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 Windy Point Wetland.

Mammals

Eleven species of mammals have been observed on Windy Point Wetland (Table 3-18). However, the literature search yielded no site-specific information pertaining to 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.

Table 3-18. Mammalian Species Observed on Windy Point Wetland[a]

Common name	Common name
Virginia opossum	raccoon
eastern cottontail	weasel
fox squirrel	mink
gray squirrel	striped skunk
muskrat	white-tailed deer
red fox	

[a] U.S. Army Corps of Engineers, 1975

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 Windy 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 LH 051

Population

Windy Point Wetland is located in Hampton Township of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-19 indicates that Bay County experienced slow population growth, while Hampton Township underwent rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-19. Population Data for the Vicinity of Windy Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Hampton Township	8,674	26.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly commercial. Extensive settling ponds and a sand pit are close by. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Bay City Northeast, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Windy Point Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Windy Point Wetland include sand and gravel (Great Lakes Basin Commission, 1974). A sand pit is located within 1,000 feet of the wetland.

Oil is a potential energy resource in the vicinity of the wetland (Great Lakes Basin Commission, 1974). No significant forest resources are present in the area.

Public Utilities and Facilities

A tower is located 0.4 mile south of Windy Point Wetland. A water tank and a substation with associated power transmission lines lie 0.5 mile southeast of the wetland (U.S.G.S. quadrangle map, Bay City Northeast, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Windy Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Windy Point Wetland.

RESEARCH PROJECTS LH 051

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

APLIN BEACH WETLAND

PHYSIOGRAPHIC SETTING

LH 052

Setting

Aplin Beach Wetland is located along the southern shoreline of Saginaw Bay, which is directly connected to Lake Huron, in Bangor Township of Bay County, Michigan. This non-wooded, Lacustrine wetland extends approximately 0.1 mile lakeward from the Saginaw Bay shoreline at Aplin and Donahue Beaches, Michigan (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Kawkawlin, Michigan, 1973).

Topography

Alpin Beach Wetland is partially submerged at the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has classified the adjacent shoreline as erodible low plain. The surrounding area is low sandy beach (U.S.G.S. quadrangle maps, Kawkawlin, Michigan, 1973; Bay City Northeast, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Aplin Beach Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

The soil found in the eastern section of Aplin Beach Wetland is Marsh, which consists of nearly level, poorly drained soils of sand or sand over gravel with a clayey subsoil.

Eastport sand is present in the western section of Aplin Beach Wetland. This soil is slightly alkaline, with a top layer of organic material and a sandy subsoil (Wonser et al., 1931).

Hydrology

The Kawkawlin River flows by Aplin Beach Wetland (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Kawkawlin, Michigan, 1973). The literture 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 Aplin Beach Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for

January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Aplin Beach Wetland (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Kawkawlin, Michigan, 1973).

BIOTIC SETTING LH 052

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 Aplin Beach Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Aplin Beach Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Aplin Beach Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Aplin Beach Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay. Berry reported (1943) the molluscs, Amnicola binneyana, A. lustrica, and A. limosa near the mouth of the Saginaw River.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Aplin Beach Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Aplin Beach 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 Aplin Beach Wetland.

Mammals

Eleven species of mammals have been observed on Aplin Beach Wetland (Table 3-20). However, the literature search yielded no site-specific information pertaining to 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.

Table 3-20. Mammalian Species Observed on Aplin Beach Wetland[a]

Common name	Common name
Virginia opossum	raccoon
eastern cottontail	weasel
fox squirrel	mink
gray squirrel	striped skunk
muskrat	white-tailed deer
red fox	

[a] U.S. Army Corps of Engineers, 1975

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 Aplin Beach 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 LH 052

Population

Aplin Beach Wetland is located in Bangor Township of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-21 indicates that Bay County experienced slow population growth, while population in Bangor Township remained stable, between 1970 and 1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-21. Population Data for the Vicinity of Aplin Beach Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Bangor Township	15,871	-0.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential along the beach. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Kawkawlin, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Aplin Beach Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Aplin Beach Wetland include sand and gravel (Great Lakes Basin Commission, 1974). There are sand pits in the area.

Oil is a potential energy resource in the vicinity of the wetland (Great Lakes Basin Commission, 1974), but no significant forest resources are present.

Public Utilities and Facilities

A tower is located 0.1 mile south of Aplin Beach Wetland (U.S.G.S. quadrangle maps, Bay City Northeast, Michigan, 1973; Kawkawlin, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Aplin Beach Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are six known archaeological sites (# 20-BY-23, 20-BY-27, 20-BY-50, 20-BY-51, 20-BY-54, 20-BY-55) in the vicinity of Aplin Beach Wetland. These sites consist of a mound and habitation areas which were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of Aplin Beach Wetland.

RESEARCH PROJECTS LH 052

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

LAGOON BEACH WETLAND

PHYSIOGRAPHIC SETTING LH 053

Setting

Lagoon Beach Wetland is located along the southern shoreline of Saginaw Bay, which is directly connected to Lake Huron, in Bangor Township of Bay County, Michigan. The wetland extends from the Saginaw Bay shoreline approximately 500 feet lakeward at Lagoon Beach, Michigan. This Lacustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Topography

Lagoon Beach Wetland is partially submerged at the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has classified the adjacent shoreline as erodible low plain.

Surficial Geology

The surficial geology of the area in which Lagoon Beach Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

Eastport sand is present in Lagoon Beach Wetland. This soil is slightly alkaline, with a top layer of organic material and a sandy subsoil (Wonser et al., 1931).

Hydrology

The Kawkawlin River flows by Lagoon Beach Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973). The literture 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 Lagoon Beach Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Lagoon Beach Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

BIOTIC SETTING LH 053

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 Lagoon Beach Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Lagoon Beach Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Lagoon Beach Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Lagoon Beach Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Lagoon Beach Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in

Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lagoon Beach 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 Lagoon Beach Wetland.

Mammals

The mammalian species observed on Aplin Beach Wetland (LH 052) may also be observed on Lagoon Beach Wetland because of the proximity of the two wetlands. 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, food sources, or relationship to water levels of the mammals inhabiting Lagoon Beach 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 Lagoon Beach 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 City Water Treatment Plant holds a NPDES permit to discharge into Saginaw Bay and the effluent may effect Lagoon Beach Wetland.

CULTURAL SETTING LH 053

Population

Lagoon Beach Wetland is located in Bangor Township of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-22 indicates that Bay County experienced slow population growth, while population in Bangor Township remained stable, between 1970 and 1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-22. Population Data for the Vicinity of Lagoon Beach Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Bangor Township	15,871	-0.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Recreation

The northwest extension of Lagoon Beach Wetland is in Bay City State Park. Recreational activities permitted in the park include camping, swimming, boating, picnicking, hiking, fishing, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Lagoon Beach Wetland include sand and gravel, and oil is a potential energy resource (Great Lakes Basin Commission, 1974).

Public Utilities and Facilities

Bay City Waterworks is adjacent to Lagoon Beach Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Pollution Sources

The Bay City Water Treatment Plant holds a NPDES permit to discharge into Saginaw Bay, and its effluent may affect Lagoon Beach Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are eight known archaeological sites (# 20-BY-16, 20-BY-18, 20-BY-41, 20-BY-46, 20-BY-47, 20-BY-48, 20-BY-52, 20-BY-53) in the vicinity of Lagoon Beach Wetland. These sites consist of a mound, a cemetery, and several

habitation areas which were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 053

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

TOBICO LAGOON WETLAND

PHYSIOGRAPHIC SETTING LH 054

Setting

Tobico Lagoon Wetland is located on the southern shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Kawkawlin Township of Bay County, Michigan, 0.8 mile from the community of Lagoon Beach. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Topography

Tobico Lagoon Wetland has very little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) describes the adjacent shoreline as erodible low plain. The surrounding area is low and flat (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Tobico Lagoon Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

Eastport sand is present in Tobico Lagoon Wetland. This soil is slightly alkaline, with a top layer of organic material and a sandy subsoil (Wonser et al., 1931).

Hydrology

No streams flow through Tobico Lagoon Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973). The literture 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 Tobico Lagoon Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Tobico Lagoon Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

BIOTIC SETTING LH 054

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 Tobico Lagoon Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Tobico Lagoon Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in Tobico Lagoon Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Tobico Lagoon Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also record taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Tobico Lagoon Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in

Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Tobico Lagoon 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 Tobico Lagoon Wetland.

Mammals

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat (Ondatra zibethicus) trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptional habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to species composition, 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 Tobico Lagoon 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 Tobico Lagoon 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 LH 054

Population

Tobico Lagoon Wetland is located in Kawkawlin Township of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-23 indicates that Bay County experienced slow growth, while Kawkawlin Township underwent rapid population growth, between 1970 and

1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-23. Population Data for the Vicinity of Tobico Lagoon Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Kawkawlin Township	4,732	14.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. A paved road divides the wetland. The wetland is under state ownership (Bay City State Park), but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Recreation

Nearly all of the Tobico Lagoon Wetland lies within Bay City State Park, where facilities are provided for camping, swimming, boating, picnicking, hiking, fishing, and snowmobiling.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Tobico Lagoon Wetland include sand and gravel (Great Lakes Basin Commission, 1974). There are several sand pits in the surrounding area.

Oil is a potential energy resource in the vicinity of the wetland (Great Lakes Basin Commission, 1974), but no significant forest resources are present in the area.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Tobico Lagoon Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Tobico Lagoon Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Tobico Lagoon Wetland.

RESEARCH PROJECTS LH 054

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

TOBICO MARSH

PHYSIOGRAPHIC SETTING

LH 055

Tobico Marsh is located along the southwestern shoreline of Saginaw Bay in Kawkawlin Township of Bay County, Michigan, 1.5 miles from the community of Linwood. This predominantly non-wooded Palustrine-Lacustrine wetland is separated from the bay by a barrier beach (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Topography

Tobico Marsh Wetland has a relief of three feet and lies at an elevation of 585 feet above sea level, five feet above the approximate mean elevation of Lake Huron. The Great Lakes Basin Commission (1975) describes the adjacent shoreline as erodible low plain. The surrounding area is flat (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Tobico Marsh lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

Maumee loam is present in Tobico Marsh. This soil consists of poorly drained, sandy loam with a subsoil of fine sand (Wonser et al., 1931).

Hydrology

Three intermittent streams flow through Tobico Marsh (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973). 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 Tobico Marsh is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Tobico Marsh (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

BIOTIC SETTING LH 055

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 Tobico Marsh.

Fish

Yellow perch (*Perca flavescens*), northern pike (*Esox lucius*), and largemouth and smallmouth bass (*Micropterus salmoides* and *M. dolomieui*) are common in permanent pools of Tobico Marsh (Michigan Department of Natural Resources, 1976). A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Area Wetland (LH 037), and a list of fish species presumed to occur in coastal wetlands of Saginaw Bay appears in Appendix A-3. However, the literature search yielded no site-specific information pertaining to species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fishes in Tobico Marsh.

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 Tobico Marsh.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Tobico Marsh.

Avifauna

The species of birds observed during a survey of Tobico Marsh in 1975 and 1976 are listed in Table 3-24. Dabbling ducks, American coots (Fulica americana), terns and shorebirds utilize this area for nesting and feeding, and during migration (Michigan DNR, 1975-1976). Data concerning the seasonal abundance, density, and productivity of waterfowl in Tobico Marsh is presented in Table 3-25. Additional information on the density and productivity of waterfowl in the area is available in Jaworski and Raphael (1978). One of the few known nesting sites for the yellow-headed blackbird (Xanthocephalus xanthocephalus) east of the Mississippi River was found in this wetland in 1975 and 1976.

Table 3-24. Birds Observed in Tobico Marsh on May 13,1975 and June 2, 1976[a]

Common name	Common name
Canada goose	Virginia rail
mallard	American coot
blue-winged teal	ring-billed gull
redhead	black tern
greater scaup	red-winged blackbird
pied-billed grebe	common grackle
short-billed marsh wren	killdeer
American bittern	

[a] Taken from Michigan Department of Natural Resources, open file data

The literature search provided no site-specific information pertaining to recreational and commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing Tobico Marsh.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), mink (Mustela vison), and white-tailed deer (Odocoileus virginianus) can be found on Tobico Marsh (Michigan Department of Natural Resources, 1975). Controlled trapping of furbearers is permitted on this wetland.

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptional habitat for muskrat (Jaworski and Raphael, 1978),

Table 3-25. Seasonal Abundance, Density, and Productivity of the Waterfowl in Tobico Marsh[a]

Waterfowl Use	Production			Fall Migration			Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	45	0.35	3000	1500	10					
black duck			1000	500	10					
gadwall										
mottled duck										
green-winged teal	2	0.02	300	150	4					
Am. wigeon			2000	1000	6					
blue-winged/ cinnamon teal	36	0.3	500	250	4					
northern shoveler										
pintail										
wood duck	10	0.10	500	250	4					
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	93	0.77	7300	3650			0	0		
redhead										
canvasback	2	0.01								
scaups			2200	1100	6					
redneck			2300	1150	6					
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers	2	0.01	4500	2250			0	0		
other ducks							0	0		
TOTAL ducks	95	0.78	11800	4900			0	0		

-continued-

Table 3-25. (concluded)

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Fall Migration: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Wintering: Avg Peak Pop.	Wintering: Avg Wintering Population	Wintering: Avg Duration (no. weeks)	Wintering: Special or Unique Pops. or Species?
Geese										
snow			200	100						
Ross'										
white-fronted										
Canada	5	0.02								
black brant										
brant										
TOTAL geese	5	0.02	200	100			0	0		
Swans										
whistling										
other										
TOTAL swans	0		0				0	0		
TOTAL waterfowl	100	0.8	12000	6000			0	0		

[a]Taken from Michigan Department of Natural Resources, 1976

The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting Tobico Marsh.

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 Tobico Marsh by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Tobico Marsh supports a diversity of bird life.

CULTURAL SETTING LH 055

Population

Tobico Marsh is located in Kawkawlin Township of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-26 indicates that Bay County experienced slow growth, while Kawkawlin Township underwent rapid population growth, between 1970 and 1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-26. Population Data for the Vicinity of Tobico Marsh

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Kawkawlin Township	4,732	14.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One hard surface road on artificial fill crosses the wetland. The Detroit and Mackinac Railroad parallels the wetland very closely. The wetland

is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Tobico Marsh.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Tobico Marsh include sand and gravel (Great Lakes Basin Commission, 1974). There are several sand pits in the surrounding area.

Oil is a potential energy resource in the vicinity of the wetland (Great Lakes Basin Commission, 1974), but no significant forest resources are present in the area.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Tobico Marsh (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Tobico Marsh. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are three known archaeological sites (# 20-BY-6, 20-BY-32, and 20-BY-49) in the vicinity of Tobico Marsh. These sites consist of two sites consist of two habitation areas and a mound which were reported by Hinsdale in 1931 and by Carstens in 1972 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 055

The literature search identified no on-going or impending research projects pertaining to Tobico Marsh.

LINWOOD AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 056

Linwood Area Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Kawkawlin and Fraser Townships of Bay County, Michigan. The wetland extends from approximately 300 feet inland to 0.1 mile off shore, and lies 0.2 mile from the community of Linwood. This Palustrine-Lacustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Topography

Linwood 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 Lake Huron). The Great Lakes Basin Commission (1975) has described the adjacent shoreline as erodible low plain. The surrounding area is very flat (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Linwood Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

Eastport sand is present in Linwood Area Wetland. This soil is slightly alkaline, with a top layer of organic material and a sandy subsoil (Wonser et al., 1931).

Hydrology

Railroad and Rosebud Drains flow through Linwood Area Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973). 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 Linwood Area Wetland is located in Bay City, Michigan. The average annual temperature is 48.1^{o}F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3^{o}F and the mean monthly high for July is 83.5^{o}F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28^{o}F) in 1975 occurring on April 15 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 Linwood Area Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

BIOTIC SETTING LH 056

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 Linwood Area Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Burques Area Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Linwood Area Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna of Linwood Area Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Linwood Area Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Linwood Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in

Bay County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Linwood 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 Linwood Area Wetland.

Mammals

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat (Ondatra zibethicus) trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptional habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to species composition, 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 Linwood 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 Linwood 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 LH 056

Population

Linwood Area Wetland is located in Kawkawlin and Fraser Townships of Bay County, Michigan. The county is moderately populated, having a density of 269 persons per square mile. Table 3-27 indicates that Bay County experienced slow population growth, while Kawkawlin and Fraser Townships underwent rapid

population growth, between 1970 and 1975. Projections for 1990 indicate that Bay County is expected to maintain a stable population.

Table 3-27. Population Data for the Vicinity of Linwood Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Kawkawlin Township	4,732	14.4	--
Fraser Township	3,881	13.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, but some dredging operations have taken place in the wetland, which is bisected by the Detroit and Mackinac Railroad. A secondary road passes close to the wetland. The surrounding area is predominantly residential. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Recreation

No known state or federal recreational facilities are present in the vicinity of Linwood Area Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Linwood Area Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Linwood Area Wetland (U.S.G.S. quadrangle map, Kawkawlin, Michigan, 1973).

Pollution Sources

There are no NPDES permit holders adjacent to Linwood Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Linwood Area Wetland.

RESEARCH PROJECTS

LH 056

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

NAYANQUING POINT WILDLIFE AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 057

Setting

Nayanquing Point Wildlife Area Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Pinconning and Fraser Townships of Bay County, and Standish Township of Arenac County, Michigan. This non-wooded, Lacustrine wetland extends from approximately 100 feet inland to 0.9 mile lakeward; most of it lies within the waters of the bay. The largest population centers in the area are Standish and Pinconning, Michigan (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Pinconning, Michigan, 1973).

Topography

Nayanquing Point Wildlife Area Wetland has a relief of five feet and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline area as wetland. The surrounding terrain is primarily flat (U.S.G.S. quadrangle maps, Pinconning, Michigan, 1973; Standish, Michigan, 1973).

Surficial Geology

The surficial geology of the area in which Nayanquing Point Wildlife Area Wetland lies is characterized by lake bed sand and lake bed clay. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation (Martin, 1955).

Soils

The soils found in Nayanquing Point Wildlife Area Wetland are Coastal Beach and Marsh. These soils are nearly level, are poorly drained, and have sand or sand over gravel with a clayey subsoil (Wonser et al., 1931). The Wisner-Sims Soil Association is present in the section of Nayanquing Point Wildlife Area Wetland in Arenac County. These soils are level or nearly level, are poorly drained, and are formed in clay loam (Redmond and Engberg, 1967).

Hydrology

The following water courses flow through Nayanquing Point Wildlife Area Wetland: Gregory Drain, Thume Drain, Tebo Drain, Willette Drain, Johnson Drain, Pinconning River, Selleck Drain, Cooper Drain, and Feather Creek. Also flowing through the wetland are ten unnamed streams (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Pinconning, Michigan, 1973). 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 Nayanquing Point Wildlife Area Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 Nayanquing Point Wildlife Area Wetland (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Pinconning, Michigan, 1973).

BIOTIC SETTING LH 057

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 Nayanquing Point Wildlife Area Wetland.

Fish

A general discussion of fishery resources in Saginaw Bay is presented under Pointe aux Barques Area Wetland (LH 037), and a list of species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A-3. This information is pertinent to Nayanquing Point Wildlife Area Wetland, but the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna of Nayanquing Point Wildlife Area Wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Nayanquing Point Wildlife Area Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Nayanquing Point Wildlife Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac and Bay Counties are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Nayanquing Point Wildlife Area Wetland.

Avifauna

The species of birds observed during 1975 and 1976 surveys of the southern portion of this wetland, from Lengsville Point to the Pinconning River, are listed in Table 3-28. One of the few nesting colonies of yellow-headed blackbirds (Xanthocephalus xanthocephalus) east of the Mississippi has been found here. Nesting of common gallinules (Gallinula chloropus) and American coots (Fulica americana) has also been observed. Dabbling ducks, terns (Sterna spp., Hydroprogne sp., Chlidonias sp.) and shorebirds utilize the area for nesting, staging and feeding, and also during migration. Data concerning seasonal abundance, density, and productivity of waterfowl at Nayanquing Point and in the vicinity of Pinconning are presented in Tables 3-29 and 3-30, respectively. Table 3-31 records the species and percent composition of nesting waterfowl at Nayanquing Point for 1969 and 1973. Additional information on density and productivity for the area is available in Jaworski and Raphael (1978). Miller (1949) determined the brood density at Nayanquing Point to be 11.3 broods per square mile for six waterfowl species. The number of hunting permit requests for Nayanquing Point State Wildlife Area in 1976 is shown in Table 3-32. Only 26% of the applications could be accommodated (Jaworski and Raphael, 1978).

Table 3-28. Birds Observed in Nayanquing Point Wildlife Area Wetland in 1975 and 1976[a]

Common name	Common name
mallard	American coot
black duck	herring gull
pintail	ring-billed gull
blue-winged teal	common tern
redhead	Caspian tern
common merganser	black tern
belted kingfisher	red-winged blackbird
long-billed marsh wren	common grackle
short-billed marsh wren	killdeer
great blue heron	ruddy turnstone
green heron	common snipe
black crowned night heron	spotted sandpiper
American bittern	lesser yellowlegs
king rail	least sandpiper
Virginia rail	dunlin
sora	red-tailed hawk
common gallinule	

[a] Taken from Michigan Department of Natural Resources, open file data, 1975

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

Mammals

The eastern cottontail (Sylvilagus floridanus), muskrat (Ondatra zibethicus), and mink (Mustela vison) have been observed on Nayanquing Point Wildlife Area Wetland (Michigan Department of Natural Resources, open file report). Nayanquing Point Wildlife Area provides hunting opportunities for upland game (U.S. Fish and Wildlife Service, 1969).

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink, and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptional habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density and productivity, life histories,

Table 3-29. Seasonal Abundance, Density and Productivity of the Waterfowl of Nayanquing Point[a]

Waterfowl Use / Species	Production		Fall Migration				Wintering			
	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	90	0.8	3000	2600	10					
black duck	7	0.05	800	500	10					
gadwall			100		3					
mottled duck										
green-winged teal			700		4					
Am. wigeon			50		3					
blue-winged/ cinnamon teal	69	0.5	1000		4					
northern shoveler	20	0.1	50		4					
pintail	7	0.05	100	100	4					
wood duck			200		4					
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	193	1.5	6000	4000			0	0	0	
redhead	2	0.01	100	100	4					
canvasback										
scaups			250	250	4					
redneck			50	50	2					
goldeneye/ bufflehead			100	100	2					
ruddy duck										
TOTAL sub-divers			500	500			0	0	0	
other ducks										
TOTAL ducks	2	0.01					0	0	0	

-continued-

Table 3-29. concluded

Waterfowl Use	Production			Fall Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow			50		2					
Ross'										
white-fronted										
Canada	5	0.03	150	100	3					
black brant										
brant										
TOTAL geese	5	0.03	200	100						
Swans										
whistling										
other										
TOTAL swans	0	0	0	0						
TOTAL waterfowl	200	1.6	6700	4600	10		0	0		

[a]Taken from Michigan Department of Natural Resources, 1976.

Table 3-30. Seasonal Abundance, Density and Productivity of the Waterfowl in the vicinity of Pinconning[a]

Waterfowl Use	Production		Fall Migration				Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	53	0.53	1000	500	10					
black duck	2	0.02	200	100	10					
gadwall										
mottled duck										
green-winged teal			200	100						
Am. wigeon										
blue-winged/ cinnamon teal	40	0.4	500	250	4					
northern shoveler										
pintail										
wood duck	5	0.05	100	50	4					
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	100	1.0	2000	1000			0	0		
redhead										
canvasback										
scaups										
redneck										
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers	0	0	0	0						
other ducks										
TOTAL ducks	100	1.0	2000	1000			0	0		

-continued-

Table 3-30. concluded

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Production: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Wintering: Avg Peak Pop.	Wintering: Avg Wintering Population	Wintering: Avg Duration (no. weeks)	Wintering: Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada										
black brant										
brant										
TOTAL geese	0	0	0	0			0	0		
Swans										
whistling										
other										
TOTAL swans	0	0	0	0			0	0		
TOTAL waterfowl	100	1.0	2000	1000			0	0		

[a]Taken from Michigan Department of Natural Resources, 1976.

Table 3-31. Species of Ducks Nesting at Nayanquing Point, Saginaw Bay[a]

Species	Nayanquing Point 1969 & 1973
mallard	48.5%
blue-winged teal	35.5
wood duck	0.0
black duck	4.0
pintail	4.0
northern shoveler	7.0
redhead	0.0
green-winged teal	1.0
unknown ducks	0.0
TOTAL	100.0%

[a]Taken from Jaworski et al., 1978

Table 3-32. Comparison of Number of Applications to Number of Available Waterfowl Hunting Reservations at Nayanquing Point, 1976[a]

Date	Nayanquing Pt. WA	
	Reservations	Applications[b]
October 6	30	362
October 7 (am)	35	115
October 7 (pm)	40	39
October 8 (am)	35	64
October 8 (pm)	35	42
October 9 (am)	35	163
October 9 (pm)	40	96
October 10 (am)	35	78
October 10 (pm)	40	35
TOTALS	325	994

Source: Permanent Files, Wildlife Division, Michigan DNR

[a]Taken from Jaworski, et al., 1978
[b]Each application represents a potential party of 2.5 people.

major food sources, or relationship to water levels of the mammals inhabiting Nayanquing Point Wildlife Area Wetland.

Endangered Species

Birds recently observed in Nayanquing Point Wildlife Area Wetland (Michigan Department of Natural Resources, 1975) included the common tern (Sterna hirundo), a species endangered in Michigan, the Caspian tern (Sterna caspia), a threatened species, and the black-crowned night heron (N. nycticorax) and the American bittern (Botaurus lentiginosus), both rare.

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, Nayanquing Point Wildlife Area Wetland supports a diversity of avifauna. The Pinconning Water Works Filtration Plant holds a NPDES permit to discharge into Saginaw Bay, and its effluent may effect the wetland.

CULTURAL SETTING LH 057

Population

Nayanquing Point Wildlife Area Wetland is located in Fraser and Pinconning Townships of Bay County, Michigan and in Standish Township of Arenac County, Michigan. Bay County is moderately populated, having a density of 269 persons per square mile, Arenac County is sparsely populated (36 persons per square mile). Table 3-33 indicates that Bay County experienced slow growth, while Fraser Township, Pinconning Township, Arenac County, and Standish Township all experienced rapid population growth, between 1970 and 1975. Projections for the future indicate that Bay County is expected to maintain a stable population, and rapid growth is expected to continue in Arenac County.

Table 3-33. Population Data for the Vicinity of Nayanquing Point Wildlife Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Bay County	120,099	2.4	122,107
Fraser Township	3,881	13.7	--
Pinconning Township	2,891	12.4	--
Arenac County	13,179	18.2	18,537
Standish Township	1,796	20.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. Several areas of artificial fill exist in the wetland, forming breakwaters for basin and coastline preservation. Scattered residences line the coast. Several paved roads and unimproved roads are in the beach area. The surrounding area is predominantly residential and rural open space. The wetland is under mixed private and state ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Standish, Michigan, 1973; Pinconning, Michigan, 1973).

Recreation

The southern portion of Nayanquing Point Wildlife Area Wetland lies within Nayanquing Point Wildlife Area. Seasonal hunting is permitted, but other recreational activities and facilities are unknown.

Mineral, Energy, and Forest Resources

Oil is a potential energy resource in Nayanquing Point Wildlife Area Wetland (Great Lakes Basin Commission, 1974). An oil well is located one and one-half miles inland from the wetland.

No significant forest or mineral resources are present in the vicinity. However, sand pits are located a mile or more inland.

Public Utilities and Facilities

Pinconning Waterworks is located adjacent to Nayanquing Point Wildlife Area Wetland (U.S.G.S. quadrangle maps, Pinconning, Michigan, 1973; Standish, Michigan, 1973).

Pollution Sources

The Pinconning Water Works Water Filtration Plant holds a NPDES permit to discharge into Saginaw Bay, and its effluent may affect Nayanquing Point Wildlife Area Wetland. No published, site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are nineteen known archaeological sites in the vicinity of Nayanquing Point Wildlife Area Wetland: # 20-AC-34, 20-BY-2, 20-BY-3, 20-BY-5, 20-BY-7, 20-BY-12, 20-BY-19, 20-BY-29, 20-BY-36, 20-BY-37, 20-BY-38, 20-BY-39, 20-BY-40, 20-BY-42 through 20-BY-45, 20-BY-57, and 20-BY-58. These sites consist of habitations, knapping areas and cemeteries and were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 057

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

PHYSIOGRAPHIC SETTING LH 058

Setting

West Saginaw Bay Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Standish, Au Gres, Arenac, and Sims Townships of Arenac County, Michigan. The wetland extends from approximately 2.0 miles inland to 0.7 mile off shore. The largest metropolitan centers in the area are Au Gres and Standish, Michigan. This large, Palustrine Lacustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Au Gres, Michigan, 1966;Standish,North-East, Michigan, 1967; and Omer, Michigan, 1968).

Topography

West Saginaw Bay Wetland has a relief of 10 feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline area as wetland, and erodible low plain. The surrounding terrain is predominantly flat (U.S.G.S. quadrangle map, Standish, Michigan, 1973; Au Gres, Michigan, 1966; Standish Northeast, Michigan, 1967; Omer, Michigan, 1968).

Surficial Geology

The surficial geology of the area in which West Saginaw Bay Wetland lies is characterized by lake bed clay and lake bed sand. Rock occurring at or near the surface is of the Pennsylvanian period and the Saginaw-Parma formation, and the Mississippian period and the Michigan formation (Martin, 1955).

Soils

The Wisner-Sims, Roscommon-Au Gres, and Epoufette-Lacota soil associations are all present in West Saginaw Bay Wetland. Wisner-Sims soils are level or nearly level, poorly drained soils that have formed in clay loam. Roscommon-Au Gres soils are level to gently undulating, poorly drained, and consist of deep sands. Epoufette-Lacota soils are nearly level, poorly drained, and have a sandy or loamy surface underlain by limy sand and gravel (Redmond, 1967).

Hydrology

West Saginaw Bay Wetland has the following water courses flowing through it: the Pine River, the Rifle River, Big Creek, Hemenway Drain, the Au Gres River, Dewitt Drain, and Roberts Drain. Also flowing through the wetland are 12 intermittent streams (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Standish Northeast, Michigan, 1967; Omer, Michigan, 1968; Augres, Michigan, 1966). Additional information regarding the Pine River may be found in Twenter (1975) and Great Lakes Basin Commission (1975). Additional information

regarding the Rifle River and the Au Gres may be found in Great Lakes Basin Commission (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 Saginaw Bay Wetland is located in Bay City, Michigan. The average annual temperature is 48.1°F, based on the normal period from 1941-1970. The mean monthly low for January is 20.3°F and the mean monthly high for July is 83.5°F. The average annual precipitation is 27.18 inches, with a mean monthly precipitation of 1.41 inches in January and 2.49 inches in July. The growing season is approximately seven months long, with the last killing frost (28°F) in 1975 occurring on April 15 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 West Saginaw Bay Wetland (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Au Gres, Michigan, 1966; Standish Northeast, Michigan, 1967; Omer, Michigan, 1968).

BIOTIC SETTING LH 058

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 Saginaw Bay Wetland.

Fish

Fishing in the Wigwam Bay State Game Area is, at times, excellent for largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), catfish (unidentified *Ictalurus* spp.), and suckers (unidentified *Catostomus* or *Moxostoma* spp., or *Minytrema melanops*) (Michigan Department of Natural Resources, 1976). Other areas in West Saginaw Bay Wetland are probably similar. Fish species found in the lower Rifle River are listed in Table 3-34. A general discussion of fishery resources of Saginaw Bay is presented under Pointe aux Barques Area Wetland (LH 037), and a list of fish species presumed to utilize coastal wetlands of Saginaw Bay appears in Appendix A3. However, the literature search yielded no site-specific information pertaining to species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or commercial use of the fish fauna in West Saginaw Bay Wetland.

Table 3-34. Fish Species Collected in the Lower Rifle River, Arenac County, Michigan[a]

Common name and use category[b]	Relative abundance[c]	Common name and use category[b]	Relative abundance[c]
Game Species		Forage Species (cont'd)	
rock bass	P	brassy minnow	C
smallmouth bass	F	blacknose shiner	VR
yellow perch	C	stoneroller	VR
pumpkinseed	R	emerald shiner	C
		spottail shiner	VC
Coarse Species		spotfin shiner	C
		mimic shiner	R
white sucker	P	fathead minnow	R
northern hogsucker	A	bluntnose minnow	C
golden redhorse	C	tadpole madtom	R
greater redhorse	C	stonecat	R
black redhorse	F	central mudminnow	C
yellow bullhead	F	banded killifish	R
brown bullhead	F	brook stickleback	C
		fantail darter	C
Forage Species		johnny darter	VC
		channel darter	C
common shiner	A	blackside darter	VC
hornyhead chub	VC	Iowa darter	R
rosyface shiner	P	logperch	C
creek chub	VC		
river chub	C		

[a] Locke (1951)
[b] Use category as judged by Locke (1951)
[c] P=predominant, A=abundant, VC=very common, C=common, F-few, R=rare, VR=very rare

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in West Saginaw Bay Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected, but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in West Saginaw Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in West Saginaw Bay Wetland.

Avifauna

Species of birds which were observed in this wetland in 1975, 1976, and 1977 are listed in Table 3-35. Dabbling ducks, American coots (Fulica americana), terns, and shorebirds utilize the area for nesting, feeding, resting, staging, and during migration. Data concerning seasonal abundance, density, and productivity of waterfowl in Wigwam Bay appear in Table 3-36.

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

Mammals

The eastern cottontail (Sylvilagus floridanus), muskrat (Ondatra zibethicus), beaver (Castor canadensis), raccoon (Procyon lotor), mink (Mustela vison), and white-tailed deer (Odocoileus virginianus) have been observed on West Saginaw Bay Wetland (Michigan Department of Natural Resources, open file report). Wigwam Bay Wildlife Area is part of West Saginaw Bay Wetland and

Table 3-35. Birds Observed in West Saginaw Bay Wetland in the Vicinity of the AuGres River, Wigwam Bay and the Pine River in 1975, 1976 and 1977[a]

Common name	Common name
Canada goose	American coot
mallard	herring gull
black duck	ring-billed gull
pintail	Bonaparte's gull
green-winged teal	common tern
blue-winged teal	Caspian tern
American wigeon	black tern
northern shoveler	bobolink
wood duck	western meadowlark
redhead	red-winged blackbird
ring-necked duck	northern oriole
lesser scaup	common grackle
common goldeneye	semipalmated plover
red-breasted merganser	killdeer
belted kingfisher	black-bellied plover
long-billed marsh wren	common snipe
short-billed marsh wren	spotted sandpiper
great blue heron	lesser yellowlegs
green heron	least sandpiper
least bittern	dunlin
American bittern	long-billed dowitcher
Virginia rail	red-tailed hawk
sora	marsh hawk
common gallinule	

[a]Taken from Michigan Department of Natural Resources, Environmental Areas Survey. 1975-1977

Table 3-36. Seasonal Abundance, Density, and Productivity of Waterfowl in Wigwam Bay[a]

Waterfowl Use	Production		Fall Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	40	0.30	500	250						
black duck	2	0.01	100	50						
gadwall										
mottled duck										
green-winged teal			100	50						
Am. wigeon										
blue-winged/ cinnamon teal	38	0.29	100	50						
northern shoveler										
pintail										
wood duck										
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	80	0.6	800	400			0	0		
redhead										
canvasback										
scaups			200	100						
redneck										
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers	0	0	200	100			0	0		
other ducks										
TOTAL ducks	80	0.6	1000	500			0	0		

-continued-

Table 3-36. (concluded)

Waterfowl Use	Production			Fall Migration			Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada										
black brant										
brant										
TOTAL geese	0	0	0	0			0	0		
Swans										
whistling										
other										
TOTAL swans	0	0	0	0			0	0		
TOTAL waterfowl	80	0.6	1000	500			0	0		

[a]Taken from Michigan Department of Natural Resources, 1976

provides hunting opportunities for upland game (U.S. Fish and Wildlife Service, 1969).

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon, red fox (Vulpes vulpes), weasels (Mustela sp.), mink, and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, these wetlands provide exceptional habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to seasonal distribution and abundance, density and productivity, life histories, major food sources, or relationship to water levels of the mammals inhabiting West Saginaw Bay Wetland.

Endangered Species

Birds observed in West Saginaw Bay Wetland in recent surveys (Michigan Department of Natural Resources, 1975-1977) have included the endangered common tern (Sterna hirundo) and the threatened marsh hawk (Circus cyaneus) and Caspian tern (Sterna caspia), as well as the American bittern (Botaurus lentiginosus), a species rare in Michigan.

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 West Saginaw 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, West Saginaw Bay Wetland supports a diversity of avifauna. Artificial fill is located in the vicinity of the wetland.

CULTURAL SETTING LH 058

Population

West Saginaw Bay Wetland is located in Standish, Au Gres, Arenac, and Sims Townships of Arenac County, Michigan. The county is sparsely populated, having a density of 36 persons per square mile. Table 3-37 indicates that Arenac County and all four townships experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Arenac County.

Table 3-37. Population Data for the Vicinity of West Saginaw Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Standish Township	1,796	20.3	--
AuGres Township	743	14.0	--
Arenac Township	901	21.9	--
Sims Township	416	26.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. There are some areas where artificial fill and dredging have formed canals and basins, including one area for a marina. Several hard surface roads cross the wetland. Whites Beach contains a moderately large residential development. The surrounding area is predominantly residential and rural open space. The wetland is under mixed private and state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, Standish, Michigan, 1973; Omer, Michigan, 1968; Standish Northeast, Michigan, 1967; Au Gres, Michigan, 1966).

Recreation

Large portions of West Saginaw Bay Wetland are within the boundaries of Tittabawassee River State Forest. Recreational activities include camping, boating, swimming, fishing, and nature trails.

Mineral, Energy, and Forest Resources

Potential mineral resources in the northern half of West Saginaw Bay Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974).

A potential forest resource exists in the northern portion of the wetland at Pointe au Gres, but no significant oil or gas 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 West Saginaw Bay Wetland (U.S.G.S. quadrangle maps, Omer, Michigan, 1968; Au Gres, Michigan, 1966; Standish, Michigan, 1973; Standish Northeast, Michigan, 1967).

Pollution Sources

There are no NPDES permit holders adjacent to West Saginaw Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are 22 known archaeological sites in the vicinity of West Saginaw Bay Wetland: # 20-AC-1, 20-BY-5, 20-AC-11, 20-AC-14, 20-AC-16, 20-AC-19, 20-AC-23 through 20-AC-33, and 20-AC-37. These sites feature mounds, cemeteries, and habitation and knapping areas. There is also one historic Chippewa Reservation nearby (Peebles and Black, 1976).

RESEARCH PROJECTS LH 058

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

SCHNITZELBANK CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 059

Setting

Schnitzelbank Creek Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Sims Township of Arenac County, Michigan. This predominantly wooded, Palustrine - Lacustrine wetland extends from approximately 2.0 miles inland to 300 feet off shore, and is 1.7 miles from Au Gres, Michigan (U.S.G.S. quadrangle maps, Au Gres, Michigan, 1966; Point Lookout, Michigan, 1966).

Topography

Schnitzelbank Creek Wetland has a relief of 25 feet and a maximum elevation of 605 feet above mean sea level (25 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline area as wetland. The wetland consists of beach ridges, and the surrounding terrain is irregular and rolling (U.S.G.S. quadrangle maps, Au Gres, Michigan, 1966; Point Lookout, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Schnitzelbank Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

The Eastport Soil Association is present in Schnitzelbank Creek Wetland. This soil is sandy, well drained to poorly drained, and is found on low beach ridges and in swales (Redmond, 1967).

Hydrology

Roberts Drain and Schnitzelbank Creek flow through Schnitzelbank Creek Wetland (U.S.G.S. quadrangle maps, Point Lookout, Michigan, 1966; Au Gres, 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 Schnitzelbank Creek Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Schnitzelbank Creek Wetland (U.S.G.S. quadrangle maps, Au Gres, Michigan, 1966; Point Lookout, Michigan, 1966).

BIOTIC SETTING LH 059

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 Schnitzelbank Creek Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon morinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Schnitzelbank Creek Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in this wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Schnitzelbank Creek Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969)

as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Schnitzelbank Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wtlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Schnitzelbank 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 Schnitzelbank Creek Wetland.

Mammals

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat (Ondatra zibethicus) trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, wetlands provide exceptionally good habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to species composition, 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 Schnitzelbank 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 Schnitzelbank 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 LH 059

Population

Schnitzelbank Creek Wetland is located in Sims Township of Arenac County, Michigan. The county is sparsely populated, having a density of 36 persons per square mile. Table 3-38 indicates that Arenac County and Sims Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Arenac County.

Table 3-38. Population Data for the Vicinity of Schnitzelbank Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Sims Township	416	26.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is primarily rural open space. However, U.S. Route 23 crosses the wetland; residences line the beach, and a housing development with associated roads projects into 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 maps, Au Gres, Michigan, 1966; Point Lookout, Michigan, 1966).

Recreation

No known state or federal recreational facilities are present in the vicinity of Schnitzelbank Creek Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Schnitzelbank Creek Wetland include limestone, dolomite, and sand (Great Lakes Basin Commission, 1974). A sand pit and quarry are located within a mile of the wetland.

The wetland is predominantly wooded, representing a potential forest resource, but no significant oil or gas 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 Schnitzelbank Creek Wetland (U.S.G.S. quadrangle maps, Au Gres, Michigan, 1966; Point Lookout, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Schnitzelbank Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one archaeological site (# 20-AC-4) in the vicinity of Schnitzelbank Creek Wetland. The site was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 059

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

WHITESTONE POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LH 060

Whitestone Point Area Wetland is located approximately 0.1 mile from the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Whitney and Sims Townships of Arenac County, Michigan, 5.3 miles from the community of Au Gres. This Palustrine wetland is predominantly wooded (U.S.G.S. quadrangle maps, Point Lookout, Michigan, 1966; Alabaster, Michigan, 1966).

Topography

Whitestone Point Area Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area contains one small hill with an elevation of 640 feet above mean sea level (U.S.G.S. quadrangle maps, Alabaster, Michigan, 1966; Point Lookout, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Whitestone Point Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

The Eastport Soil Association is present in Whitestone Point Area Wetland. This soil is sandy, well drained to poorly drained, and is found on low beach ridges and in swales (Redmond, 1967).

Hydrology

Silver Drain, Hammell Creek, Dime Drain, and one intermittent creek flow through Whitestone Point Area Wetland (U.S.G.S. quadrangle maps, Alabaster, Michigan, 1966; Point Lookout, 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 Whitestone Point Area Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Whitestone Point Area Wetland (U.S.G.S. quadrangle maps, Alabaster, Michigan, 1966; Point Lookout, Michigan, 1966).

BIOTIC SETTING LH 060

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 Whitestone Point Area Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon morinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Whitestone Point Area Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in this wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Whitestone Point Area Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969) as diverse and composed of over 44 genera. Pollution tolerant species of

oligochaetes and chironomids comprised the bulk of the organisms collected but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Whitestone Point Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wtlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitestone 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 Whitestone Point Area Wetland.

Mammals

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat (Ondatra zibethicus) trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, wetlands provide exceptionally good habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to species composition, 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 Whitestone 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 Whitestone 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, Hammel Beach Hardware and a laundromat hold NPDES permits to discharge into groundwater, and this may affect Whitestone Point Area Wetland.

CULTURAL SETTING LH 060

Population

Whitestone Point Area Wetland is located in Whitney and Sims Townships of Arenac County, Michigan. The county is sparsely populated, having a density of 36 persons per square mile. Table 3-39 indicates that Arenac County and Sims Township experienced rapid population growth, while Whitney Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Arenac County.

Table 3-39. Population Data for the Vicinity of Whitestone Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Whitney Township	669	-10.0	--
Sims Township	416	26.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly rural open space and residential. U.S. Route 23 and a few other paved roads run through 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, Alabaster, Michigan, 1966; Point Lookout, Michigan, 1966).

Recreation

No known state or federal recreational facilities are present in the vicinity of Whitestone Point Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Whitestone Point Area Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974). A sand pit and a quarry are located within 1,000 feet of the wetland.

The wetland is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A pumping station is located approximately 400 feet west of Whitestone Point Area Wetland, and Township Park lies adjacent to the wetland (U.S.G.S. quadrangle maps, Point Lookout, Michigan, 1966; Alabaster, Michigan, 1966).

Pollution Sources

Hammel Beach Hardware and a laundromat hold NPDES permits to discharge into groundwater, and their effluents may affect Whitestone Point Area Wetland. No published, site-specific information was located through the literature search pertaining to non-point sources of pollution in this wetland.

Historical and Archaeological Features

Alabaster Quarry is located within 500 feet of Whitestone Point Area Wetland. The quarry has been in operation since 1862 and was named for a variety of gypsum which was discovered nearby in 1837 (County Inventory).

There is one archaeological site (# 20-AC-7) in the vicinity of Whitestone Point Area Wetland. The site was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

RESEARCH PROJECTS LH 060

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

PINE WOOD PARK AREA WETLAND

PHYSIOGRAPHIC SETTING LH 061

Setting

Pine Wood Park Area Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, within Alabaster and Whitney Townships of Iosco and Arenac Counties, Michigan. Various component parts of this wooded, Palustrine wetland lie from approximately 100 feet to 750 feet from the Saginaw Bay shoreline at Cedar Haven and Pine Wood Park, Michigan (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Topography

Pine Wood Park Area Wetland has a relief of 25 feet and a maximum elevation of 605 feet above mean sea level (25 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is irregular in elevation with extensive interior swamps in Alpena State Forest and Ogemaw State Forest (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Pine Wood Park Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

The Eastport Soil Association is present in the section of Pine Wood Park Area Wetland in Arenac County. This soil is sandy, well drained to poorly drained, and is found on low beach ridges and in swales (Redmond, 1967). No soil survey information is available for Iosco County.

Hydrology

No streams flow through Pine Wood Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, 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 Pine Wood Park Area Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58

inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Pine Wood Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

BIOTIC SETTING LH 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 Pine Wood Park Area Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon morinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Pine Wood Park Area Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna in this wetland.

Invertebrates

The distribution, abundance and productivity of the benthic invertebrates of Saginaw Bay from 1955 to 1965 is discussed in Schneider et al. (1969). The organisms collected during this study may occur, in addition to other invertebrates, in Pine Wood Park Area Wetland owing to the proximity of the bay. The invertebrate fauna of the bay was characterized by Schneider et al. (1969)

as diverse and composed of over 44 genera. Pollution tolerant species of oligochaetes and chironomids comprised the bulk of the organisms collected but typical Lake Huron open water species and inland water species from other taxa were also present. Appendix B-5 lists the benthic invertebrate taxa collected in Saginaw Bay. Schuytema et al. (1966) also list taxa collected from Saginaw Bay.

The literature search yielded no site-specific information pertaining to seasonal distribution, density and productivity, major food sources, or relationship to water levels of the invertebrates present in Pine Wood Park Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Arenac and Iosco Counties are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pine Wood Park 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 Pine Wood Park Area Wetland.

Mammals

A discussion of the Saginaw Bay estuary (U.S. Fish and Wildlife Service, 1970) indicated that eleven species of mammals may be found on the wetlands associated with Saginaw Bay (Appendix E-2). Muskrat (Ondatra zibethicus) trapping is an important activity on these wetlands, but only a small amount of trapping effort is expended on the Virginia opossum (Didelphis virginiana), raccoon (Procyon lotor), red fox (Vulpes vulpes), weasels (Mustela sp.), mink (M. vison), and striped skunk (Mephitis mephitis). Mink have been decreasing on the wetlands of Saginaw Bay since 1964. However, wetlands provide exceptionally good habitat for muskrat (Jaworski and Raphael, 1978).

The literature search yielded no site-specific information pertaining to species composition, 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 Pine Wood Park 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 Pine Wood Park 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 LH 061

Population

Pine Wood Park Area Wetland is located in Whitney Township of Arenac County, Michigan and in Alabaster Township of Iosco County, Michigan. Arenac County is sparsely populated, having a density of 36 persons per square mile; Iosco County is also sparsely populated (52 persons per square mile). Table 3-40 indicates that Arenac County and Iosco County both experienced rapid population growth, while Whitney Township and Alabaster Township each underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in both counties.

Table 3-40. Population Data for the Vicinity of Pine Wood Park Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Arenac County	13,179	18.2	18,537
Whitney Township	669	-10.0	--
Iosco County	28,218	13.3	39,068
Alabaster Township	252	-10.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. U.S. Route 23 bisects the wetland. A large strip mine with an installed conveyor is close to the northern portion of the wetland. The surrounding area is predominantly rural open space

and residential. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Recreation

No known state or federal recreational facilities are present in the vicinity of Pine Wood Park Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Pine Wood Park Area Wetland include limestone, dolomite, and gypsum (Great Lakes Basin Commission, 1974). The U.S. Gypsum Company has a strip mine at Alabaster, Michigan, just north of the wetland (Dorr and Eschman, 1970).

The wetland is wooded, but is not large enough to represent a significant potential forest resource, and no significant oil or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A water tank is located approximately 0.4 mile north of Pine Wood Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Pine Wood Park Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Alabaster Quarry is located within 500 feet of Pine Wood Area Wetland. The quarry has been in operation since 1862 and was named for a variety of gypsum which was discovered nearby in 1837 (County Inventory).

There is one archaeological site (# 20-AC-2) in the vicinity of Pine Wood Park Area Wetland. The site was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

RESEARCH PROJECTS LH 061

The literature search identified no on-going or impending research projects pertaining to Pine Wood Park Area Wetland.

Table 3-41. Data Gaps - Lake Section 3

Data Gap*		Wetland Number	040	041	042-045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061
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 4

INTRODUCTION

Lake Section 4 extends from the Arenac-Iosco county line to South Nine Mile Point. The coastline of Iosco and Alpena Counties is within this lake section. The region features irregular to flat topography. Low beach ridges are also common. The predominant shore type along this 62 mile stretch of shoreline is erodible low plain.

Figures 4-1 and 4-2 show the approximate location of the 24 coastal wetlands in Lake Section 4. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 4-1. The wetlands of Lake Section 4 lie at elevations between 582 and 650 feet above sea level.

Available information related to physiographic and cultural features of these 24 wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to biotic characteristics of many of these wetlands.

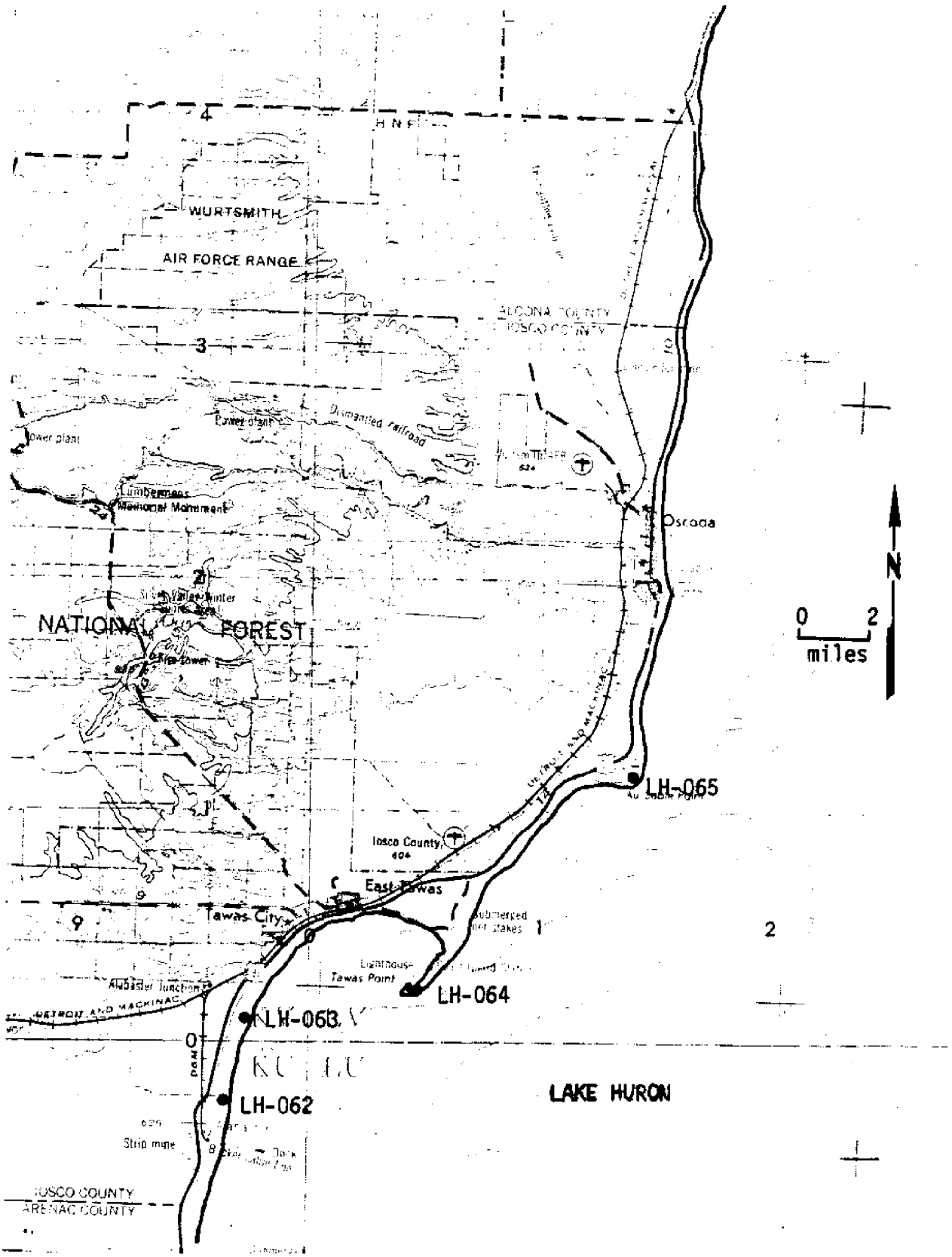


Figure 4-1. Lake Section 4 - Tawas Bay Area

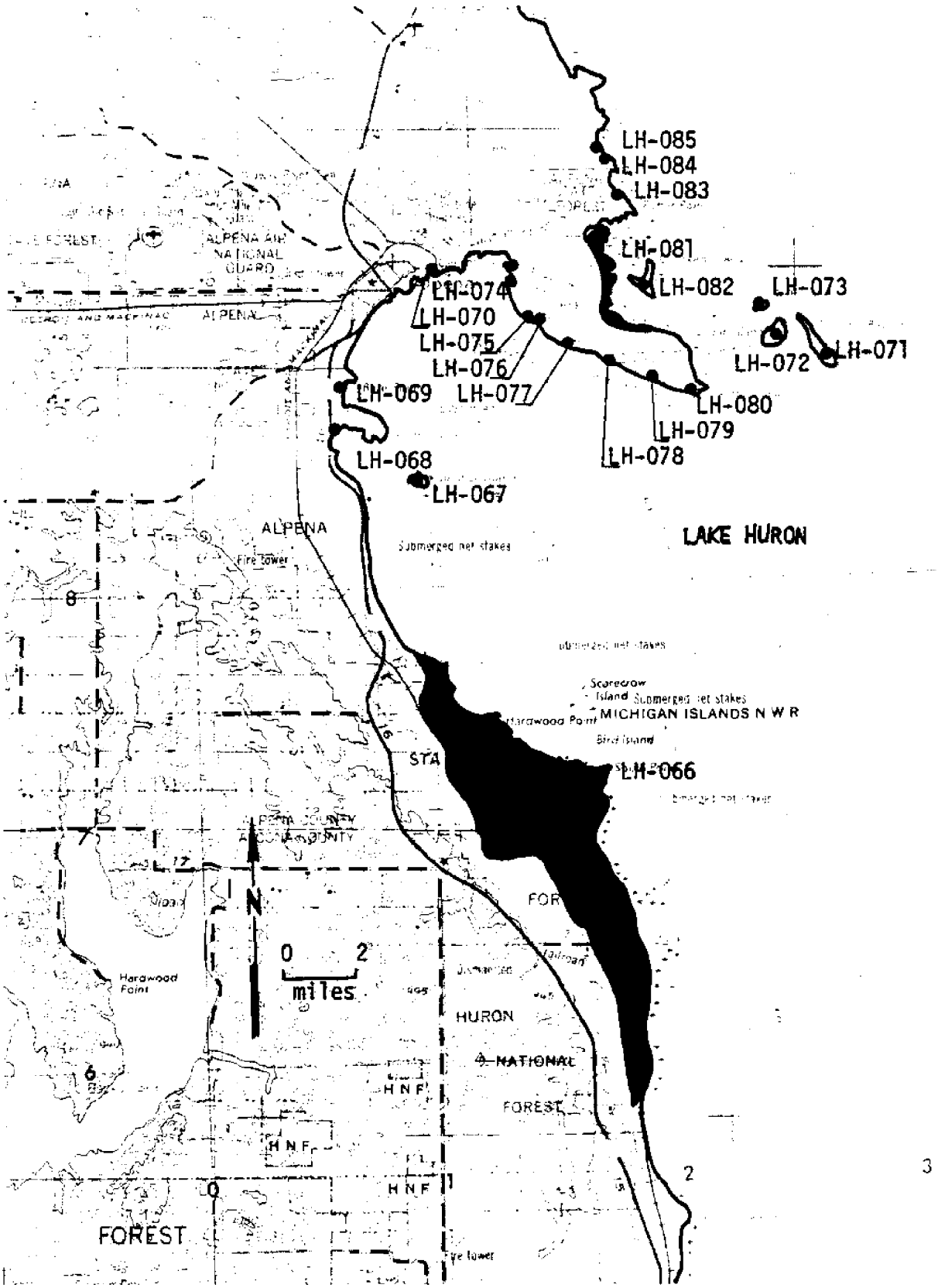


Figure 4-2. Lake Section 4 - Thunder Bay Area

Table 4-1. Location, Acreage, and Classification of Wetlands in Lake Section 4

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 062	Benson Park Area Wetland	43°12'28"	83°33'18"	45	P
LH 063	Lake Huron Beach Area Wetland	43°14'22"	83°32'45"	65	P
LH 064	Tawas Point Wetland	44°17'10"	83°25'55"	820	P
LH 065	Au Sable Point Wetland	44°20'08"	83°20'56"	130	P
LH 066	South Thunder Bay Wetland	44°51'22"	83°20'34"	7241	P
LH 067	Sulfur Island Wetland	44°59'16"	83°24'56"	25	P
LH 068	Squaw Bay Wetland	44°59'21"	83°24'34"	777	P
LH 069	South Alpena Area Wetland	45°01'12"	83°27'10"	385	P
LH 070	McRae Park Area Wetland	45°04'26"	83°24'42"	33	P
LH 071	Thunder Bay Island Wetland	45°02'20"	83°11'58"	5	P
LH 072	Sugar Island Wetland	45°02'43"	83°13'22"	40	P
LH 073	North Gull Island Wetland	45°03'21"	83°13'58"	2	P
LH 074	Whitefish Bay Wetland	45°04'38"	83°22'18"	180	P
	NORTH THUNDER BAY WETLAND COMPLEX				
LH 075	Whitefish Point Wetland	45°03'02"	83°21'22"	1	P
LH 076	North Thunder Bay Wetland #1	45°03'02"	83°20'44"	13	P
LH 077	North Thunder Bay Wetland #2	45°02'30"	83°20'15"	15	P
LH 078	North Thunder Bay Wetland #3	45°02'18"	83°19'12"	12	P
LH 079	North Thunder Bay Wetland #4	45°02'09"	83°18'20"	5	P
LH 080	North Thunder Bay Wetland #5	45°01'38"	83°17'13"	1	P
LH 081	Misery Bay Wetland	45°04'33"	83°19'22"	1885	P
LH 082	Crooked Island Wetland	45°03'55"	83°17'47"	35	P
LH 083	El Cajon Beach Wetland #1	45°05'49"	83°18'26"	45	P
LH 084	El Cajon Beach Wetland #2	45°05'34"	83°18'47"	22	P
LH 085	Grass Creek Wetland	45°07'32"	83°19'14"	25	P

[a]P=palustrine

BENSON PARK AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 062

Setting

Benson Park Area Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, in Alabaster Township of Iosco County, Michigan. The various component parts of the wetland lie approximately 0.1 mile from the Saginaw Bay shoreline at the communities of Hyde Park, Oak Wood Shores, and Benson Park, Michigan. This Palustrine System occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Topography

Benson Park Area Wetland has a relief of 60 feet and a maximum elevation of 645 feet above mean sea level (65 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding terrain is irregular, and swampy in places (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Benson Park Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Iosco County.

Hydrology

Mason Creek and two intermittent streams flow through Benson Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, 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 Benson Park Area Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Benson Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

BIOTIC SETTING LH 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 Benson Park Area Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A-3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon marinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Benson Park Area Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna 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 Benson Park Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Iosco County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Benson Park 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 Benson Park 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 Benson Park 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 Benson Park 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 LH 062

Population

Benson Park Area Wetland is located in Alabaster Township of Iosco County, Michigan. The county is sparsely populated, having a density of 52 persons per square mile. Table 4-2 indicates that Iosco County experienced rapid growth, while Alabaster Township underwent a rapid decline in population, between 1970

and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Iosco County.

Table 4-2. Population Data for the Vicinity of Benson Park Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Iosco County	28,218	13.3	39,068
Alabaster Township	252	-10.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly rural open space and residential. A large strip mine with an associated conveyor to Saginaw Bay is located near the wetland, and a Detroit and Mackinac Railroad track from the strip mine parallels the wetland. U.S. Route 23 passes close by, and residences line the beach near 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, Alabaster, Michigan, 1966).

Recreation

No known state or federal recreational facilities are present in the vicinity of Benson Park Area Wetland.

Mineral, Energy, and Forest Resources

A potential mineral resource in the vicinity of Benson Park Area Wetland is gypsum (Great Lakes Basin Commission, 1974). The U.S. Gypsum Company has a strip mine at Alabaster, Michigan, just south of the wetland (Dorr and Eschman, 1970).

No significant forest, oil, or gas resources are known to be present in the vicinity.

Public Utilities and Facilities

A water tank is located approximately 0.3 mile south of Benson Park Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Benson Park Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

Alabaster Quarry is located within 500 feet of Benson Park Area Wetland. The quarry has been in operation since 1862 and was named for a variety of gypsum which was discovered nearby in 1937 (County Inventory).

There are no known archaeological sites in the vicinity of Benson Park Area Wetland.

RESEARCH PROJECTS LH 062

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

LAKE HURON BEACH AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 063

Setting

Lake Huron Beach Area Wetland is located along the western shoreline of Saginaw Bay, which is directly connected to Lake Huron, in Tawas and Alabaster Townships of Iosco County, Michigan. The various component parts of this wooded, Palustrine wetland lie approximately 0.1 mile from the Saginaw Bay shoreline at the communities of Huron Oaks, Lake Huron Beach, Anderson Bayview, and Clark Bayshore, Michigan (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Topography

Lake Huron Beach Area Wetland has a relief of 55 feet and a maximum elevation of 645 feet above mean sea level (65 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The wetland area is divided by a 50 foot bluff, and the inland portion is primarily flat (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Surficial Geology

The surficial geology of the area in which Lake Huron Beach Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Iosco County.

Hydrology

No streams flow through Lake Huron Beach Area Wetland (U.S.G.S. quadrangle map, Alabaster, 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 Lake Huron Beach Area Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Lake Huron Beach Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

BIOTIC SETTING LH 063

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 Huron Beach Area Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A-3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon marinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Lake Huron Beach Area Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna 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 Huron Beach Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Iosco County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lake Huron Beach 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 Lake Huron Beach 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 Lake Huron Beach 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 Lake Huron Beach 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 LH 063

Population

Lake Huron Beach Area Wetland is located in Alabaster and Tawas Townships of Iosco County, Michigan. The county is sparsely populated, having a density of 52 persons per square mile. Table 4-3 indicates that Iosco County and Tawas Township experienced rapid population growth, while Alabaster Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Iosco County.

Table 4-3. Population Data for the Vicinity of Lake Huron Beach Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Iosco County	28,218	13.3	39,068
Alabaster Township	252	-10.0	--
Tawas Township	1,465	16.9	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly rural open space and residential. U.S. Route 23 bisects the wetland, and houses with associated roads line the beach. A Detroit and Mackinac Railroad siding, which is connected to a mine conveyor in the lake, crosses 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, Alabaster, Michigan, 1966).

Recreation

No known state or federal recreational facilities are present in the vicinity of Lake Huron Beach Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Lake Huron Beach Area Wetland include gypsum, sand, and gravel (Great Lakes Basin Commission, 1974).

No significant forest resources are present in the wetland, although a large wooded area does lie adjacent to it on the west. No significant oil or gas 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 Lake Huron Beach Area Wetland (U.S.G.S. quadrangle map, Alabaster, Michigan, 1966).

Pollution Sources

There are no NPDES permit holders adjacent to Lake Huron Beach Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Lake Huron Beach Area Wetland.

RESEARCH PROJECTS LH 063

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

TAWAS POINT WETLAND

PHYSIOGRAPHIC SETTING LH 064

Setting

Tawas Point Wetland is located approximately 500 feet from the shoreline of Tawas Bay, which is directly connected to Lake Huron, in Baldwin Township of Iosco County, Michigan, 1.5 miles from the community of Tawas. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Topography

Tawas Point Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. Topography in the surrounding area is irregular (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Surficial Geology

The surficial geology of the area in which Tawas Point Wetland lies is characterized by sand dunes. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Iosco County.

Hydrology

There is a small unnamed stream that drains from Lake Solitude (located in the wetland) through Tawas Point Wetland to Lake Huron (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959). 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 Tawas Point Wetland is located in East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Tawas Point Wetland (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

BIOTIC SETTING LH 064

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 Tawas Point Wetland.

Fish

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A-3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon marinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Tawas Point Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna 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 Tawas Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is

general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Iosco County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Tawas Point Wetland.

Avifauna

Blue-winged teal (Anas discors), herring gulls (Larus argentatus), black terns (Chlidonias niger), Caspian terns (Sterna caspia), red-winged blackbirds (Agelaius phoeniceus), common grackles (Quiscalus quiscula), black-bellied plovers (Pluvialis squatarola), spotted sandpipers (Actitis macularia) and least sandpipers (Caladris minutilla) were observed in this wetland on June 2, 1975 by Michigan Department of Natural Resources personnel. This area is considered a critical migration stopover for passerines, shorebirds, marsh birds, and waterfowl. Other waterbirds and waterfowl also use the habitat for nesting and rearing of young (Michigan DNR 1974). Kelley et al. (1973) provided a list of birds banded on the point from 1962 to 1971 during fall migration. The Caspian tern is currently on the state threatened species list.

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 Tawas Point Wetland.

Mammals

Muskrat (Ondatra zibethicus) and mink (Mustela vison) have been observed on Tawas Point Wetland (Michigan Department of Natural Resources, open file report). However, the literature search yielded no site-specific information pertaining to 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 Tawas Point Wetland.

Endangered Species

Caspian terns, a species threatened in Michigan, were observed on Tawas Point Wetland in 1975 (Michigan Department of Natural Resources).

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, the wetland provides a critical migration stopover for passerines, shore birds, marsh birds, and waterfowl.

Population

Tawas Point Wetland is located in Baldwin Township of Iosco County, Michigan. The county is sparsely populated, having a density of 52 persons per square mile. Table 4-4 indicates that Iosco County and Baldwin Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Iosco County.

Table 4-4. Population Data for the Vicinity of Tawas Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Iosco County	28,218	13.3	39,068
Baldwin Township	1,053	10.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space but the town of East Tawas is within a mile of the wetland. U.S. Route 23 and other hard surface roads traverse the wetland, and housing developments are scattered along the wetland borders. The wetland is under private ownership, but information is not sufficient to evaluate development pressure (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Recreation

No known state or federal recreational facilities are present in the vicinity of Tawas Point Wetland.

Mineral, Energy, and Forest Resources

Potential forest resources are present in the northern portion of Tawas Point Wetland and the surrounding area. No significant mineral, oil, or gas 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 Tawas Point Wetland (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Pollution Sources

There are no NPDES permit holders adjacent to Tawas Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (# 20-IS-3) in the vicinity of Tawas Point Wetland. The site features a village which was reported by Gillman in 1874 and Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 064

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

AU SABLE POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 065

Setting

Au Sable Point Wetland is located on the shoreline of Lake Huron in Baldwin Township of Iosco County, Michigan at Au Sable Point, three miles from the community of Tawas. This Palustrine System occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Topography

Au Sable Point Wetland has a relief of five feet and lies at an elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. Topography in the surrounding area is irregular, with little grade (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Surficial Geology

The surficial geology of the area in which Au Sable Point Wetland lies is characterized by sand dunes. Rock occurring at or near the surface is of the Mississippian period and the Napoleon-Marshall formation (Martin, 1955).

Soils

No recent soil survey is available for Iosco County.

Hydrology

No water courses flow through Au Sable Point Wetland (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959). 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 East Tawas, Michigan. The average annual temperature is 45.2°F, based on the normal period from 1941-1970. The mean monthly low for January is 13.9°F and the mean monthly high for July is 80.7°F. The average annual precipitation is 29.31 inches, with a mean monthly precipitation of 1.58 inches in January and 2.96 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 26 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Au Sable Point Wetland (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

BIOTIC SETTING LH 065

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

A list of fish species presumed to utilize the coastal wetlands of Saginaw Bay is presented in Appendix A-3. Commercial fishing prior to 1900 was concentrated on lake trout (Salvelinus namaycush) and lake whitefish (Coregonus clupeaformis), and was later focused on walleye (Stizostedion vitreum) as well. Stocks of these species have been greatly depleted since the 1930's and 1940's due to a combination of factors including predation by sea lamprey (Petromyzon marinus), over-exploitation, habitat alteration, and pollution. These factors have affected most other species to a certain degree, but such commercial species as lake herring (Coregonus artedii), yellow perch (Perca flavescens), white sucker (Catostomus commersoni), redhorses (Moxostoma spp.), and carp (Cyrpinus carpio) remain relatively abundant. Lack of profitable markets for these species has discouraged commercial exploitation (U.S. Department of the Interior, 1970).

Saginaw Bay also supports an active and diverse recreational fishery. Such wetland utilizing species as northern pike (Esox lucius), yellow perch, carp, and smallmouth bass (Micropterus dolomieui) are important game fishes in shallow bay waters (U.S. Department of the Interior, 1970). Some of the species listed in Appendix A-3 may occur in Au Sable Point Wetland. However, the literature search yielded no site-specific information pertaining to major species, species composition, spawning and hatching areas, seasonal distribution and abundance, life histories, food sources, or recreational and commercial use of the fish fauna 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 Au Sable Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is

general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Iosco County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, 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 LH 065

Population

Au Sable Point Wetland is located in Baldwin Township of Iosco County, Michigan. The county is sparsely populated, having a density of 52 persons per square mile. Table 4-5 indicates that Iosco County and Baldwin Township experienced rapid growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Iosco County.

Table 4-5. Population Data for the Vicinity of Au Sable Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Iosco County	28,218	13.3	39,068
Baldwin Township	1,053	10.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. U.S. Route 23 adjoins the wetland and several hard surface roads are close by. The wetland is under private ownership, and its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Recreation

No known state or federal recreational facilities are present in the vicinity of Au Sable Point Wetland.

Mineral, Energy, and Forest Resources

A potential forest resource exists inland to the west of Au Sable Point Wetland. No significant mineral, oil, or gas 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 Au Sable Point Wetland (U.S.G.S. quadrangle map, East Tawas, Michigan, 1959).

Pollution Sources

There are no NPDES permit holders adjacent to Au Sable Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Au Sable Point Wetland.

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

SOUTH THUNDER BAY WETLAND

PHYSIOGRAPHIC SETTING LH 066

Setting

South Thunder Bay Wetland is located along the western shoreline of Lake Huron within Haynes, Alcona, and Sanborn Townships of Alcona and Alpena Counties, Michigan, at Thunder Bay. The various component parts of this wooded, Palustrine wetland extend from the shoreline to approximately 1.5 miles inland in Thunder Bay River State Forest and Huron National Forest. The largest population center in the area is Alpena, Michigan (U.S.G.S. quadrangle maps, Black River, Michigan, 1971; South Point, Michigan, 1971; Ossineke, Michigan, 1971).

Topography

South Thunder Bay Wetland has a relief of 70 feet and a maximum elevation of 650 feet above mean sea level (70 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the area as wetland. The surrounding topography is irregular and hilly (U.S.G.S. quadrangle maps, Black River, Michigan, 1971; South Point, Michigan, 1971; Ossineke, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which South Thunder Bay Wetland lies is characterized by lake bed sand. Rock occuring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Rubicon sand, Lupton muck, Ogemaw sandy loam, Granby sand, and Coastal beach are all types of soil present in South Thunder Bay Wetland. All of these soils generally consist of a thin topsoil of loam, sandy loam, or organic matter over extensive sand or sand and gravel subsoil. They are nearly level, are poorly drained, and usually occur in swales (Wildermuth, et al., 1924).

Hydrology

The Black River and one intermittent stream flow through South Thunder Bay Wetland (U.S.G.S. quadrangle maps, Black River, Michigan, 1971; Ossineke, Michigan, 1971; South Point, Michigan, 1971). 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 Black River may be found in Knutilla (1970) and Twenter (1975).

Climate

The closest weather station providing climatic data for South Thunder Bay Wetland is located in Harrisville, Michigan*. The average temperature was 46.1°F in 1975. The mean daily low for January was 16.9°F and the mean daily high for July was 81.8°F. The average annual precipitation is 31.14 inches, with a mean monthly precipitation of 2.64 inches in January and 4.29 inches in July. The growing season is approximately six months long, with the last killing frost (28°F) in 1975 occurring on April 28 and the first killing frost on October 31 (National Oceanic and Atmospheric Administration, 1975).

* Long term mean values not yet established.

Special Features

No natural special features are found in the vicinity of South Thunder Bay Wetland (U.S.G.S. quadrangle maps, Black River, Michigan, 1971; Ossineke, Michigan, 1971; South Point, Michigan, 1971).

BIOTIC SETTING LH 066

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 Thunder Bay Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 South Thunder 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 Thunder Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alcona and Alpena Counties are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Thunder Bay Wetland.

Avifauna

Species observed during bird surveys (1974, 1975) conducted in South Thunder Bay Wetland in the vicinity of Muskrat Lake, South Point, Hardwood Point, and Ossineke Forest Campground are listed in Table 4-6 (Michigan Department of Natural Resources, 1974, 1975). The portion of this wetland that extends from Muskrat Lake north to the Alpena County line is a critical waterfowl and shorebird nesting area (Michigan Department of Natural Resources, 1974).

Table 4-6. Birds Observed in South Thunder Bay Wetland[a]

Common name	Common name
Canada goose	great blue heron
mallard	green heron
black duck	least bittern
gadwall	American bittern
green-winged teal	herring gull
blue-winged teal	ring-billed gull
American wigeon	red-winged blackbird
common goldeneye	common grackle
common merganser	spotted sandpiper
red-breasted merganser	American woodcock
belted kingfisher	

[a] Michigan Department of Natural Resources, Environmental Areas Survey (1974, 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 South Thunder Bay Wetland.

Mammals

The eastern cottontail (Sylvilagus floridanus), snowshoe hare (Lepus americanus), beaver (Castor canadensis), muskrat (Ondatra zibethicus), mink (Mustela vison), and river otter (Lutra canadensis) have been observed in South Thunder Bay Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 Thunder Bay Wetland by the literature search.

Health

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

Population

South Thunder Bay Wetland is located in Haynes and Alcona Townships of Alcona County, and in Sanborn Township of Alpena County, Michigan. Alcona County is sparsely populated, having a density of 13 persons per square mile; Alpena County is also sparsely populated (59 persons per square mile). Table 4-6 indicates that Alcona County, Alcona Township, Alpena County, and Sanborn Township experienced rapid growth, while population remained stable in Haynes Township, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in both counties.

Table 4-6. Population Data for the Vicinity of South Thunder Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alcona County	8,640	21.5	10,692
Haynes Township	413	-0.7	--
Alcona Township	858	76.5	--
Alpena County	33,293	8.4	40,721
Sanborn Township	2,089	28.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23 runs parallel to the wetland on the inland side, and a hard surface and several unimproved roads lie in the wetland area. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, Ossineke, Michigan, 1971; South Point, Michigan, 1971; Black River, Michigan, 1971).

Recreation

Part of South Thunder Bay Wetland is located within Thunder Bay River State Forest, and the southern end is within Alpena State Park. Another portion is within the Huron National Forest. Thunder Bay River State Forest provides facilities for camping, day hikes, boating, swimming, and fishing. Recreational facilities in Alpena State Park and Huron National Forest are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of South Thunder Bay Wetland include sand and gravel (Great Lakes Basin Commission, 1974). There are numerous gravel pits in the area.

The wetland is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

Sanborn County Park is located approximately 0.4 mile north of South Thunder Bay Wetland (U.S.G.S. quadrangle maps, Ossineke, Michigan, 1971; Black River, Michigan, 1971; South Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to South Thunder Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are four known archaeological sites (# 20-AL-5, 20-AL-19, 20-AA-20, 20-AA-21) in the vicinity of South Thunder Bay Wetland. These sites feature cemeteries, a habitation area, storage pits, and an old corn field (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 066

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

SULFUR ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 067

Setting

Sulfur Island Wetland is located on the shoreline of Sulfur Island in Thunder Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, approximately 3.5 miles from the town of Alpena. This Lacustrine System is partially wooded (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971).

Topography

Sulfur Island Wetland has very little relief and lies at an elevation of about 584 feet above mean sea level (four feet above the approximate mean elevation of Lake Huron). The surrounding area is flat (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Sulfur Island Wetland.

Soils

Granby sand is present in Sulfur Island Wetland. This soil consist of loam or sandy loam over a sandy subsoil (Wildermuth, et al., 1924).

Hydrology

No streams flow through Sulfur Island Wetland (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971). 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 Sulfur Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Sulfur Island Wetland (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971)

BIOTIC SETTING LH 067

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 Sulfur Island Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 Sulfur 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 Sulfur Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sulfur Island Wetland.

Avifauna

Mallards (Anas platyrhynchos), gadwalls (A. strepera), American wigeon (A. americana), common mergansers (Mergus merganser), common terns (Sterna hirundo), and red-winged blackbirds (Agelaius phoeniceus) were sighted during a bird survey conducted in this wetland on June 24, 1975 (Michigan Department of Natural Resources, 1975). A ring-billed gull (Larus delawarensis) and herring gull (L. argentatus) rookery was also located (Michigan Department of Natural Resources, 1975-1977).

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 Sulfur 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 Sulfur Island Wetland.

Endangered Species

Common terns, a species endangered in Michigan, were observed in Sulfur Island 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.

Population

Sulfur Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-8 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-8. Population Data for the Vicinity of Sulfur Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is under state ownership. The location of the wetland on Sulphur Island suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Sulfur Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of Sulfur Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sulfur Island Wetland (U.S.G.S. quadrangle map, Ossineke, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Sulfur Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Sulfur Island Wetland.

RESEARCH PROJECTS LH 067

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

PHYSIOGRAPHIC SETTING LH 068

Setting

Squaw Bay Wetland is located on the shoreline of Squaw Bay, which is directly connected to Lake Huron through Thunder Bay, in Alpena Township of Alpena County, Michigan, approximately 1.7 miles from the town of Alpena, Michigan. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle maps, Ossineke, Michigan, 1971; Alpena, Michigan, 1971).

Topography

Squaw Bay Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat with low coastal ridges (U.S.G.S. quadrangle maps, Ossineke, Michigan, 1971; Alpena, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Squaw Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Granby sand is the major type of soil present in Squaw Bay Wetland. This soil consists of loam or sandy loam over a sandy subsoil (Wildermuth et al., 1924).

Hydrology

Several swales occur in Squaw Bay Wetland (U.S.G.S. quadrangle maps, Alpena, Michigan, 1971; Ossineke, Michigan, 1971). 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 Squaw Bay Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Squaw Bay Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971; Ossineke, Michigan, 1971).

BIOTIC SETTING LH 068

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 Squaw Bay Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 Squaw 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 Squaw Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Squaw Bay Wetland.

Avifauna

Approximately 1,000 birds, consisting of 90% lesser scaup (Aythya affinis), 5% mergansers (Lophodytes sp. or Mergus spp.), 3% buffleheads (Bucephala albeola) and 2% goldeneyes (Bucephala spp.) were observed in the bay during the 1977 spring waterfowl migration survey (Michigan Department of Natural Resources, 1977). Bird species which were observed along the west shoreline of the bay in 1975 are listed in Table 4-9 (Michigan Department of Natural Resources, 1975). Data concerning seasonal abundance, density and productivity of waterfowl in Squaw Bay in 1976 are presented in Table 4-10.

Table 4-9. Birds Observed on the West Shoreline of Squaw Bay[a]

Common name	Common name
mallard	herring gull
blue-winged teal	ring-billed gull
pied-billed grebe	common tern
belted kingfisher	red-winged blackbird
short-billed marsh wren	killdeer
great blue heron	solitary sandpiper
green heron	Cooper's hawk
American bittern	

[a] Taken from Michigan Department of Natural Resources, Environmental Areas Survey, 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 Squaw Bay Wetland.

Table 4-10. Seasonal Abundance, Density, and Productivity of Waterfowl in Squaw Bay in 1976[a]

Waterfowl Use	Production			Fall Migration				Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	5	0.1	250	100	1					
black duck										
gadwall										
mottled duck										
green-winged teal										
Am. wigeon										
blue-winged/ cinnamon teal	5	0.1								
northern shoveler										
pintail										
wood duck	22	0.05								
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	0	0	0	0	0		0	0	0	
redhead			500	200	1					
canvasback			250	100	1					
scaups		5000	1000	2F,4S[b]						
redneck										
goldeneye/ bufflehead		100	100	3F			100	50	16	
ruddy duck										
TOTAL sub-divers										
other ducks merganser	2	0.05								
TOTAL ducks										

-continued-

Table 4-10. (concluded)

Waterfowl Use	Production			Fall Migration				Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada			1000	200	1					
black brant										
brant										
TOTAL geese	0	0	0	0	0					
Swans										
whistling			occasional							
other										
TOTAL swans										
TOTAL waterfowl	14	0.3	7100	1700	0		100	50	16	

[a]Taken from Michigan Department of Natural Resources, Waterfowl Habitat Reconaissance. Open file data. 1975-1977

[b]F=fall
S=spring

Mammals

The muskrat (Ondatra zibethicus), beaver (Castor canadensis), mink (Mustela vison), and white-tailed deer (Odocoileus virginianus) have been observed in Squaw Bay Wetland (Michgian Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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

Birds recorded along the shoreline of Squaw Bay Wetland during a survey in 1975 (Michigan Department of Natural Resources, 1975) included the common tern (Sterna hirundo), a species now endangered in Michigan, the Cooper's hawk (Accipiter cooperii), which is on the state list of threatened species, and the American bittern (Botaurus lentiginosus), which is rare in Michigan.

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 Squaw 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 wetland is utilized by a diversity of avifauna.

CULTURAL SETTING LH 068

Population

Squaw Bay Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-11 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-11. Population Data for the Vicinity of Squaw Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23 crosses the wetland. Housing lines the beach adjacent to 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 maps, Ossineke, Michigan, 1971; Alpena, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Squaw Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in Squaw Bay Wetland include sand and gravel. There are several gravel pits in the vicinity.

The surrounding area and 50 percent of the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Squaw Bay Wetland (U.S.G.S. quadrangle maps, Ossineke, Michigan, 1971; Alpena, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Squaw Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are two archaeological sites (# 20-AL-7, 20-AL-10) in the vicinity of Squaw Bay Wetland. These sites consist of two mounds and were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no historical features within 500 feet of the wetland.

RESEARCH PROJECTS LH 068

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

SOUTH ALPENA AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 069

Setting

South Alpena Area Wetland is located along the shoreline of Thunder Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, at the town of Alpena. The various component parts of this partially wooded, Palustrine wetland extend from the shoreline to approximately 0.3 mile inland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Topography

South Alpena Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has defined the shoreline as wetland and erodible low plain. The surrounding area consists of low beach ridges (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which South Alpena Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Coastal beach and Granby sand are the major types of soil present in South Alpena Area Wetland. These soils consist of loam or sand over a sandy subsoil. Other soil types present are Eastport sand, Dunesand, Alpena cobbly loam and Summerville stony loam (Wildermuth et al., 1924).

Hydrology

No streams flow through South Alpena Area Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971). 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 Alpena Area Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{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 80.5^{o}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 South Alpena Area Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971)

BIOTIC SETTING LH 069

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 Alpena Area Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 South Alpena 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 South Alpena Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Alpena 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 Alpena 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 South Alpena 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 South Alpena 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 LH 069

Population

South Alpena Area Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-12 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-12. Population Data for the Vicinity of South Alpena Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. Artifical fill, forming canals and basins, adjoins the wetland. Housing parallels the wetland along U.S. Route 23. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of South Alpena Area Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present in the vicinity of South Alpena Area Wetland.

Public Utilities and Facilities

A radio tower is approximately 0.2 mile north of South Alpena Area Wetland and there is a filtration plant 0.5 mile to the northeast (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to South Alpena Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There are two known archaeological sites (# 20-AL-9, 20-AL-11) in the vicinity of South Alpena Area Wetland. These sites feature a habitation

area and a mound, and were first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 069

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

McRAE PARK AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 070

Setting

McRae Park Area Wetland is located 0.2 mile from the shoreline of Thunder Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, 0.3 mile from the town of Alpena. This Palustrine System is partially wooded (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Topography

McRae Park Area Wetland has little total relief and lies at an elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and wetland. The surrounding area is primarily flat with the exception of a quarry adjoining the wetland (U.S.G.S. quadrangle map, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which McRae Park Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Eastport sand is present in McRae Park Area Wetland. This soil is nearly level, poorly drained, and has a thin organic layer over a sandy subsoil (Wildermuth et al., 1924).

Hydrology

No streams flow through McRae Park Area Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971). 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 McRae Park Area Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{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 80.5^{o}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 McRae Park Area Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971)

BIOTIC SETTING LH 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 McRae Park Area Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 McRae Park 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 McRae Park Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in McRae Park 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 McRae Park 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 McRae Park 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 McRae Park 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 LH 070

Population

McRae Park Area Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-13 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-13. Population Data for the Vicinity of McRae Park Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly residential. The wetland is adjoined by a quarry with conveyor and a Detroit and Mackinac Railroad track. The city of Alpena is close to the wetland. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Alpena Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of McRae Park Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of McRae Park Area Wetland include limestone, dolomite, and gravel. A large quarry is located just northeast of the wetland.

Public Utilities and Facilities

Power transmission lines lie along the western boundary of McRae Park Area Wetland (U.S.G.S. quadrangle map, Alpena, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to McRae Park Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of McRae Park Area Wetland.

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

THUNDER BAY ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 071

Setting

Thunder Bay Island Wetland is located on Thunder Bay Island in Lake Huron, within Alpena Township of Alpena County, Michigan. This partially wooded Palustrine wetland lies approximately 200 feet from the Lake Huron shoreline. The largest population center in the area is Alpena, Michigan (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Topography

Thunder Bay Island Wetland has very little relief and lies at an elevation of about 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The rest of the island is primarily flat (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Thunder Bay Island Wetland.

Soils

Summerville stony loam is present in Thunder Bay Island Wetland. This soil is thin, nearly level to slightly sloping, and consists of silty clay loam or clay over limestone bedrock (Wildermuth et al., 1924).

Hydrology

No streams flow through Thunder Bay Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971). 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 Thunder Bay Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{0}F and the mean monthly high for July is 80.5^{0}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 inches in July. The growing season is approximately six and one-half months long, with the last killing frost (28^{0}F) in 1975 occurring on April 22 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 Thunder Bay Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971)

BIOTIC SETTING LH 071

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 Thunder Bay Island Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 Thunder Bay 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 Thunder Bay Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Thunder Bay Island Wetland.

Avifauna

Mallards (Anas platyrhynchos), blue-winged teal (Anas discors), and common mergansers (Mergus merganser) were observed in this wetland in 1975 by the Michigan Department of Natural Resources personnel (1975-1977). Ring-billed gulls (Larus delawarensis), herring gulls (L. argentatus), and common terns (sterna hirundo) were observed nesting at that time. The common tern is currently on the state endangered species list.

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 Thunder Bay 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 Thunder Bay Island Wetland.

Endangered Species

Common terns, a species endangered in Michigan, were observed nesting in Thunder Bay Island Wetland in 1975 (Michigan Department of Natural Resources, 1975-1977).

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.

Population

Thunder Bay Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-14 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-14. Population Data for the Vicinity of Thunder Bay Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The island contains a lighthouse and an unimproved road that connects two piers on opposite sides of the island. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Thunder Bay Island Wetland.

Mineral, Energy, and Forest Resources

Thunder Bay Island is 50 percent wooded, but is not large enough to represent a significant forest resource. No significant mineral, oil, or gas resources are known to be present in the vicinity of Thunder Bay Island Wetland.

Public Utilities and Facilities

A lighthouse is located approximately 0.2 mile southeast of Thunder Bay Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Thunder Bay Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Thunder Bay Island Wetland.

RESEARCH PROJECTS LH 071

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

SUGAR ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 072

Setting

Sugar Island Wetland is located on the shoreline of Sugar Island in Lake Huron, within Alpena Township of Alpena County, Michigan. The largest population center in the area is Alpena, Michigan. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Topography

Sugar Island Wetland has a relief of five feet and a maximum elevation of 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The rest of the island is irregular, with a steady rise to a peak at about 600 feet above sea level (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Sugar Island Wetland.

Soils

Summerville stony loam and Coastal beach are present in Sugar Island Wetland. These soils are nearly level to slightly sloping and consist of silty clay loam, clay, or sand over limestone bedrock (Wildermuth et al., 1924).

Hydrology

No streams flow through Sugar Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971). 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 Sugar Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Sugar Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

BIOTIC SETTING

LH 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 Sugar Island Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omisiomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteu osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 Sugar 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 Sugar Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Sugar Island Wetland.

Avifauna

The species observed during a bird survey conducted in this wetland on June 24, 1975 by Michigan Department of Natural Resources personnel are listed in Table 4-14. A large nesting colony of ring-billed gulls (Larus delawarensis) and herring gulls (L. argentatus) was found at that time.

Table 4-15. Birds Observed in Sugar Island Wetland on June 24, 1975[a]

Common name	Common name
Canada goose	Virginia rail
mallard	herring gull
black duck	ring-billed gull
gadwall	common tern
green-winged teal	black tern
blue-winged teal	red-winged blackbird
greater scaup	common grackle
common merganser	spotted sandpiper
black-crowned night heron	

[a] Michigan Department of Natural Resources, Environmental Areas Survey (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 Sugar 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 Sugar Island Wetland.

Endangered Species

Common terns (Sterna hirundo), a species now endangered in Michigan, and black-crowned night herons (N. nycticorax), which are rare, were observed in Sugar Island 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.

CULTURAL SETTING LH 072

Population

Sugar Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-16 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-16. Population Data for the Vicinity of Sugar Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, Thunder Bay Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Sugar Island Wetland.

Mineral, Energy, and Forest Resources

Sugar Island is wooded, but is not large enough to represent a significant forest resource. No significant mineral, oil, or gas resources are known to be present in the vicinity of Sugar Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Sugar Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Sugar Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Sugar Island Wetland.

RESEARCH PROJECTS LH 072

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

NORTH GULL ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 073

Setting

North Gull Island Wetland is located on Gull Island in Lake Huron within Alpena Township of Alpena County, Michigan. This wooded, Palustrine System is located approximately 200 feet from the Lake Huron shoreline. The largest metropolitan center in the area is Alpena, Michigan (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Topography

North Gull Island Wetland has very 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 rest of the island is fairly flat (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of North Gull Island Wetland.

Soils

Summerville stony loam and Coastal beach soil are present in North Gull Island Wetland. These soils are nearly level to slightly sloping and consist of silty clay loam, clay, or sand over limestone bedrock (Wildermuth et al., 1924).

Hydrology

No streams flow through North Gull Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971). 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 Gull Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 North Gull Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

BIOTIC SETTING LH 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 North Gull Island Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 North Gull 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 North Gull Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North Gull Island Wetland.

Avifauna

Large numbers of ring-billed gulls (Larus delawarensis) and herring gulls (L. argentatus) were observed nesting in this wetland on June 24, 1975. A great blue heron (Ardea herodias) rookery was found in the central part of the island. Seventy Canada geese (Branta canadensis) were also seen, in addition to common mergansers (Mergus merganser), common terns (Sterna hirundo) and red-winged blackbirds (Agelaius phoeniceus) (Michigan Department of Natural Resources, 1975-1977). The common tern is currently on the state endangered species list.

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 Gull 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 North Gull Island Wetland.

Endangered Species

Common terns, a species now endangered in Michigan, were recorded in North Gull Island Wetland in 1975 (Michigan Department of Natural Resources, 1975-1977). 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.

Population

North Gull Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-17 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-17. Population Data for the Vicinity of North Gull Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, Thunder Bay Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of North Gull Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, oil, or gas resources are known to be present in the vicinity of North Gull Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of North Gull Island Wetland (U.S.G.S. quadrangle map, Thunder Bay Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to North Gull Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of North Gull Island Wetland.

RESEARCH PROJECTS LH 073

The literature search identified no on-going or impending research projects pertaining to North Gull Island Wetland.

WHITEFISH BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 074

Setting

Whitefish Bay Wetland is located on the shoreline of Whitefish Bay, which is connected to Lake Huron through Thunder Bay, in Alpena Township of Alpena County, Michigan, approximately 1.7 miles from the town of Alpena. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, North Point, Michigan, 1971; Alpena, Michigan, 1971).

Topography

Whitefish Bay Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and wetland. The surrounding area is flat (U.S.G.S. quadrangle maps, Alpena, Michigan, 1971; North Point, Michigan, 1971).

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 Devonian period (Martin, 1955).

Soils

Coastal beach soil is present in Whitefish Bay Wetland. This is a nearly level, poorly drained soil consisting of sand or sand over gravel, with a clayey subsoil (Wildermuth et al., 1924).

Hydrology

Norwegian Creek flows through Whitefish Bay Wetland (U.S.G.S. quadrangle maps, Alpena, Michigan, 1971; North Point, Michigan, 1971). 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 Alpena, Michigan. The average annual temperature is 47.4^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{0}F and the mean monthly high for July is 80.5^{0}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 inches in July. The growing season is approximately six and one-half months long, with the last killing frost (28^{0}F) in 1975

occurring on April 22 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 Whitefish Bay Wetland (U.S.G.S. quadrangle maps, North Point, Michigan, 1971; Alpena, Michigan, 1971).

BIOTIC SETTING LH 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 Whitefish Bay Wetland.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 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 Whitefish Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, 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

Species which were observed in this wetland during a bird survey conducted by Michigan Department of Natural Resources personnel (1975) are listed in Table 4-18. A common tern (Sterna hirundo) rookery was found on the point extending out into the eastern portion of the bay. Dabbling ducks, diving ducks, mergansers (Lophodytes sp. or Mergus spp.), geese (Branta spp., Anser spp., Chen spp.) and shorebirds utilize the area for nesting, feeding, resting, staging, and during migration (Michigan Department of Natural Resources, 1975). The common tern is currently on the state list of endangered species.

Table 4-18. Birds Observed in Whitefish Bay Wetland[a]

Common name	Common name
mallard	red-winged blackbird
belted kingfisher	killdeer
great blue heron	pectoral sandpiper
green heron	Cooper's hawk
herring gull	American kestrel
common tern	

[a] Michigan Department of Natural Resources, Environmental Areas Survey (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 Whitefish Bay Wetland.

Mammals

The snowshoe hare (Lepus americanus) and muskrat (Ondatra zibethicus) have been observed on Whitefish Bay Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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

Common terns, a species now endangered in Michigan, and Cooper's hawks (Accipiter cooperii), a threatened species, were recorded in Whitefish 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 this 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 LH 074

Population

Whitefish Bay Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-19 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-19. Population Data for the Vicinity of Whitefish Bay Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A hard surface road, an unimproved road, and an old railroad grade lie in the wetland area. The wetland is under private ownership, but its location within the Alpena State Forest suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, North Point, Michigan, 1971; Alpena, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Whitefish Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Whitefish Bay Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974). There are several gravel pits in the surrounding area, and a large quarry to the west of the wetland.

Although the wetland is not wooded, the surrounding area represents a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Whitefish Bay Wetland (U.S.G.S. quadrangle maps, Alpena, Michigan, 1971; North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Whitefish Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Whitefish Bay Wetland.

RESEARCH PROJECTS LH 074

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

NORTH THUNDER BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 075-080

Setting

The North Thunder Bay Wetland Complex is located along the shoreline of Thunder Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan. Whitefish Point Wetland lies about 400 feet inland at Whitefish Point. Thunder Bay Wetland #1 lies approximately 200 feet from the Thunder Bay shoreline and 3.2 miles from Alpena, Michigan. Thunder Bay Wetlands #2 and #3 lie on the shoreline and approximately 4.4 miles from Alpena. Thunder Bay Wetland #4 lies approximately 0.1 mile from the shoreline and 5.9 miles from Alpena. Thunder Bay Wetland #5 lies approximately 7.0 miles from Alpena. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Topography

The North Thunder Bay Wetland Complex has a total relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and wetland. The surrounding topography is irregular with little relief (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which the North Thunder Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena cobbly loam and Eastport sand are present in the North Thunder Bay Wetland Complex. These are nearly level, poorly drained soils of gravelly loamy sand or sand, over sandy subsoil (Wildermuth et al., 1924).

Hydrology

No streams flow through the North Thunder Bay Wetland Complex (U.S.G.S. quadrangle map, North Point, Michigan, 1971). 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 North Thunder Bay Wetland Complex is located in Alpena, Michigan. The average annual temperature is 47.4^{0}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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 the North Thunder Bay Wetland Complex (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

BIOTIC SETTING LH 075-080

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 North Thunder Bay Wetland Complex.

Fish

The recreational fishery of Thunder Bay is dominated by yellow perch (Perca flavescens), smallmouth bass (Micropterus dolomieui), and bluegill (Lepomis macrochirus). Introduced salmonids, including brown trout (Salmo trutta), steelhead trout (Salmo gairdneri), chinook salmon (Oncorhynchus tschawytscha), coho salmon (Oncorhynchus kisutch), lake trout (Salvelinus namaycush), and splake (Salvelinus namaycush x S. fontinalis) also comprise a major recreational fishery in the bay area, although this family of fishes seems to have little relation to wetlands. Gill net catches in the vicinity of Alpena Harbor indicate the presence of bowfin (Amia calva), northern pike (Esox lucius), gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), round whitefish (Prosopium cylindraceum), rainbow smelt (Osmerus mordax), brown bullhead (Ictalurus nebulosus), stonecat (Noturus flavus), channel catfish (Ictalurus punctatus), carp (Cyprinus carpio), white sucker (Catostomus commersoni), shorthead redhorse (Moxostoma macrolepidotum), trout-perch (Percopsis omiscomaycus), rock bass (Ambloplites rupestris), and black crappie (Pomoxis nigromaculatus). Longnose gar (Lepisosteus osseus) and burbot (Lota lota) are also reported present (U.S. Army Corps of Engineers, 1976). Of these species, the bowfin, longnose gar, northern pike, gizzard shad, brown bullhead, carp, white sucker, black crappie, yellow perch, and bluegill are probably most common in the coastal wetlands of Thunder Bay. A list of fish species utilizing the coastal wetlands of Michigan is presented 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 six wetlands of the North Thunder 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 North Thunder Bay Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitefish Point Wetland and North Thunder Bay Wetlands #1-#5.

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 North Thunder 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, major food sources, or relationship to water levels of the mammals inhabiting the six wetlands of the North Thunder 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 North Thunder 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 North Thunder Bay Wetland Complex is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-20 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-20. Population Data for the Vicinity of the North Thunder Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. Two hard surface roads later becoming unimproved roads are located along the coast. Scattered housing lines the coast in the area of Whitefish Point Wetland and North Thunder Bay Wetland #1. The wetlands are under private ownership, but their location within the Alpena State Forest suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of the North Thunder Bay Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the North Thunder Bay Wetland Complex include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974). There are several gravel pits nearby.

The area is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the North Thunder Bay Wetland Complex (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to any of the wetlands in the North Thunder 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 or archaeological features are present within 500 feet of the North Thunder Bay Wetland Complex.

RESEARCH PROJECTS

LH 075-080

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

MISERY BAY WETLAND

PHYSIOGRAPHIC SETTING LH 081

Setting

Misery Bay Wetland is located on the shoreline of Misery Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, approximately 3.2 miles from the town of Alpena. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Topography

Misery Bay Wetland has a total relief of 30 feet and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain and wetland. The surrounding area is irregular in contour, with little relief (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Misery Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Granby sand, Eastport sand, Alpena cobbly loam and Summerville stony loam are all present in Misery Bay Wtland. These soils consist of sand, sandy loam, or silty clay loam, over a sandy subsoil (Wildermuth et al., 1924).

Hydrology

One unnamed stream flows through Misery Bay Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971). 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 Misery Bay Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22

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 Misery Bay Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

BIOTIC SETTING LH 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 Misery Bay Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Misery 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 Misery Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Misery Bay Wetland.

Avifauna

Data concerning seasonal abundance, density, and productivity of waterfowl in Misery Bay (1976) are presented in Table 4-21. The bay area functions as a migration stopover and is utilized by blue (snow) geese (Chen caerulescens) as

Table 4-21. Seasonal Abundance, Density, and Productivity of Waterfowl in Misery Bay, 1976[a]

Waterfowl Use	Production		Fall Migration			Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Population	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	5	0.05	500	100	3		Frozen			
black duck			100	50	1					
gadwall										
mottled duck										
green-winged teal			500	100	1					
Am. wigeon										
blue-winged/ cinnamon teal			500	100	1					
northern shoveler										
pintail			200	100	1					
wood duck										
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers			1800	450						
redhead			500	200						
canvasback			500	200						
scaups			5000	500						
redneck			100	50						
goldeneye/ bufflehead			500	500			50	10	16	
ruddy duck										
TOTAL sub-divers			6600	1900			50	10		
other ducks (mergansers)	7	0.07	1000	200						
TOTAL ducks			20000	2000						

-continued-

Table 4-21. (concluded)

Waterfowl Use / Species	Production: Avg Density (prs/sq mi)	Production: Avg Young/ wetland acre	Production: Avg Peak Pop.	Fall Migration: Avg Fall Pop.	Fall Migration: Avg Duration (no. weeks)	Fall Migration: Special or Unique Pops. or Species?	Wintering: Avg Peak Pop.	Wintering: Avg Wintering Population	Wintering: Avg Duration (no. weeks)	Wintering: Special or Unique Pops. or Species?
Geese										
snow			10000	1000						
Ross'										
white-fronted										
Canada			10000	1000						
black brant										
brant										
TOTAL geese			20000	2000						
Swans										
whistling										
other										
TOTAL swans	0	0	0	0			0	0		
TOTAL waterfowl	12	0.1	229400	4550			50	10		

[a]Taken from Michigan Department of Natural Resources, 1976

well as other waterfowl (Michigan Department of Natural Resources, 1976). Estimates of waterfowl density and productivity for 1975 are available in Jaworski and Raphael (1978).

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 Misery 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 Misery 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 Misery 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 LH 081

Population

Misery Bay Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-22 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-22. Population Data for the Vicinity of Misery Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Some dredged areas, which form canals, and associated housing are located adjacent to and in the wetland area. The development is comparatively small. Several hard surface and unimproved roads cross the wetland for the apparent purpose of gaining access to several gravel pits. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Recreation

The northern portion of Misery Bay Wetland is within the Thunder Bay River State Forest. Thunder Bay River State Forest has facilities for camping, boating, swimming, fishing, and nature hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Misery Bay Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974). There are several gravel pits nearby.

The wetland and surrounding area is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Misery Bay Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Misery Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Misery Bay Wetland.

RESEARCH PROJECTS LH 081

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

CROOKED ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 082

Setting

Crooked Island Wetland is located on the shoreline of Crooked Island in Lake Huron, within Alpena Township of Alpena County, Michigan, 5.6 miles from the town of Alpena. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Topography

Crooked Island 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 remainder of the island is relatively flat (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Crooked Island Wetland.

Soils

Coastal beach and Eastport sand are present in Crooked Island Wetland. These soils are slightly alkaline, with a thin organic layer or sand over sandy subsoil (Wildermuth et al., 1924).

Hydrology

No streams flow through Crooked Island Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971). 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 Crooked Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Crooked Island Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

BIOTIC SETTING LH 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 Crooked Island Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Crooked Island 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 Crooked Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Crooked Island Wetland.

Avifauna

The species which were observed in this wetland during a bird survey conducted by Michigan Department of Natural Resources personnel (1975) are listed in Table 4-23. It is one of the important resting and feeding areas in northern Lake Huron for Canada geese (*Branta canadensis*) and snow (blue) geese (*Chen caerulescens*) during fall migration.

Table 4-23. Birds Observed in Crooked Island Wetland[a]

Common name	Common name
mute swan	herring gull
mallard	ring-billed gull
common merganser	common snipe
belted kingfisher	spotted sandpiper
great blue heron	red-tailed hawk
green heron	

[a] Michigan Department of Natural Resources, Environmental Areas Survey (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 Crooked Island Wetland.

Mammals

Muskrat (Ondatra zibethicus), raccoon (Procyon lotor), mink (Mustela vison), and white-tailed deer (Odocoileus virginianus) have been observed on Crooked Island Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 Crooked 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 LH 082

Population

Crooked Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per

square mile. Table 4-24 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-24. Population Data for the Vicinity of Crooked Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There is a path and one building on the island. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Crooked Island Wetland.

Mineral, Energy, and Forest Resources

Crooked Island is 50 percent wooded, but is not large enough to represent a significant forest resource. No significant mineral, oil, or gas resources are known to be present in the vicinity of Crooked Island Wetland.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Crooked Island Wetland (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Crooked Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Crooked Island Wetland.

RESEARCH PROJECTS LH 082

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

EL CAJON BEACH WETLAND #1

PHYSIOGRAPHIC SETTING LH 083

Setting

El Cajon Beach Wetland #1 is located on the western shoreline of Lake Huron in Alpena Township of Alpena County, Michigan, approximately 3.8 miles from the town of Alpena. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Topography

El Cajon Beach Wetland #1 has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is relatively flat; there is one small area inland with an elevation of 625 feet above sea level (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which El Cajon Beach Wetland #1 lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena cobbly loam is present in El Cajon Beach Wetland #1. This soil consists of gravelly sand over a subsoil of sandy loam or sandy clay loam (Wildermuth et al., 1924).

Hydrology

No streams flow through El Cajon Beach Wetland #1 (U.S.G.S. quadrangle map, North Point, Michigan, 1971). 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 El Cajon Beach Wetland #1 is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 El Cajon Beach Wetland #1 (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

BIOTIC SETTING LH 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 El Cajon Beach Wetland #1.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize El Cajon Beach 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 El Cajon Beach Wetland #1.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in El Cajon Beach 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 El Cajon Beach 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, major food sources, or relationship to water levels of the mammals inhabiting El Cajon Beach 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; Michigan Endangered and Threatened Species Program, 1976) were documented in El Cajon Beach 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 LH 083

Population

El Cajon Beach Wetland #1 is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-25 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-25. Population Data for the Vicinity of El Cajon Beach Wetland #1

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is adjacent to a developed beach area containing houses and a hard surface road. A few houses lie along the wetland's canal. The wetland is under private ownership, but its location within the Thunder Bay River State Forest suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Recreation

El Cajon Beach Wetland #1 is within the boundaries of the Thunder Bay River State Forest, where facilities are provided for camping, boating, swimming, fishing, and nature hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of El Cajon Beach Wetland #1 include limestone dolomite, and gravel (Great Lakes Basin Commission, 1974).

A potential forest resource exists in the area surrounding the wetland, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of El Cajon Beach Wetland #1 (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to El Cajon Beach Wetland #1. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of El Cajon Beach Wetland #1.

RESEARCH PROJECTS LH 083

The literature search identified no on-going or impending research projects pertaining to El Cajon Beach Wetland #1.

EL CAJON BEACH WETLAND #2

PHYSIOGRAPHIC SETTING

LH 084

Setting

El Cajon Beach Wetland #2 is located approximately 100 feet from the western shoreline of Lake Huron in Alpena Township of Alpena County, Michigan, 3.7 miles from the town of Alpena. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Topography

El Cajon Beach Wetland #2 has a relief of 15 feet and a maximum elevation of 595 feet above mean sea level (15 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is relatively flat (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which El Cajon Beach Wetland #2 lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena cobbly loam and Granby sand are present in El Cajon Beach Wetland #2. These soils consist of sandy loam or gravelly sand over a subsoil of sand, sandy loam, or sandy clay loam (Wildermuth et al., 1924).

Hydrology

No streams flow through El Cajon Beach Wetland #2 (U.S.G.S. quadrangle map, North Point, Michigan, 1971). 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 El Cajon Beach Wetland #2 is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 El Cajon Beach Wetland #2 (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

BIOTIC SETTING LH 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 El Cajon Beach Wetland #2.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize El Cajon Beach 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 El Cajon Beach Wetland #2.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in El Cajon Beach 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 El Cajon Beach 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, major food sources, or relationship to water levels of the mammals inhabiting El Cajon Beach 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; Michigan Endangered and Threatened Species Program, 1976) were documented in El Cajon Beach 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 LH 084

Population

El Cajon Beach Wetland #2 is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-26 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-26. Population Data for the Vicinity of El Cajon Beach Wetland #2

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is located near a residential beach development serviced by a hard surface road which runsthrough the wetland. A secondary road goes out to a navigational light on a small penninsula. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of El Cajon Beach Wetland #2.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of El Cajon Beach Wetland #2 include limestone dolomite, and gravel (Great Lakes Basin Commission, 1974). There is a gravel pit within 1,000 feet of the wetland.

A potential forest resource exists in the area surrounding the wetland, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of El Cajon Beach Wetland #2 (U.S.G.S. quadrangle map, North Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to El Cajon Beach Wetland #2. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of El Cajon Beach Wetland #2.

RESEARCH PROJECTS LH 084

The literature search identified no on-going or impending research projects pertaining to El Cajon Beach Wetland #2.

GRASS CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 085

Setting

Grass Creek Wetland is located on the western shoreline of Lake Huron in Alpena Township of Alpena County, Michigan, approximately 4.6 miles from the town of Alpena. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Topography

Grass Creek Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is relatively flat (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Grass Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Bridgman sand is present in Grass Creek Wetland. This soil consists of slightly acid, loose sands over a loamy sand subsoil (Wildermuth, et al., 1924).

Hydrology

Grass Creek flows through Grass Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971). 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 Grass Creek Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{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 80.5^{o}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Grass Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

BIOTIC SETTING LH 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 Grass Creek Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Grass Creek 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 Grass Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Grass 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 Grass 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, major food sources, or relationship to water levels of the mammals inhabiting Grass 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 Grass 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

LH 085

Population

Grass Creek Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 4-27 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 4-27. Population Data for the Vicinity of Grass Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A small landing strip and hard surface road are located close to 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, Middle Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Grass Creek Wetland.

Mineral, Energy, and Forest Resources

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

The wetland and surrounding area is predominantly wooded, representing a potential forest resource.

No significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Grass Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Grass Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Grass Creek Wetland.

RESEARCH PROJECTS LH 085

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

Table 4-28. Data Gaps-Lake Section 4

Data Gap*		Wetland Number	062	063	064	065	066	067	068	069	070	071	072	073	074	075–080	081	082	083	084	085
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 5

INTRODUCTION

Lake Section 5 extends from South Ninemile Point to Adams Point. The coastlines of Alpena and Presque Isle Counties are within this lake section. The region features flat topography, but irregular topography is also prevalent. The predominant shore types along this 32 mile stretch of shoreline are erodible and non-erodible low plains.

Figure 5-1 shows the approximate location of the 22 coastal wetlands in Lake Section 5. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 5-1. The wetlands of Lake Section 5 lie at elevations between 590 and 630 feet above sea level. These wetlands are all classified as Palustrine and Riverine Systems.

Available information related to physiographic and cultural features of these 22 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.

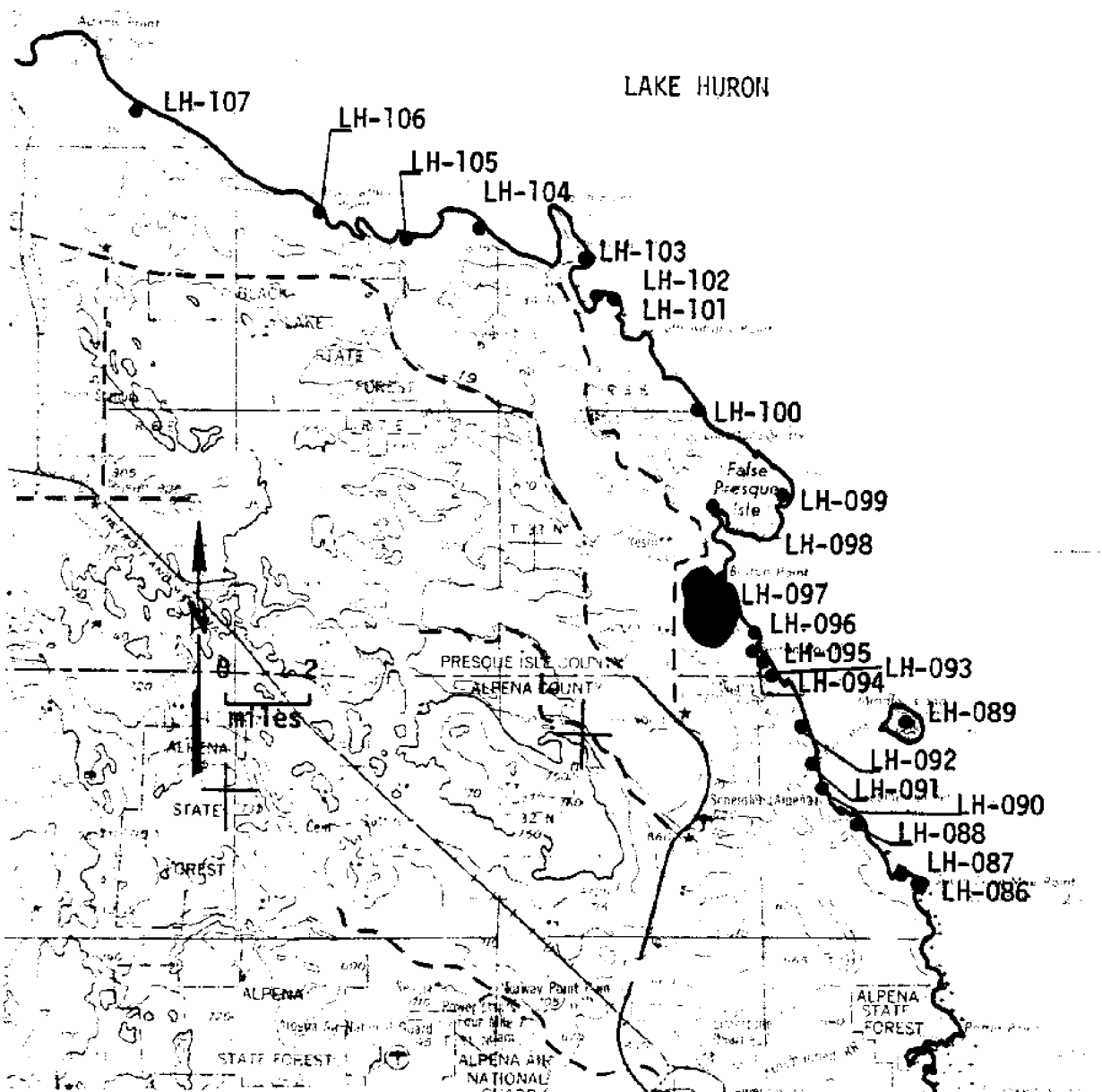


Figure 5-1. Lake Section 5

Table 5-1. Location, Acreage, and Classification of Wetlands in Lake Section 5

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 086	South Nine Mile Point Wetland	45°08'17"	83°19'19"	10	P
LH 087	Morris Bay Wetland	45°08'34"	83°20'14"	45	P
LH 088	Long Lake Creek Wetland	45°09'16"	83°21'16"	110	P
LH 089	Middle Island Wetland	45°11'32"	83°19'42"	45	P
	ROCKPORT AREA WETLAND COMPLEX				
LH 090	Rockport Area Wetland #1	45°10'40"	83°22'29"	70	P
LH 091	Rockport Area Wetland #2	45°11'21"	83°22'20"	2	P
LH 092	Rockport Area Wetland #3	45°11'46"	83°22'37"	8	P
	FERRON POINT AREA WETLAND COMPLEX				
LH 093	Ferron Point Area Wetland #1	45°12'42"	83°22'37"	5	P
LH 094	Ferron Point Area Wetland #2	45°12'45"	83°23'56"	10	P
LH 095	Ferron Point Area Wetland #3	45°12'58"	83°24'09"	5	P
LH 096	Ferron Point Area Wetland #4	45°13'13"	83°23'57"	27	P
LH 097	Black Lake State Forest Wetland	45°13'51"	83°25'18"	522	P
LH 098	Bell's River Wetland	45°16'10"	83°25'00"	335	R-P
LH 099	False Presque Isle Wetland	45°15'57"	83°23'18"	30	P
LH 100	Wreck Point Wetland	45°18'05"	83°26'12"	200	P
LH 101	Albany Bay Wetland	45°19'13"	83°27'44"	45	P
LH 102	Presque Isle Harbor Wetland	45°20'05"	83°28'58"	65	P
LH 103	Harbor View Area Wetland	45°20'49"	83°28'57"	20	P
LH 104	North Bay Area Wetland	45°20'43"	83°31'20"	13	P
LH 105	Thompsons Harbor Wetland	45°20'53"	83°34'37"	82	P
LH 106	West Thompsons Harbor Wetland	45°21'18"	83°36'13"	240	P
LH 107	Adams Point Area Wetland	45°23'30"	83°41'25"	30	P

P=palustrine

SOUTH NINEMILE POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 086

Setting

South Ninemile Point Wetland is located on the shoreline of Lincoln Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, approximately 4.6 miles from the town of Alpena. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Topography

South Ninemile Point Wetland has a relief of ten feet and a maximum elevation of 595 feet above mean sea level (15 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which South Ninemile Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena cobbly loam and Granby sand are present in South Ninemile Point Wetland. These soils consist of sandy loam or gravelly sand over a subsoil of sand, sandy loam, or sandy clay loam (Wildermuth et al., 1924).

Hydrology

No streams flow through South Ninemile Point Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971). 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 Ninemile Point Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{0}F and the mean monthly high for July is 80.5^{0}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 South Ninemile Point Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

BIOTIC SETTING LH 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 South Ninemile Point Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize South Ninemile Point 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 South Ninemile Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in South Ninemile 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 South Ninemile 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, major food sources, or relationship to water levels of the mammals inhabiting South Ninemile 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 South Ninemile 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 LH 086

Population

South Ninemile Point Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 5-2 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 5-2. Population Data for the Vicinity of South Ninemile Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A dirt road crosses 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, Middle Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of South Ninemile Point Wetland.

Mineral, Energy, and Forest Resources

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

The wetland and surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of South Ninemile Point Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to South Ninemile Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of South Ninemile Point Wetland.

RESEARCH PROJECTS LH 086

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

MORRIS BAY WETLAND

PHYSIOGRAPHIC SETTING LH 087

Setting

Morris Bay Wetland is located on the shoreline of Morris Bay, which is directly connected to Lake Huron, in Alpena Township of Alpena County, Michigan, approximately 6.0 miles from the city of Alpena. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Topography

Morris Bay Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is flat (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Morris Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena cobbly loam, Granby sand and Bridgman sand are present in Morris Bay Wetland. These soils consist of sandy loam or gravelly sand over a subsoil of sand, sandy loam, or sandy clay loam (Wildermuth et al., 1924).

Hydrology

No streams flow through Morris Bay Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971). 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 Morris Bay Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Morris Bay Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

BIOTIC SETTING LH 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 Morris Bay Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix , and some of these species probably utilize Morris Bay Wetland. However, a search of the literature provided no site-specific information pertatining 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 Morris Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix . The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Morris 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 Morris 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, major food sources, or relationship to water levels of the mammals inhabiting Morris 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 Morris 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 LH 087

Population

Morris Bay Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 5-3 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 5-3. Population Data for the Vicinity of Morris Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There is a paved road crossing 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, Middle Island, Michigan, 1971).

Recreation

No known state or federal recrational facilities are present in the vicinity of Morris Bay Wetland.

Mineral, Energy, and Forest Resources

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

The wetland and surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Morris Bay Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Morris Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Morris Bay Wetland.

RESEARCH PROJECTS LH 087

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

LONG LAKE CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 088

Setting

Long Lake Creek Wetland is located approximately 0.1 mile from the western shoreline of Lake Huron in Alpena Township of Alpena County, Michigan, 6.0 miles from the town of Alpena. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Topography

Long Lake Creek Wetland has relief of 40 feet and a maximum elevation of 620 feet above mean sea level (40 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area consists of two rising irregular slopes conforming generally to the lines of Long Lake Creek (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Long Lake Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Bergland clay loam is present in Long Lake Creek Wetland. This soil occurs in depressed flats or swales and is high in organic matter; it consists of clay loam or silty clay loam over a heavy clay subsoil. Other soils present are Alpena cobbly loam and Granby sand (Wildermuth et al., 1924).

Hydrology

Long Lake Creek flows through Long Lake Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971). 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 Long Lake Creek Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Long Lake Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

BIOTIC SETTING LH 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 Long Lake Creek Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Long Lake Creek 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 Long Lake Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Long 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 Long Lake 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, major food sources, or relationship to water levels of the mammals inhabiting Long 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 Long 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 LH 088

Population

Long Lake Creek Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 5-4 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 5-4. Population Data for the Vicinity of Long Lake Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There are two unimproved roads within 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, Middle Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Long Lake Creek Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Long Lake Creek Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Long Lake Creek Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Long Lake Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Long Lake Creek Wetland.

RESEARCH PROJECTS

LH 088

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

MIDDLE ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 089

Setting

Middle Island Wetland is located on the shoreline of Middle Island in Lake Huron, within Alpena Township of Alpena County, Michigan, 8.9 miles from the town of Alpena. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Topography

Middle Island Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The island is relatively flat; the highest elevation is 595 feet above sea level (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Surficial Geology

The literature search yielded no information regarding the surficial geology of Middle Island Wetland.

Soils

Coastal beach and Summerville stony loam are present in Middle Island Wetland. Summerville stony loam consists of a silty clay loam or clay underlain by limestone bedrock (Wildermuth, et al., 1924).

Hydrology

No streams flow through Middle Island Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971). 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 Island Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{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 80.5^{o}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Middle Island Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

BIOTIC SETTING LH 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 Middle Island Wetland.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Middle Island 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 Middle Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Middle 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 Middle 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, major food sources, or relationship to water levels of the mammals inhabiting Middle 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 Middle 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 LH 089

Population

Middle Island Wetland is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 5-5 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 5-5. Population Data for the Vicinity of Middle Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The island contains one lighthouse, a few buildings, one unimproved road and one small boat pier. The wetland is under mixed private and state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Middle Island Wetland.

Mineral, Energy, and Forest Resources

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

The wetland and surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Middle Island Wetland (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Middle Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Middle Island Wetland.

RESEARCH PROJECTS LH 089

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

ROCKPORT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 090-092

Setting

The Rockport Area Wetland Complex (Rockport Area Wetlands #1-#3) is located along the western shoreline of Lake Huron in Alpena Township of Alpena County, Michigan. The various component parts of the complex lie approximately 0.1 mile from Alpena, Michigan. These Palustrine wetlands occupy wooded sites (U.S.G.S. quadrangle maps, Middle Island, Michigan, 1971; Long Lake East, Michigan, 1971).

Topography

The Rockport Area Wetland Complex has a relief of 30 feet and a maximum elevation of 610 feet above the mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding topography is irregular but generally rises as it progresses inland (U.S.G.S. quadrangle maps, Middle Island, Michigan, 1971; Long Lake East, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which the Rockport Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Bergland clay loam is present in the Rockport Area Wetland Complex. This soil occurs in depressed flats or swales and is high in organic matter; it consists of clay loam or silty clay loam over a heavy clay subsoil. Granby sand is also present in these wetlands (Wildermuth et al., 1924).

Hydrology

No streams flow through the Rockport Area Wetland Complex (U.S.G.S. quadrangle maps, Middle Island, Michigan, 1971; Long Lake East, Michigan, 1971). 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 Rockport Area Wetland Complex is located in Alpena, Michigan. The average annual temperature is 47.4^{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 80.5^{o}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45

inches in January and 2.52 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 22 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 the Rockport Area Wetland Complex (U.S.G.S. quadrangle maps, Middle Island, Michigan, 1971; Long Lake East, Michigan, 1971).

BIOTIC SETTING LH 090-092

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 Rockport Area Wetland Complex.

Fish

A list of common fish species utilizing the coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the Rockport Area 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 Rockport Area Wetlands #1-#3.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Alpena County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Rockport Area Wetlands #1-#3.

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 Rockport 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, major food sources, or relationship to water levels of the mammals inhabiting Rockport Area Wetlands #1-#3.

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 Rockport 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 LH 090-092

Population

The Rockport Area Wetland Complex is located in Alpena Township of Alpena County, Michigan. The county is sparsely populated, having a density of 59 persons per square mile. Table 5-6 indicates that Alpena County experienced rapid population growth, while the growth rate in Alpena Township was moderate, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Alpena County.

Table 5-6. Population Data for the Vicinity of the Rockport Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Alpena County	33,293	8.4	40,721
Alpena Township	9,398	4.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. Two roads, one of them paved, cross the wetlands. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Middle Island, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Rockport Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Rockport Area Wetland Complex include limestone, dolomite, shale, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetlands and surrounding areas are wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Rockport Area Wetland Complex (U.S.G.S. quadrangle maps, Middle Island, Michigan, 1971; Long Lake East, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to the Rockport 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 or archaeological features are present within 500 feet of the Rockport Area Wetland Complex.

RESEARCH PROJECTS LH 090-092

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

FERRON POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 093-096

Setting

The Ferron Point Area Wetland Complex (Ferron Point Area Wetlands #1-#4) is located along the western shoreline of Lake Huron in Presque Isle Township of Presque Isle County, Michigan. The various components of the complex lie from approximately 300 feet to 0.2 mile from the Lake Huron shoreline and 5.5 miles from Presque Isle, Michigan. These Palustrine wetlands are predominantly wooded except for some non-wooded areas in Ferron Point Wetland #1 (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Topography

The Ferron Point Area Wetland Complex has a relief of 30 feet and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is irregular in contour and elevation but rises as it progresses inland. There are some sinkholes or excavations in the area (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which the Ferron Point Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Summerville soils are present in the Ferron Point Area Wetland Complex. These soils are on undulating stony limestone bedrock plains (Veatch et al., 1954).

Hydrology

No streams flow through the Ferron Point Area Wetland Complex (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971). 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 Ferron Point Area Wetland Complex is located in Alpena, Michigan. The average annual temperature is 47.4^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{0}F and the mean monthly high for July is 80.5^{0}F.

The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 the Ferron Point Area Wetland Complex (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

BIOTIC SETTING LH 093-096

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 the Ferron Point Area Wetland Complex.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Ferron Point Area Wetlands #1, #2, #3, and #4. 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 Ferron Point Area Wetlands #1-#4.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution

information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Ferron 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 the Ferron 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, major food sources, or relationship to water levels of the mammals inhabiting Ferron Point Area Wetlands #1-#4.

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 Ferron 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 LH 093-096

Population

The Ferron Point Area Wetland Complex is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-7 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-7. Population Data for the Vicinity of the Ferron Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. Two unimproved roads traverse the wetlands, and a quarry is located near the complex. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Ferron Point Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Ferron Point Area Wetland Complex include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974). A quarry is located to the south of the complex.

The wetlands and surrounding areas are wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Ferron Point Area Wetland Complex (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to the Ferron 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 or archaeological features are present within 500 feet of the Ferron Point Area Wetland Complex.

RESEARCH PROJECTS LH 093-096

The literature search identified no on-going or impending research projects pertaining to the Ferron Point Area Wetland Complex.

BLACK LAKE STATE FOREST WETLAND

PHYSIOGRAPHIC SETTING LH 097

Setting

Black Lake State Forest Wetland is located on the western shoreline of Lake Huron in Presque Isle Township of Presque Isle County, Michigan, 4.0 miles from the community of Presque Isle. This Palustrine wetland extends 2.0 miles inland and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Topography

Black Lake State Forest Wetland has a relief of 50 feet, and a maximum elevation of 630 feet above mean sea level (50 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding area is primarily flat until the 640 foot contour when the slope is quite steep. The highest elevation in the area is about 710 feet above mean sea level (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Black Lake State Forest Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Detour and Ruse soils and mucks and peats are present in Black Lake State Forest Wetland. These soils are found on wet stony lakebed plains (Veatch et al., 1954).

Hydrology

No streams flow through Black Lake State Forest Wetland (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971). 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 Lake State Forest Wetland is located in Alpena, Michigan. The average annual temperature is 47.4^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 17.0^{0}F and the mean monthly high for July is 80.5^{0}F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 Black Lake State Forest Wetland (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

BIOTIC SETTING LH 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 Black Lake State Forest Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Black Lake State Forest 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 Black Lake State Forest Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that

may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Black Lake State Forest 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 Lake State Forest 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, major food sources, or relationship to water levels of the mammals inhabiting Black Lake State Forest 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 Lake State Forest 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 LH 097

Population

Black Lake State Forest Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-8 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-8. Population Data for the Vicinity of Black Lake State Forest Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Two roads, one of them paved, cross the wetland. The wetland is under state ownership. The location of the wetland suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Recreation

Portions of Black Lake State Forest Wetland are within the boundaries of Black Lake State Forest, where recreational activities include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Black Lake State Forest Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974).

The wetland and the surrounding area is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Black Lake State Forest Wetland (U.S.G.S. quadrangle map, Long Lake East, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Black Lake State Forest Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Black Lake State Forest Wetland.

RESEARCH PROJECTS LH 097

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

BELL RIVER WETLAND

PHYSIOGRAPHIC SETTING LH 098

Setting

Bell River Wetland is located along the shoreline of Bell River, which is directly connected to Lake Huron, in Presque Isle Township of Presque Isle County, Michigan. The various component parts of the wetland extend from the lake shoreline to approximately 0.8 mile inland, and lie 2.7 miles from the community of Presque Isle. This Palustrine-Riverine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

Bell River Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding terrain is irregular (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Bell River Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Bell River Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

The Bell River and one intermittent stream flow through Bell River Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 Bell River may be found in Knutilla (1970) and Twenter (1975).

Climate

The closest weather station providing climatic data for Bell River Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22

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 Bell River Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 Bell River Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Bell River 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 Bell River Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded

no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bell 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 Bell 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, major food sources, or relationship to water levels of the mammals inhabiting Bell 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 Bell 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 LH 098

Population

Bell River Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-9 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-9. Population Data for the Vicinity of Bell River Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly commercial/industrial. One hard surface and one unimproved road traverse the wetland. A large quarry with a conveyor to the lake adjoins the wetland. The wetland is under undetermined ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bell River Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Bell River Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974). A large stone quarry is located within 1,000 feet of the wetland on the north.

The wetland and surrounding area is 50 percent wooded, representing potential forest resources, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Bell River Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Bell River Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (# 20-PI-1) in the vicinity of Bell River Wetland. The site, which features a cemetery, was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of the wetland.

RESEARCH PROJECTS LH 098

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

FALSE PRESQUE ISLE WETLAND

PHYSIOGRAPHIC SETTING LH 099

Setting

False Presque Isle Wetland is located on False Presque Isle in Lake Huron, within Presque Isle Township of Presque Isle County, Michigan. The various component parts of the wetland extend from the shoreline to approximately 0.3 mile inland, and lie 4.7 miles from the community of Presque Isle. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

False Presque Isle Wetland has 15 feet of relief and a maximum elevation of 595 feet above mean sea level (15 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding area rises in an irregular manner to an elevation of about 610 feet above mean sea level (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which False Presque Isle Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in False Presque Isle Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through False Presque Isle Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 False Presque Isle Wetland is located in Alpena, Michigan. The average annual temperature is 47.4°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 80.5°F. The average annual precipitation is 27.09 inches, with a mean monthly precipitation of 1.45 inches in January and 2.52 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 22 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 False Presque Isle Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 False Presque Isle Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize False Presque Isle 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 False Presque Isle Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in

Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in False Presque Isle 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 False Presque Isle 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, major food sources, or relationship to water levels of the mammals inhabiting False Presque Isle 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 False Presque Isle 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 LH 099

Population

False Presque Isle Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-10 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-10. Population Data for the Vicinity of False Presque Isle Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of False Presque Isle Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of False Presque Isle Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974).

False Presque Isle is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of False Presque Isle Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to False Presque Isle Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of False Presque Isle Wetland.

RESEARCH PROJECTS LH 099

The literature search identified no on-going or impending research projects pertaining to False Presque Isle Wetland.

WRECK POINT WETLAND

PHYSIOGRAPHIC SETTING LH 100

Setting

Wreck Point Wetland is located on the shoreline of Lake Huron in Presque Isle Township of Presque Isle County, Michigan, approximately 1.6 miles from the community of Presque Isle. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

Wreck Point Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding area includes a quarry (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Wreck Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Wreck Point Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through Wreck Point Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 Wreck Point Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Wreck Point Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 Wreck Point Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Wreck Point 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 Wreck Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded

no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Wreck 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 Wreck 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, major food sources, or relationship to water levels of the mammals inhabiting Wreck 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 Wreck 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 LH 100

Population

Wreck Point Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-11 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-11. Population Data for the Vicinity of Wreck Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space. The surrounding area is predominantly commercial. There is an unimproved road in the wetland and a quarry nearby. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Wreck Point Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Wreck Point Wetland include limestone, dolomite, sand, and gravel (Great Lakes Basin Commission, 1974). A large stone quarry is located within 1,000 feet of the wetland on the south.

The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Wreck Point Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Wreck Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Wreck Point Wetland.

RESEARCH PROJECTS LH 100

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

ALBANY BAY WETLAND

PHYSIOGRAPHIC SETTING LH 101

Setting

Albany Bay Wetland is located on the shoreline of Lake Huron in Presque Isle Township of Presque Isle County, Michigan, approximately 1.2 miles from the town of Presque Isle. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

Albany Bay Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography consists of a gentle slope rising inland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Albany Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Albany Bay Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through Albany Bay Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 Albany Bay Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Albany Bay Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 Albany Bay Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Albany 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 Albany Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded

no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Albany 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 Albany 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, major food sources, or relationship to water levels of the mammals inhabiting Albany 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 Albany 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 LH 101

Population

Albany Bay Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-12 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-12. Population Data for the Vicinity of Albany Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A paved road passes the wetland to Camp Chickagam. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Albany Bay Wetland.

Mineral, Energy, and Forest Resources

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

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Albany Bay Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Albany Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Albany Bay Wetland.

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

PRESQUE ISLE HARBOR WETLAND

PHYSIOGRAPHIC SETTING LH 102

Setting

Presque Isle Harbor Wetland is located approximately 0.1 mile from the shoreline of Presque Isle Harbor, which is directly connected to Lake Huron, within Presque Isle Township of Presque Isle County, Michigan, 2.7 miles from the town of Presque Isle. This Palustrine wetland is partially wooded and non-wooded (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

Presque Isle Harbor Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is primarily flat (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Presque Isle Harbor Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Presque Isle Harbor Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through Presque Isle Harbor Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 Presque Isle Harbor Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with

the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Presque Isle Harbor Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 Presque Isle Harbor Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Presque Isle Harbor 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 Presque Isle Harbor Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands

or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Presque Isle Harbor 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 Presque Isle Harbor 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, major food sources, or relationship to water levels of the mammals inhabiting Presque Isle Harbor 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 Presque Isle Harbor 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 LH 102

Population

Presque Isle Harbor Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-13 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-13. Population Data for the Vicinity of Presque Isle Harbor Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One secondary highway crosses the wetland. Several buildings with a pier extending into the lake lie in the northern section of the wetland. The southern section contains an unimproved road. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Presque Isle Harbor Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Presque Isle Harbor Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

A portion of the wetland and the surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

An old lighthouse is located approximately 0.4 mile east of Presque Isle Harbor Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Presque Isle Harbor Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Presque Isle Harbor Wetland.

RESEARCH PROJECTS LH 102

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

HARBOR VIEW AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 103

Setting

Harbor View Area Wetland is located approximately 100 feet from the shoreline of Lake Huron in Presque Isle Township of Presque Isle County, Michigan, 2.6 miles from the town of Presque Isle. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Topography

Harbor View Area Wetland has a relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is flat (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Harbor View Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Harbor View Area Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through Harbor View Area Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971). 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 Harbor View Area Wetland is located in Rogers City, Michigan. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with

the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Harbor View Area Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

BIOTIC SETTING LH 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 Harbor View Area Wetland.

Fish

Presque Isle Township Planning Commission (1976) mentions the presence of yellow perch (Perca flavescens), as well as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytsha), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri), and splake (Salvelinus namaycush x S. fontinalis), in Lake Huron along the coast of Presque Isle Township. Although the yellow perch is known to utilize coastal wetlands of Michigan (Jaworski and Raphael, 1978), it is doubtful that the above salmonids utilize coastal wetlands in Presque Isle Township to any large extent. Draining of marshes in this township, some probably coastal, has apparently been detrimental to spawning of northern pike (Esox lucius) (Presque Isle Township Planning Commission, 1976). A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Harbor View 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 Harbor View Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands

or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Harbor View 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 Harbor View 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, major food sources, or relationship to water levels of the mammals inhabiting Harbor View 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 Harbor View 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 LH 103

Population

Harbor View Area Wetland is located in Presque Isle Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-14 indicates that Presque Isle County experienced rapid population growth, while Presque Isle Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-14. Population Data for the Vicinity of Harbor View Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Presque Isle Township	634	-9.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A paved road crosses 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, Presque Isle, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Harbor View Area Wetland.

Mineral, Energy, and Forest Resources

The area surrounding Harbor View Area Wetland is wooded, representing a potential forest resource, but no significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

An old lighthouse is located approximately 0.2 mile south of Harbor View Area Wetland (U.S.G.S. quadrangle map, Presque Isle, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Harbor View Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Harbor View Area Wetland.

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

NORTH BAY AREA WETLAND

PHYSIOGRAPHIC SETTING LH 104

Setting

North Bay Area Wetland is located along the shoreline of North Bay, which is directly connected to Lake Huron, within Krakow Township of Presque Isle County, Michigan, 3.0 miles from the town of Presque Isle. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Topography

North Bay Area Wetland has very little relief and lies at an elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area is flat with a low bluff between the wetland and the beach (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which North Bay Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in North Bay Area Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through North Bay Area Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971). 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 Bay Area Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in

July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of North Bay Area Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

BIOTIC SETTING LH 104

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 Bay Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize North 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 North Bay Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in North 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 North Bay 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, major food sources, or relationship to water levels of the mammals inhabiting North Bay 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 North 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 LH 104

Population

North Bay Area Wetland is located in Krakow Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-15 indicates that Presque Isle County and Krakow Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-15. Population Data for the Vicinity of North Bay Area Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Krakow Township	468	5.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, Thompsons Harbor, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of North Bay Area Wetland.

Mineral, Energy, and Forest Resources

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

The wetland and surrounding areas are wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports that the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of North Bay Area Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to North Bay Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of North Bay Area Wetland.

RESEARCH PROJECTS LH 104

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

THOMPSONS HARBOR WETLAND

PHYSIOGRAPHIC SETTING LH 105

Setting

Thompsons Harbor Wetland is located along the shoreline of Thompsons Harbor, which is directly connected to Lake Huron, within Krakow Township of Presque Isle County, Michigan, 4.7 miles from the town of Presque Isle. The various component parts of this Palustrine wetland extend from the shoreline to approximately 0.3 mile inland, and occupy both wooded and non-wooded sites (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Topography

Thompsons Harbor Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is flat (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Thompsons Harbor Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Detour and Ruse soils and mucks and peats are present in Thompsons Harbor Wetland. These soils occur on wet, stony lakebed plains (Veatch et al., 1954).

Hydrology

Grand Lake Outlet flows through Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompson Harbor, Michigan, 1971). 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 Thompsons Harbor Wetland is located in Rogers City, Michigan. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with

the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

BIOTIC SETTING LH 104

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 Thompsons Harbor Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Thompsons Harbor 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 Thompsons Harbor Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Thompsons Harbor 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 Thompsons Harbor 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, major food sources, or relationship to water levels of the mammals inhabiting Thompsons Harbor 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 Thompsons Harbor 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 LH 105

Population

Thompsons Harbor Wetland is located in Krakow Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-16 indicates that Presque Isle County and Krakow Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-16. Population Data for the Vicinity of Thompsons Harbor Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Krakow Township	468	5.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, Thompsons Harbor, Michigan, 1971).

Recreation

A small area of Thompsons Harbor Wetland is in the Black Lake State Forest, where recreational activities include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Thompsons Harbor Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

The area surrounding the wetland is wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports that the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Thompsons Harbor Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Thompsons Harbor Wetland.

RESEARCH PROJECTS LH 105

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

WEST THOMPSONS HARBOR WETLAND

PHYSIOGRAPHIC SETTING LH 106

Setting

West Thompsons Harbor Wetland is located along the shoreline of Lake Huron in Krakow Township of Presque Isle County, Michigan, 5.4 miles from the town of Presque Isle. This Palustrine wetland extends from the shoreline to approximately 0.8 miles inland, and occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Topography

West Thompsons Harbor Wetland has a relief of 30 feet and a maximum elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography consists of a moderately steep grade rising inland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which West Thompsons Harbor Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in West Thompsons Harbor Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through West Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompson Harbor, Michigan, 1971). 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 Thompsons Harbor Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in

July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of West Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

BIOTIC SETTING LH 106

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 Thompsons Harbor Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize West Thompsons Harbor 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 West Thompsons Harbor Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in West Thompsons Harbor 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 Thompsons Harbor 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, major food sources, or relationship to water levels of the mammals inhabiting West Thompsons Harbor 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 Thompsons Harbor 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 LH 106

Population

West Thompsons Harbor Wetland is located in Krakow Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-17 indicates that Presque Isle County and Krakow Township experienced rapid population growth, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-17. Population Data for the Vicinity of West Thompsons Harbor Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Krakow Township	468	5.2	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, Thompsons Harbor, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of West Thompsons Harbor Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of West Thompsons Harbor Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding areas are wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports that the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of West Thompsons Harbor Wetland (U.S.G.S. quadrangle map, Thompsons Harbor, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to West Thompsons Harbor Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of West Thompsons Harbor Wetland.

RESEARCH PROJECTS LH 106

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

ADAMS POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LH 107

Setting

Adams Point Area Wetland is located approximately 0.1 mile from the shoreline of Lake Huron in Pulawski Township of Presque Isle County, Michigan, 5.4 miles from Rogers City. This Palustrine wetland occupies several wooded sites (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Topography

Adams Point Area Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is flat (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Adams Point Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period (Martin, 1955).

Soils

Alpena and Summerville soils are present in Adams Point Area Wetland. These soils are limy, cobbly, and gravelly and occur on coastal lowlands (Veatch et al., 1954).

Hydrology

No streams flow through Adams Point Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971). 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 Adams Point Area Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Adams Point Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

BIOTIC SETTING LH 107

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 Adams Point Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Adams Point 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 Adams Point Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Adams 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 Adams 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, major food sources, or relationship to water levels of the mammals inhabiting Adams 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 Adams 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 LH 107

Population

Adams Point Area Wetland is located in Pulawski Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 5-18 indicates that Presque Isle County and Pulawski Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 5-18. Population Data for the Vicinity of Adams Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Pulawski Township	434	9.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. An unimproved road crosses the wetland and a paved road is adjacent on the north. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Adams Point Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Adams Point Area Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974). A quarry is located west of the wetland.

The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports that the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Adams Point Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Adams Point Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Adams Point Area Wetland.

RESEARCH PROJECTS LH 107

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

Table 5-19. Data Gaps-Lake Section 5

Data Gap*		Wetland Number	086	087	088	089	090–092	093–096	097	098	099	100	101	102	103	104	105	106	107
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 6

INTRODUCTION

Lake Section 6 extends from Adams Point to Grosse Point. The coastal zones of Presque Isle, Cheboygan, and Mackinac Counties, Michigan, are located in Lake Section 6. The region features irregular topography although topography is flat in several wetlands. The predominant shore type along this 73 mile stretch of shoreline is erodible low plain. Non-erodible low plains also occur in this lake section.

Figures 6-1, 6-2, and 6-3 show the approximate location of the 31 coastal wetlands in Lake Section 6. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 6-1. The wetlands of Lake Section 6 lie at elevations between 580 and 645 feet above sea level. These wetlands are all classified as Palustrine Systems.

Available information related to physiographic and cultural features of these 31 wetlands is summarized in the individual wetland narratives presented in this chapter. Published sources lack site-specific information related to biotic characteristics of many of these wetlands.

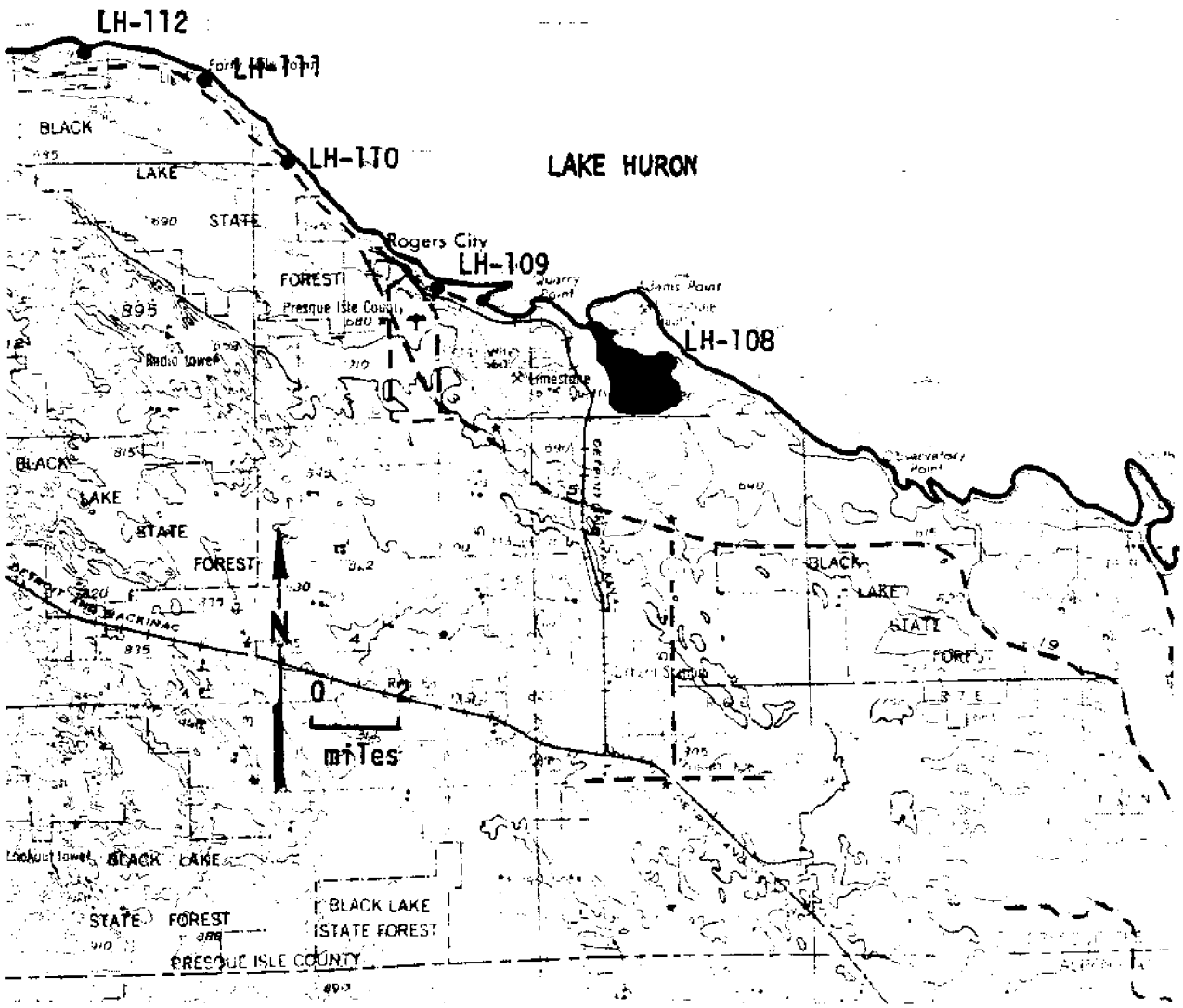
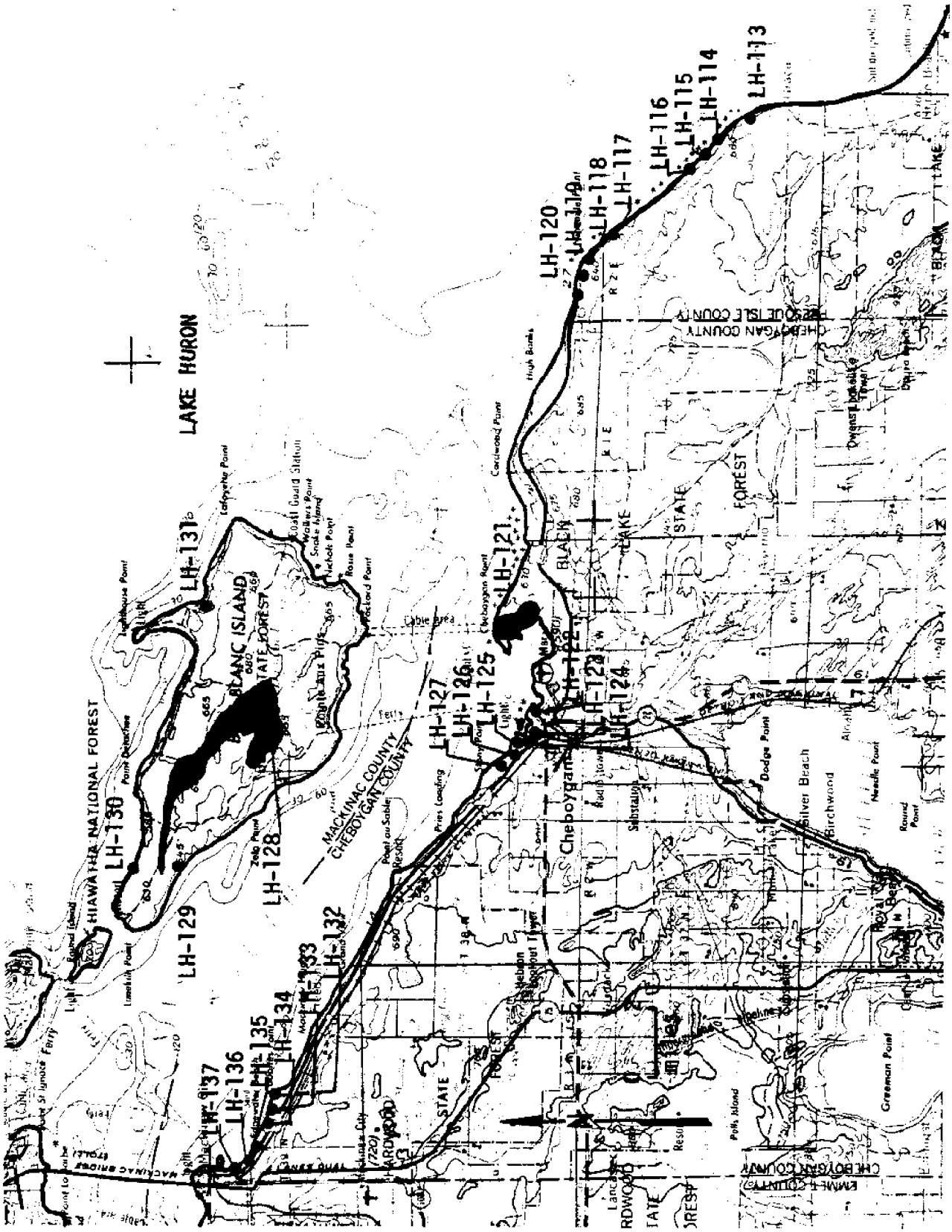


Figure 6-1. Lake Section 6 - Adams Point Area


LAKE HURON
LH-113
LH-114
LH-115
LH-116
LH-117
LH-118
LH-119
LH-120
LH-121
LH-122
LH-123
LH-124
LH-125
LH-126
LH-127
LH-128
LH-129
LH-130
LH-131
LH-132
LH-133
LH-134
LH-135
LH-136
LH-137
HIAWATHA NATIONAL FOREST
BLANC ISLAND
STATE FOREST
MACKINAC COUNTY
CHEBOYGAN COUNTY
Cheboygan
Silver Beach
Birchwood
Dodge Point
Greenman Point
Point aux Pins
Point au Sable
Resort
Ferry
Cable area
Pier Loading
Lighthouse Point
Point Detective
Lighthouse
Lafayette Point
Nichols Point
Rouse Point
Hubbell Point
Carlewood Point
Cheboygan Point
Sturgeon Point
Needle Point
Round Point
Parks Island
Lancaster
RDWOOD
STATE FOREST
CHEBOYGAN COUNTY
EMMET COUNTY
CHEBOYGAN COUNTY
PRESQUE ISLE COUNTY
BLACK LAKE
STATE FOREST
LAKE
BEACH
Royal Park Beach
Hebron
Lighthouse
Mackinac Bridge
Lower Dual
Upper Dual
Mackinaw City
(720)
Point St Ignace Ferry
Island
Marina
Resort
Public Boat Launch
Public Boat Launch
Public Boat Launch

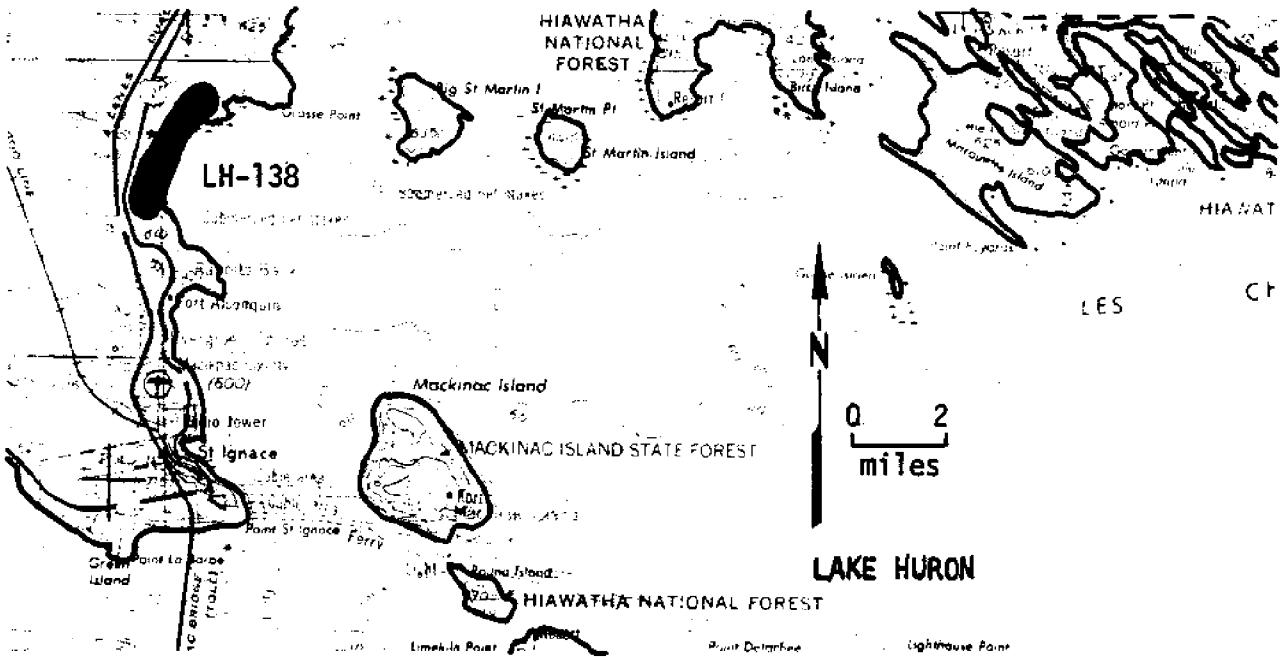


Figure 6-3. Lake Section 6 - Horseshoe Bay Area

Table 6-1. Location, Acreage, and Classification of Wetlands in Lake Section 6

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 108	Swan Lake Area Wetland	45°23'24"	83°43'27"	770	P
LH 109	Calcite Road Wetland	45°24'59"	83°47'56"	20	P
LH 110	Nagels Creek Area Wetland	45°27'07"	83°52'04"	25	P
LH 111	Forty Mile Point Area Wetland	45°28'41"	83°54'16"	7	P
LH 112	Evergreen Beach Wetland	45°29'40"	83°58'19"	7	P
	MAST POINT AREA WETLAND COMPLEX				
LH 113	Grace Area Wetland #1	45°33'38"	84°07'58"	10	P
LH 114	Grace Area Wetland #2	45°33'50"	84°08'00"	10	P
LH 115	Mast Point Area Wetland #1	45°34'30"	84°08'50"	5	P
LH 116	Mast Point Area Wetland #2	45°34'40"	84°09'04"	5	P
LH 117	Mulligan Creek Area Wetland	45°35'49"	84°10'40'	360	P
	NINEMILE POINT AREA WETLAND COMPLEX				
LH 118	Ninemile Point Area Wetland #1	45°37'25"	84°12'18"	5	P
LH 119	Ninemile Point Area Wetland #2	45°37'35"	84°12'28"	5	P
LH 120	Ninemile Point Area Wetland #3	45°37'58"	84°13'10"	40	P
LH 121	Cheboygan Point Wetland	45°39'22"	84°24'43"	830	P
	CHEBOYGAN AREA WETLAND COMPLEX				
LH 122	Cheboygan Area Wetland #1	45°39'05"	84°27'36"	40	P
LH 123	Cheboygan Area Wetland #2	45°39'15"	84°28'10"	100	P
LH 124	Cheboygan Area Wetland #3	45°39'15"	84°28'48"	2	P
LH 125	Cheboygan Area Wetland #4	45°39'28"	84°29'05"	45	P
LH 126	Cheboygan Area Wetland #5	45°40'08"	84°30'05"	50	P
LH 127	Cheboygan Area Wetland #6	45°40'47"	84°31'18"	5	P
	BOIS BLANC ISLAND WETLAND COMPLEX				
LH 128	Point Aux Pins Wetland	45°44'15"	84°27'42"	250	P
LH 129	Bois Blanc Island Wetland	45°46'50"	84°29'44"	1812	P
LH 130	Point Catosh Wetland	45°48'28"	84°31'24"	55	P
LH 131	Swedes Bay Wetland	45°46'52"	84°23'53"	11	P
LH 132	Cadottes Point Wetland	45°45'10"	84°40'56"	15	P
	EDGEWATER BEACH AREA WETLAND COMPLEX				
LH 133	Edgewater Beach Area Wetland #1	45°45'26"	84°41'40"	3	P
LH 134	Edgewater Beach Area Wetland #2	45°45'40"	84°42'18"	15	P
LH 135	Edgewater Beach Area Wetland #3	45°45'51"	84°43'17"	65	P
LH 136	Edgewater Beach Area Wetland #4	45°46'22"	84°43'44"	10	P
LH 137	Edgewater Beach Area Wetland #5	45°46'34"	84°43'43"	5	P
LH 138	Hiawatha National Forest Wetland	map not available			

P=palustrine

SWAN LAKE AREA WETLAND

PHYSIOGRAPHIC SETTING LH 108

Setting

Swan Lake Area Wetland is located approximately 0.1 mile from the shoreline of Lake Huron in Pulawski Township of Presque Isle County, Michigan, 3.1 miles from Rogers City. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Topography

Swan Lake Area Wetland has a 25 feet of relief and a maximum elevation of 605 feet above mean sea level (25 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain. The surrounding topography is irregular (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Swan Lake Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Detour and Ruse soils and mucks and peats are present in Swan Lake Area Wetland. These soils occur on wet, stony lakebed plains (Veatch et al., 1954).

Hydrology

The Swan River and one intermittent stream flow through Swan Lake Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971). 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 Swan Lake Area Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Swan Lake Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

BIOTIC SETTING LH 108

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 Swan Lake Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Swan Lake 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 Swan Lake Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Swan Lake 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 Swan Lake 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, major food sources, or relationship to water levels of the mammals inhabiting Swan Lake 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 Swan Lake 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 Michigan Limestone unit of U.S. Steel Corporation, holds a NPDES permit to discharge into a tributary of Swan Lake. This may affect Swan Lake Area Wetland.

CULTURAL SETTING LH 108

Population

Swan Lake Area Wetland is located in Pulawski Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-2 indicates that Presque Isle County and Pulawski Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-2. Population Data for the Vicinity of Swan Lake Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Pulawski Township	434	9.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One hard surface road, partially on a trestle, bisects the wetland and connects two quarries. The wetland is under private ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Swan Lake Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Swan Lake Area Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974). A large quarry is located to the west within one-half mile of the wetland.

The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports that the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Swan Lake Area Wetland (U.S.G.S. quadrangle map, Adams Point, Michigan, 1971).

Pollution Sources

U.S. Steel Corporation, Michigan Limestone Operation holds a NPDES permit to discharge into Little Lake Basin which flows into Swan Lake. This effluent may affect Swan Lake Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Swan Lake Area Wetland.

RESEARCH PROJECTS LH 108

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

CALCITE ROAD WETLAND

PHYSIOGRAPHIC SETTING LH 109

Setting

Calcite Road Wetland is located about 200 feet from the shoreline of Lake Huron in Rogers Township of Presque Isle County, Michigan, 0.2 mile from Rogers City. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Topography

Calcite Road Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding topography is flat (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Calcite Road Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in Calcite Road Wetland. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

One intermittent stream flows through Calcite Road Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971). 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 Calcite Road Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with

the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Calcite Road Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

BIOTIC SETTING LH 109

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 Calcite Road Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Calcite Road 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 Calcite Road Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Calcite Road 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 Calcite Road 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, major food sources, or relationship to water levels of the mammals inhabiting Calcite Road 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 Calcite Road 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 LH 109

Population

Calcite Road Wetland is located in Rogers Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-3 indicates that Presque Isle County experienced rapid population growth, while Rogers Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-3. Population Data for the Vicinity of Calcite Road Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Rogers Township	680	-6.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly institutional. Calcite Road (hard surface) adjoins the wetland. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Recreation

No known state or federal recreational facilities are present in the vicinity of Calcite Road Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Calcite Road Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974). A large quarry is located within one-half mile of the wetland on the south.

The Great Lakes Basin Commission (1974) reports the area is favorable for oil and gas field discoveries. There are no significant forest resources in the vicinity of the wetland.

Public Utilities and Facilities

A substation with associated power transmission lines is located approximately 0.5 mile southeast of Calcite Road Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Calcite Road Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Calcite Road Wetland.

RESEARCH PROJECTS LH 109

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

NAGELS CREEK AREA WETLAND

PHYSIOGRAPHIC SETTING LH 110

Setting

Nagels Creek Area Wetland is located approximately 0.1 mile from the shoreline of Lake Huron in Rogers Township of Presque Isle County, Michigan, 2.2 miles from Rogers City. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Topography

Nagels Creek Area Wetland has little relief and lies at an elevation of 610 feet above mean sea level (30 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises irregularly inland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Nagels Creek Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in Nagels Creek Area Wetland. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

No streams flow through Nagels Creek Area Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971). 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 Nagels Creek Area Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with

the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Nagels Creek Area Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

BIOTIC SETTING LH 110

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 Nagels Creek Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Nagels Creek 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 Nagels Creek Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Nagels Creek 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 Nagels Creek 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, major food sources, or relationship to water levels of the mammals inhabiting Nagels Creek 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 Nagels Creek 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 LH 110

Population

Nagels Creek Area Wetland is located in Rogers Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-4 indicates that Presque Isle County experienced rapid population growth, while Rogers Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-4. Population Data for the Vicinity of Nagels Creek Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Rogers Township	680	-6.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23 and another paved road border 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, Rogers City, Michigan, 1971).

Recreation

Nagels Creek Area Wetland is located within Black Lake State Forest, where recreational activities include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Nagels Creek Area Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding areas are wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Nagels Creek Area Wetland (U.S.G.S. quadrangle map, Rogers City, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Nagels Creek Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Nagels Creek Area Wetland.

RESEARCH PROJECTS LH 110

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

FORTY MILE POINT AREA WETLAND

PHYSIOGRAPHIC SETTING LH 111

Setting

Forty Mile Point Area Wetland is located approximately 0.2 mile from the shoreline of Lake Huron in Rogers Township of Presque Isle County, Michigan, 4.9 miles from Rogers City. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Topography

Forty Mile Point Area Wetland has little relief and lies at an elevation of 630 feet above mean sea level (50 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. A steep hill rises 50 feet above the wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Forty Mile Point Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in Forty Mile Point Area Wetland. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

No streams flow through Forty Mile Point Area Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971). 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 Forty Mile Point Area Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Forty Mile Point Area Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

BIOTIC SETTING LH 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 Forty Mile Point Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Forty Mile Point 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 Forty Mile Point Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Forty Mile 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 Forty Mile 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, major food sources, or relationship to water levels of the mammals inhabiting Forty Mile 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 Forty Mile 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 LH 111

Population

Forty Mile Point Area Wetland is located in Rogers Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-5 indicates that Presque Isle County experienced rapid population growth, while Rogers Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-5. Population Data for the Vicinity of Forty Mile Point Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Rogers Township	680	-6.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23, and some beach housing serviced by a hard surface road, are adjacent to 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, Moltke, Michigan, 1971).

Recreation

Forty Mile Point Area Wetland is located within Black Lake State Forest, where recreational activities in Black Lake State Forest include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Forty Mile Area Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

The area surrounding the wetland is predominantly wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Forty Mile Point Area Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Forty Mile Point Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Forty Mile Point Area Wetland.

RESEARCH PROJECTS LH 111

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

EVERGREEN BEACH WETLAND

PHYSIOGRAPHIC SETTING LH 112

Setting

Evergreen Beach Wetland is located approximately 100 feet from the shoreline of Lake Huron, within Rogers Township of Presque Isle County, Michigan, 8.5 miles from Rogers City. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Topography

Evergreen Beach 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 Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding topography is irregular, with a gentle rise inland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Surficial Geology

The surficial geology of the area in which Evergreen Beach Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in Evergreen Beach Wetland. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

No streams flow through Evergreen Beach Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971). 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 Evergreen Beach Wetland is located in Rogers City, Michigan*. The average temperature was 45.1°F in 1975. The mean daily low for January was 15.5°F and the mean daily high for July was 81.7°F. The average annual precipitation is 32.83 inches, with a mean monthly precipitation of 2.24 inches in January and 4.94 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

* Long term averages not yet established.

Special Features

No natural special features are found in the vicinity of Evergreen Beach Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

BIOTIC SETTING LH 112

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 Evergreen Beach Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Evergreen Beach 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 Evergreen Beach Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Evergreen Beach 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 the Evergreen Beach 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, major food sources, or relationship to water levels of the mammals inhabiting Evergreen Beach 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 Evergreen Beach 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 LH 112

Population

Evergreen Beach Wetland is located in Rogers Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-6 indicates that Presque Isle County experienced rapid population growth, while Rogers Township underwent a rapid decline in population, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-6. Population Data for the Vicinity of Evergreen Beach Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Rogers Township	680	-6.5	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural wooded space. Beach houses serviced by a paved road are adjacent to 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, Moltke, Michigan, 1971).

Recreation

Evergreen Beach Wetland is located within Black Lake State Forest, where recreational activities in Black Lake State Forest include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Evergreen Beach Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974).

The wetland and surrounding areas are wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Evergreen Beach Wetland (U.S.G.S. quadrangle map, Moltke, Michigan, 1971).

Pollution Sources

There are no NPDES permit holders adjacent to Evergreen Beach Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Evergreen Beach Wetland.

RESEARCH PROJECTS LH 112

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

MAST POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 113-116

Setting

The Mast Point Area Wetland Complex is located approximately 0.2 mile from the shoreline of Lake Huron in Bearinger Township of Presque Isle County, Michigan, 12.5 miles from the town of Cheboygan. This Palustrine wetland complex occupies predominantly non-wooded sites, except for a wooded section in Grace Area Wetland #2 (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Topography

The Mast Point Area Wetland Complex has 20 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 Great Lakes Basin Commission (1975) has classified the shoreline as erodible low plain. The surrounding area is flat except for a 40 foot interior bluff (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which the Mast Point Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in the Mast Point Area Wetland Complex. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

No streams flow through the Mast Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, 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 Mast Point Area Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing

frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Mast Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

BIOTIC SETTING LH 113-116

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 the Mast Point Area Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Grace Area Wetlands #1 and #2 and Mast Point Area Wetlands #1 and #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 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 Mast Point Area Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Mast 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 the Mast 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, major food sources, or relationship to water levels of the mammals inhabiting the Mast 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 Mast 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 LH 113-116

Population

The Mast Point Area Wetland Complex is located in Bearinger Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-7 indicates that Presque Isle County and Bearinger Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-7. Population Data for the Vicinity of the Mast Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Bearinger Township	82	22.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23 passes close to the wetlands. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Recreation

No known state or federal recrational facilities are present in the vicinity of the Mast Point Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Mast Point Area Wetland Complex include limestone and dolomite (Great Lakes Basin Commission, 1974).

The wetlands and surrounding areas are wooded, representing a potential forest resource, and the Great Lakes Basin Commission (1974) reports the area is favorable for oil and gas field discoveries.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Mast Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to the Mast 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 or archaeological features are present within 500 feet of the Mast Point Area Wetland Complex.

RESEARCH PROJECTS LH 113-116

The literature search identified no on-going or impending research projects pertaining to the Mast Point Area Wetland Complex.

MULLIGAN CREEK AREA WETLAND

PHYSIOGRAPHIC SETTING LH 117

Setting

Mulligan Creek Area Wetland lies approximately 0.3 mile from the shoreline of Lake Huron in Bearinger Township of Presque Isle County, Michigan, 11.0 miles from the town of Cheboygan. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Topography

Mulligan Creek Area Wetland has 20 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 Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is irregular, with an interior 40 foot bluff (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which Mulligan Creek Area Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Bois Blanc formation (Martin, 1955).

Soils

Eastport and Deer Park soils are present in Mulligan Creek Area Wetland. These soils are found on sandy coastal lowlands, beaches and dunes (Veatch et al., 1954).

Hydrology

Mulligan Creek flows through and one intermittent stream flows into Mulligan Creek Area Wetland (U.S.G.S. quadrangle map, Grace, 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 Mulligan Creek Area Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Mulligan Creek Area Wetland (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

BIOTIC SETTING LH 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 Mulligan Creek Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Mulligan Creek 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 Mulligan Creek Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Mulligan Creek 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 Mulligan Creek 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, major food sources, or relationship to water levels of the mammals inhabiting Mulligan Creek 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 Mulligan Creek 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 LH 117

Population

Mulligan Creek Area Wetland is located in Bearinger Township of Presque Isle County, Michigan. The county is sparsely populated, having a density of 22 persons per square mile. Table 6-8 indicates that Presque Isle County and Bearinger Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Presque Isle County.

Table 6-8. Population Data for the Vicinity of Mulligan Creek Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Bearinger Township	82	22.4	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. U.S. Route 23 adjoins 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, Grace, Michigan, 1958).

Recreation

No known state or federal recreational facilities are present in the vicinity of Mulligan Creek Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Mulligan Creek Area Wetland include limestone and dolomite (Great Lakes Basin Commission, 1974).

The wetland and surrounding areas are wooded, representing a potential forest resource, but no oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Mulligan Creek Area Wetland (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to Mulligan Creek Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Mulligan Creek Area Wetland.

RESEARCH PROJECTS LH 117

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

NINEMILE POINT AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 118-120

Setting

The Ninemile Point Area Wetland Complex is located approximately 0.1 mile from the shoreline of Lake Huron within Bearinger and Benton Townships of Presque Isle and Cheboygan Counties (Michigan), respectively, 10.0 miles from the town of Cheboygan. This Palustrine wetland complex occupies wooded sites (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Topography

Ninemile Point Area Wetland Complex has 20 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 Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding topography is irregular (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Surficial Geology

The surficial geology of the area in which the Ninemile Point Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Bois Blanc formation (Martin, 1955).

Soils

East port and Deer Park soils are present in Ninemile Point Area Wetland #1. These soils are found on sandy castal lowlands, beaches and dunes (Veatch et al., 1954).

Kalkaska and Emmet soils are present in Ninemile Point Area Wetlands #2 and #3. These soils are loamy sands, level to undulating, with good to free drainage (Foster et al., 1939).

Hydrology

No streams flow through the Ninemile Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, 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 Ninemile Point Area Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F.

The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five 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 October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Ninemile Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

BIOTIC SETTING LH 118-120

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 Ninemile Point Area Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Ninemile Point Area Wetlands #1, #2, and #3. 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 Ninemile Point Area Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Presque Isle County and Cheboygan County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, 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 Ninemile 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 the Ninemile 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, major food sources, or relationship to water levels of the mammals inhabiting the Ninemile 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 Ninemile 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 LH 118-120

Population

The Ninemile Point Area Wetland Complex is located partly in Bearinger Township of Presque Isle County, Michigan, and partly in Benton Township of Cheboygan County. Both counties are sparsely populated, having a density of 22 and 27 persons per square mile, respectively. Table 6-9 indicates that both counties and both townships experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in both counties.

Table 6-9. Population Data for the Vicinity of the Ninemile Point Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Presque Isle County	14,000	9.1	17,848
Bearinger Township	82	22.4	--
Cheboygan Coungy	19,419	17.2	23,587
Benton Township	1,777	24.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. U.S. Route 23 passes through the wetlands. The wetlands are under private ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Recreation

No known state or federal recrational facilities are present in the vicinity of the Ninemile Point Area Wetland Complex.

Mineral, Energy, and Forest Resources

The Ninemile Point Area Wetland Complex and the surrounding areas are wooded, representing potential forest resources. No significant mineral, oil, or gas 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 Ninemile Point Area Wetland Complex (U.S.G.S. quadrangle map, Grace, Michigan, 1958).

Pollution Sources

There are no NPDES permit holders adjacent to the Ninemile 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 or archaeological features are present within 500 feet of the Ninemile Point Area Wetland Complex.

RESEARCH PROJECTS LH 118-120

The literature search identified no on-going or impending research projects pertaining to the Ninemile Point Area Wetland Complex.

CHEBOYGAN POINT WETLAND

PHYSIOGRAPHIC SETTING LH 121

Setting

Cheboygan Point Wetland is located on the shoreline of McLeod Bay, which is directly connected to Lake Huron, in Benton township of Cheboygan County, Michigan, 1.5 miles from the town of Cheboygan. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957).

Topography

Cheboygan Point 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 Great Lakes Basin Commission (1975) has described the area as wetland. The surrounding topography is predominantly flat (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957).

Surficial Geology

The surficial geology of the area in which Cheboygan Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Bois Blanc formation (Martin, 1955).

Soils

Munuscong sandy loam is present in Cheboygan Point Wetland. This is a poorly to well drained soil, which often occurs in ridges and swales (Foster et al., 1939).

Hydrology

Elliot Creek flows through Cheboygan Point Wetland (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957). 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 Cheboygan Point Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 16.9^{o}F and the mean monthly high for July is 79.0^{o}F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five 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 October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Cheboygan Point Wetland (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957).

BIOTIC SETTING LH 121

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 Cheboygan Point Wetland.

Fish

Northern pike (Esox lucius), grass pickerel (Esox americanus), lake whitefish (Coregonus clupeaformis), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), crappies (Pomoxis spp.), largemouth bass (Micropterus salmoides), smallmouth bass (Micropterus dolomieui), sunfishes (Lepomis spp.), rock bass (Ambloplites rupestris), and various salmonids provide the majority of the recreational fishery catch in the vicinity of Cheboygan. Suckers (Catostomidae), carp (Cyprinus carpio), longnose gar (Lepisosteus osseus), and bowfin (Amia calva) are also present in the area (U.S. Army Corps of Engineers, 1976). All these species, except the salmonids and the rock bass, are reported to utilize the coastal wetlands of Michigan (Jaworski and Raphael, 1978), and some of them probably utilize Cheboygan Point Wetland. Spearing of lake sturgeon (Acipenser fulvescens) is a legal recreational fishery in the Cheboygan area during February (U.S. Army Corps of Engineers, 1976), but no specific sites were mentioned in the report. Little or no commercial fishing is conducted in the Cheboygan area (U.S. Army Corps of Engineers, 1976), and probably none occurs in Cheboygan Point Wetland. There is no documentation of fish spawning sites in the area, but most of the species listed above probably utilize Cheboygan Point Wetland as a spawning or nursery area. A list of common fish species utilizing coastal wetlands of Michigan is provided 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, 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 Cheboygan Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is

general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Cheboygan County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Cheboygan Point Wetland.

Avifauna

Green-winged teal (Anas crecca), belted kingfishers (Megaceryle alcyon), herring gulls (Larus argentatus), solitary sandpipers (Tringa solitaria), and sanderlings (Crocethia alba) were observed in this wetland during a bird survey conducted on September 9, 1975 by Michigan Department of Natural Resources personnel.

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 Cheboygan Point Wetland.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), mink (Mustela vison), and river otter (Lutra canadensis) have been observed on Cheboygan Point Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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

Spearing of lake sturgeon, a threatened species in Michigan, is a legal recreational fishery in the Cheboygan area (U.S. Army Corps of Engineers, 1976). However, 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 Cheboygan Point Wetland by the literature search.

Health

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

Population

Cheboygan Point Wetland is located in Benton Township of Cheboygan County, Michigan. The county is sparsely populated, having a density of 27 persons per square mile. Table 6-10 indicates that Cheboygan County and Benton Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Cheboygan County.

Table 6-10. Population Data for the Vicinity of Cheboygan Point Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Cheboygan County	19,419	17.2	23,587
Benton Township	1,777	24.3	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly institutional. Two roads, one of them paved, pass close to the wetland. The wetland is under private ownership, and its location suggests that it is subject to severe development pressure (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957).

Recreation

No known state or federal recreational facilities are present in the vicinity of Cheboygan Point Wetland.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of Cheboygan Point Wetland. The wetland and surrounding areas are partially wooded,, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Cheboygan Point Wetland (U.S.G.S. quadrangle map, Cheboygan, Michigan, 1957).

Pollution Sources

There are no NPDES permit holders adjacent to Cheboygan Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Cheboygan Point Wetland.

RESEARCH PROJECTS LH 121

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

CHEBOYGAN AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 122-127

Setting

The Cheboygan Area Wetland Complex is located along the shoreline of Lake Huron in Beaugrand and Cheboygan Townships of Cheboygan County, Michigan. Cheboygan Area Wetlands #1 and #2 lie on the Lake Huron shoreline approximately 0.3 mile from Cheboygan, Michigan. Cheboygan Area Wetlands #3, #4, #5, and #6 lie approximately 0.1 mile from the Lake Huron shoreline. Wetlands #3 and #4 are located at Cheboygan, wetland #5 lies 1.0 mile from Cheboygan, and wetland #6 lies 2.5 miles from Cheboygan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Cheyboygan, Michigan, 1957; Mullett Lake, Michigan, 1957).

Topography

The Cheboygan Area Wetland Complex has an overall relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the area as wetland. The surrounding terrain is flat near the eastern wetlands and rises fairly quickly in the western wetland areas (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Mullet Lake, Michigan, 1957).

Surficial Geology

The surficial geology of the area in which the Cheboygan Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Dundee formation (Martin, 1955).

Soils

Munuscong sandy loam is present in the Cheboygan Area Wetland Complex. This is a poorly to well drained soil, which often occurs in ridges and swales (Foster et al., 1939).

Hydrology

The Cheboygan River flows by Cheboygan Area Wetland #2, and an unnamed stream flows through Cheboygan Area Wetland #5 but no streams flow through Cheboygan Area Wetlands #1, #3, #4, and #6 (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Mullett Lake, Michigan, 1957). 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 Cheboygan Area Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Cheboygan Area Wetland Complex (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Mullett Lake, Michigan, 1957).

BIOTIC SETTING LH 122-127

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 Cheboygan Area Wetland Complex.

Fish

Northern pike (Esox lucius), grass pickerel (Esox americanus), lake whitefish (Coregonus clupeaformis), yellow perch (Perca flavescens), walleye (Stizostedion vitreum), crappies (Pomoxis spp.), largemouth bass (Micropterus salmoides), smallmouth bass (Micropterus dolomieui), sunfishes (Lepomis spp.), rock bass (Ambloplites rupestris), and various salmonids provide the majority of the recreational fishery catch in the vicinity of Cheboygan. Suckers (Catostomidae), carp (Cyprinus carpio), longnose gar (Lepisosteus osseus), and bowfin (Amia calva) are also present in the area (U.S. Army Corps of Engineers, 1976). All these species, except the salmonids and the rock bass, are reported to utilize the coastal wetlands of Michigan (Jaworski and Raphael, 1978), and some of them probably utilize the six Cheboygan Area Wetlands. Spearing of lake sturgeon (Acipenser fulvescens) is a legal recreational fishery in the Cheboygan area during February (U.S. Army Corps of Engineers, 1976), but no specific sites were mentioned in the report. Little or no commercial fishing is conducted in the Cheboygan area (U.S. Army Corps of Engineers, 1976), and probably none occurs in the Cheboygan Area Wetlands. There is no documentation of fish spawning sites in the area, but most of the species listed above probably utilize the Cheboygan Area Wetland Complex as a spawning or nursery area. A list of common fish species utilizing coastal wetlands of Michigan is provided 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, 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 Cheboygan Area Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Cheboygan County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Cheboygan Area Wetlands #1-#6.

Avifauna

A bird survey was conducted in Cheboygan Area Wetlands #1 and #2 on September 9, 1975 by Michigan Department of Natural Resources personnel. Mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), pied-billed grebes (Podilymbus podiceps), long-billed marsh wrens (Cistothorus palustris), black-crowned night herons (Nycticorax nycticorax), American Coots (Fulica americana), herring gulls (Larus argentatus), and red-winged blackbirds (Agelaius phoeniceus) were observed. Data concerning seasonal abundance, density, and productivity of waterfowl in 1974 are presented in Table 6-11. Nesting species at that time included mallards, blue-winged teal, green-winged teal (Anas crecca), wood ducks (Aix sponsa), American coot, sora (Porzana carolina), least bitterns (Ixobrychus exilis), American bitterns (Botaurus lentiginosus), and yellow-headed blackbirds (Xanthocephalus xanthocephalus) (Michigan Department of Natural Resources, 1974-1975). In addition, Thobaben (1974) recorded nests for the willow flycatcher (Empidonax traillii), black tern (Chlidonias niger), killdeer (Charadrius vociferus), long-billed marsh wren, and red-winged blackbird. Noteworthy sightings within the last fifty years include the glaucous gull (Larus hyperboreus), Iceland gull (Larus glaucoides), great black-backed gull (Larus marinus), white pelican (Pelecanus erythrorhynchos) and great egret (Casmerodius albus).

Table 6-12 lists waterfowl shot in Cheboygan Area Wetland #1 and #2 in Autumn 1974. Table 6-13 provides supplementary information on these two wetlands.

Table 6-11. Seasonal Abundance, Density and Productivity of Waterfowl in Cheboygan Area Wetlands #1 and #2.[a]

Waterfowl Use / Species	Production			Fall Migration			Wintering		
	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard	134	1.0	300	200	2-4		none			
black duck	7	0.05	20	100	2-4		none			
gadwall										
mottled duck										
green-winged teal	100	0.8	200	100	2-4		none			
Am. wigeon										
blue-winged/ cinnamon teal	80	0.6	100	50	2-4		none			
northern shoveler										
pintail	7	0.05	40	20	2-4		none			
wood duck										
black-bellied tree duck										
fulvous tree duck										
TOTAL sub-dabblers	395		780	480						
redhead										
canvasback										
scaups										
redneck										
goldeneye/ bufflehead										
ruddy duck										
TOTAL sub-divers			50	20						
other ducks			50	20						
TOTAL ducks			880	530						

-continued-

Table 6-11. concluded

Waterfowl Use	Production			Fall Migration			Wintering		
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Fall Pop.	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada			40	20	1-2					
black brant										
brant										
TOTAL geese	0	0	40	20						
Swans										
whistling										
other (mute)	13	0.02	8	8						
TOTAL swans			8	8						
TOTAL waterfowl	408		928	558						

[a]Taken from Michigan Department of Natural Resources, Environmental Areas Survey, open file data, 1975

Table 6-12. Waterfowl Shot (in order of abundance) in Fall 1974 in Cheboygan Area Wetlands #1 and #2[a]

Common name	Common name
Canada goose	redhead
snow goose	gadwall
mallard	American wigeon
blue-winged teal	ring-necked duck
wood duck	canvasback
green-winged teal	scaup
black duck	common goldeneye
American coot	bufflehead
pintail	scoter
hooded merganser	common gallinule
common merganser	pied-billed grebe
red-breasted merganser	

[a] Thobaben (1974)

The literature search provided no site-specific information pertaining to the commercial use, health, life histories, relationship to water levels, or major food sources of the birds utilizing the Cheboygan Area Wetland Complex, or to seasonal abundance, density and productivity, or recreational use of avifauna in Cheboygan Area Wetlands #3-#6.

Mammals

Muskrat (Ondatra zibethicus), beaver (Castor canadensis), mink (Mustela vison), and river otter (Lutra canadensis) have been observed on Cheboygan Area Wetlands #1 and #2 (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 the Cheboygan Area Wetland Complex, nor to species composition in Cheboygan Area Wetlands #3, #4, and #5.

Endangered Species

Spearing of lake sturgeon, a threatened species in Michigan, is a legal recreational fishery in the Cheboygan area (U.S. Army Corps of Engineers, 1976).

Bird species recorded in Cheboygan Area Wetlands #1 and #2 have included the common tern (Sterna hirundo), which is on the Michigan list of Endangered species; the Caspian tern (Sterna caspia) and the marsh hawk (Circus cyaneus), both threatened in Michigan; and the black-crowned night heron (N. nycticorax) and American bittern (Botaurus lentiginosus), both rare species.

Table 6-13. Birds Observed in Cheboygan Area Wetlands #1 and #2[a]

Species	Total	Symbol of abundance[b]	Other data[c]
red-winged blackbird	600+	A	N,Y(1)
black tern	600+	A	N,Y(11)
ring-billed gull	600+	A	Y
long-billed marsh wren	229	A	N,Y(1)
tree swallow	229	A	N,Y
mallard	174	C	N,Y
American coot	125	C	N,Y
least bittern	70	F	N,Y(1)
blue-winged teal	62	F	Y
green-winged teal	62	F	Y
common snipe	57	U	
killdeer	56	U	N,Y(2),Z
green heron	56	U	Y
common grackle	33	U	Y(2)
yellow warbler	29	U	Z
common tern	27	U	
American goldfinch	28	U	Z
purple martin	28	U	Y
swamp sparrow	28	U	Y,Z
pied-billed grebe	28	U	Y
common yellowthroat	25	U	Z
spotted sandpiper	23	U	Y(3)
wood duck	19	U	Y
American bittern	16	U	Y
sora	13	U	Y,Z
crow	13	U	Y,Z
mute swan	11	R	
Virginia rail	10	R	Y
lesser yellowlegs	10	R	Z
veery	9	R	Z
alder flycatcher	8	R	N,Y,Z
yellow-headed blackbird	7	R	Y
American redstart	7	R	Y,Z
pintail	7	R	
belted kingfisher	6	R	
Canada goose	6	R	
pectoral sandpiper	6	R	Z
American kestrel	5	R	Z
common gallinule	3	R	
savannah sparrow	4	R	Z
herring gull	4	R	
common nighthawk	1	R	
American wigeon	1	R	
eastern meadowlark	1	R	Z

-continued-

Table 6-13. concluded

Species	Total	Symbol of abundance[b]	Other data[c]
Caspian tern	1	R	Z
black duck	1	R	
red-breasted merganser	1	R	
marsh hawk	1	R	
common loon	1	R	
least sandpiper	1	R	Z

[a]Taken from Thobaben (1974)
[b]A=abundant (15 or more)
C=common (10 to 14)
F=frequent (5 to 9)
U=uncommon (1 to 4)
R=rare (0.9 or less)
[c]N=nest
Y=young observed (# in parenthesis)
Z=found only in marsh ecotone
t=more than could be determined

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 six wetlands of the Cheboygan 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 Cheboygan Area Wetland Complex is utilized by a diversity of avifauna. Cheboygan Waste and Water Treatment Plant and Thompson Industries hold NPDES permits to discharge into the Cheboygan River. These effluents may affect Cheboygan Area Wetland #2.

CULTURAL SETTING LH 122-127

Population

The Cheboygan Area Wetland Complex is located in the city of Cheboygan and in Beaugrand Township of Cheboygan County, Michigan. The county is sparsely populated, having a density of 27 persons per square mile. Table 6-14 indicates that Cheboygan County and Beaugrand Township experienced rapid population growth, while the population of Cheboygan (city) remained stable, between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Cheboygan County.

Table 6-14. Population Data for the Vicinity of the Cheboygan Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Cheboygan County	19,419	17.2	23,587
City of Cheboygan	5,595	0.8	--
Beaugrand Township	1,111	30.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is urban open space. The main body of the wetland complex lies within the city of Cheboygan and is surrounded by the features normally associated with a small city. Two notable features are the city's nearby airport and the artificial breakwater built at the mouth of the Cheboygan River. U.S. Route 23 passes

close to the wetland. The wetlands are under local government ownership, but their location suggests that they are subject to severe development pressure (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Mullet Lake, Michigan, 1957).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Cheboygan Area Wetland Complex.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Cheboygan Area Wetland Complex include sand and gravel. No significant forest, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Cheboygan Area Wetland Complex (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Mullet Lake, Michigan, 1957).

Pollution Sources

The Cheboygan Waste and Water Treatment Plant and Thompson Industries hold NPDES permits to discharge into the Cheboygan River. These effluents may affect Cheboygan Area Wetland #2. No other permit holders are located around the other wetlands of this complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (# 20-CN-5) in the vicinity of the Cheboygan Area Wetland Complex. This site, featuring a habitation area and mound, was first reported by Hinsdale in 1931 (Peebles and Black, 1976).

There are no known historical sites within 500 feet of any of the wetlands of the Cheboygan Area Wetland Complex.

RESEARCH PROJECTS LH 122-127

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

BOIS BLANC ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING — LH 128-131

Setting

The Bois Blanc Island Wetland Complex is located on Bois Blanc Island in Lake Huron, within Bois Blanc Township of Mackinac County, Michigan. Pointe aux Pins Wetland lies approximately 0.1 mile from the Lake Huron shoreline and 4.8 miles from the town of Cheboygan. Bois Blanc Island Wetland extends from the Lake Huron shoreline to approximately 2.2 miles inland and lies 5.6 miles from Mackinac Island, Michigan. Point Catosh Wetland lies approximately 100 feet from the Lake Huron shoreline and 4.0 miles from Mackinac Island, Michigan, at Point Catosh and Point Detochee. Swedes Bay Wetland lies approximately 200 feet from the Swedes Bay shoreline, which is directly connected to Lake Huron, and is 10.0 miles from Cheboygan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; McRae Bay, Michigan, 1964; Round Island, Michigan, 1964).

Topography

The Bois Blanc Island Wetland Complex has an overall relief of 65 feet and a maximum elevation of 645 feet above mean sea level (65 feet above the approximate mean elevation of Lake Huron). The island is irregular, with a steady rise from the shoreline to a summit of 656 feet above mean sea level (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; McRae Bay Michigan, 1964; Round Island, Michigan, 1964).

Surficial Geology

The literature search yielded no information regarding the surficial geology of the Bois Blanc Island Wetland Complex.

Soils

No recent soil survey is available for Mackinac County.

Hydrology

The river draining Echo Lake flows through Pointe aux Pins Wetland. Twin Lake Creek, an intermittent stream, flows out of Bois Blanc Island Wetland. No other streams flow through the rest of the Bois Blanc Island Wetland Complex (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Round Island, Michigan, 1964; McRae Bay, Michigan, 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 Bois Blanc Island Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Bois Blanc Island Wetland Complex (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; McRae Bay, Michigan, 1964; Round Island, Michigan, 1964).

BIOTIC SETTING LH 128-131

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 Blanc Island Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is provided in Appendix A-1, and some of these species probably utilize Pointe aux Pins Wetland, Bois Blanc Island Wetland, Point Catosh Wetland, and Swedes 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, 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 Bois Blanc Island Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands

or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Bois Blanc 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 Bois Blanc Island Wetland Complex.

Mammals

Controlled hunting of white-tailed deer (Odocoileus virginianus) is permitted on some portions of the four wetlands of the Bois Blanc Island Wetland Complex (Johnson et al., 1963). The hunt is closely monitered by the Michigan Department of Natural resources. White-tailed deer harvested on Bois Blanc Island are typically lighter than deer from the mainland.

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 Bois Blanc 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 four wetlands of the Bois Blanc 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 LH 128-131

Population

The Bois Blanc Island Wetland Complex is located in Bois Blanc Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 6-15 indicates that Mackinac County and Bois Blanc Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 6-15. Population Data for the Vicinity of the Bois Blanc Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Bois Blanc Township	51	82.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. A road has been constructed around the perimeter of the island which sometimes winds inland; it periodically degrades to an unimproved road. A small aircraft landing field is located on the island, and a small pier is located on the northeastern point. The community of Pointe aux Pins is on the southern edge of the island. The wetlands are under state ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; Round Island, Michigan, 1964; McRae Bay, Michigan, 1964).

Recreation

The Bois Blanc Island Wetland Complex lies within Black Lake State Forest, where recreational activities include camping, boating, swimming, fishing, and day hikes.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of the Bois Blanc Island Wetland Complex. The wetlands and Bois Blanc Island are predominantly wooded, representing potential forest resources, but no significant oil or gas resources are known to be present on the island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Bois Blanc Island Wetland Complex (U.S.G.S. quadrangle maps, Cheboygan, Michigan, 1957; McRae Bay, Michigan, 1964; Round Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Bois Blanc 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 or archaeological features are present within 500 feet of the Bois Blanc Island Wetland Complex.

RESEARCH PROJECTS LH 128-131

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

CADOTTES POINT WETLAND

PHYSIOGRAPHIC SETTING LH 132

Setting

Cadottes Point Wetland is located on the Lake Huron shoreline in Mackinaw Township of Cheboygan County, Michigan, approximately 2.8 miles from Mackinaw City. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Topography

Cadottes 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 Lake Huron). The Great Lakes Basin Commission (1975) has described the area as wetland. The surrounding terrain rises fairly quickly inland (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Cadottes Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Bois Blanc formation (Martin, 1955).

Soils

Munuscong sandy loam is present in Cadottes Point Wetland. This is a poorly to well drained soil which often occurs in ridges and swales (Foster, et al., 1939).

Hydrology

No streams flow through Cadottes Point Wetland (U.S.G.S. quadrangle map, St. Ignace, Michigan, 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 Cadottes Point Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Cadottes Point Wetland (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

BIOTIC SETTING LH 132

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 Cadottes Point Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Cadottes Point 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 Cadottes Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Cheboygan County are listed in Appendix A-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Cadottes 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 Cadottes 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, major food sources, or relationship to water levels of the mammals inhabiting Cadottes 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 Cadottes 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

LH 132

Population

Cadottes Point Wetland is located in Mackinaw Township of Cheboygan County, Michigan. The county is sparsely populated, having a density of 27 persons per square mile. Table 6-16 indicates that Cheboygan County and Mackinaw Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Cheboygan County.

Table 6-16. Population Data for the Vicinity of Cadottes Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Cheboygan County	19,419	17.2	23,587
Mackinaw Township	606	9.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. One unimproved road approaches the wetland near the beach where one building has been built. U.S. Route 23 and a NYC Railroad line pass close to the wetland. The wetland is under undetermined ownership, but its location suggests that it is subject to moderate development pressure (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Recreation

Cadottes Point Wetland is within the Hardwood State Forest. Recreational activities in the forest include camping, boating, swimming, and fishing.

Mineral, Energy, and Forest Resources

The area surrounding Cadottes Point Wetland is wooded, representing a potential forest resource, but no significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Cadottes Point Wetland (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Cadottes Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Cadottes Point Wetland.

RESEARCH PROJECTS LH 132

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

EDGEWATER BEACH AREA WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 133-137

Setting

The Edgewater Beach Area Wetland Complex is located approximately 0.1 mile from the shoreline of Lake Huron in Mackinaw Township of Cheboygan County, Michigan, 0.3 to 2.2 miles from Mackinaw City. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Topography

The Edgewater Beach Area Wetland Complex has an overall relief of ten feet and a maximum elevation of 595 feet above mean sea level (15 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Committee (1975) has described the shoreline as erodible low bluff, erodible low plain and wetland, respectively, progressing westerly. The surrounding terrain varies, but primarily consists of a flat coastal area with an inland bluff (U.S.G.S. quadrangle map, Ignace, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Edgewater Beach Area Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Devonian period and the Bois Blanc formation (Martin, 1955).

Soils

Munuscong sandy loam is present in the Edgewater Beach Area Wetland Complex. This is a poorly to well drained soil which often occurs in ridges and swales (Foster, et al., 1939).

Hydrology

No streams flow through the Edgewater Beach Area Wetland Complex (U.S.G.S. quadrangle map, St. Ignace, Michigan, 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 Edgewater Beach Area Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 16.9^{o}F and the mean monthly high for July is 79.0^{o}F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing

season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Edgewater Beach Area Wetland Complex (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

BIOTIC SETTING LH 133-137

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 the Edgewater Beach Area Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is provided in Appendix A-1, and some of these species probably utilize Edgewater Beach Area Wetlands #1-#5. 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, 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 Edgewater Beach Area Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Cheboygan County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Edgewater Beach Area Wetlands #1-#5.

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 Edgewater Beach 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 Edgewater Beach 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 five wetlands of the Edgewater 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 LH 133-137

Population

The Edgewater Beach Area Wetland Complex is located in Mackinaw Township of Cheboygan County, Michigan. The county is sparsely populated, having a density of 27 persons per square mile. Table 6-17 indicates that Cheboygan County and Mackinaw Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that rapid growth is expected to continue in Cheboygan County.

Table 6-17. Population Data for the Vicinity of the Edgewater Beach Area Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Cheboygan County	19,419	17.2	23,587
Mackinaw Township	606	9.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex is rural open space. The surrounding area is predominantly residential. This complex lies in and on the outskirts of Mackinac City. Considerable development exists near the northern wetland, while comparatively little exists near the southern wetlands with the exception of U.S. Route 23 and a NYC Railroad line, which bisects the wetlands. The wetlands are under undertermined ownership, but their location suggests that they are subject to severe development pressure (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Recreation

Edgewater Beach Area Wetlands #1, #2, and #3 are within the Hardwood State Forest, where recreational activities include camping, boating, swimming, and fishing.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of the Edgewater Beach Area Wetland Complex. The wetlands and and surrounding areas are partially wooded, representing a potential forest resource, but no siginificant oil or gas resources are known to be present.

Public Utilities and Facilities

A water tank is located approximately 0.5 mile northeast of Edgewater Beach Area Wetland #5 (U.S.G.S. quadrangle map, St. Ignace, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Edgewater Beach Area Wetland Complex. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

There is one known archaeological site (# 20-CN-30) in the vicinity of the Edgewater Beach Area Wetland Complex (Peebles and Black, 1976). This site features a habitation area.

There are no known historical sites within 500 feet of the Edgewater Beach Area Wetland Complex.

RESEARCH PROJECTS LH 133-137

The literature search identified no on-going or impending research projects pertaining to the Edgewater Beach Area Wetland Complex.

HIAWATHA NATIONAL FOREST WETLAND

PHYSIOGRAPHIC SETTING LH 138

Setting

Hiawatha National Forest Wetland is located on the shoreline of Horseshoe Bay, which is directly connected to Lake Huron, in St. Ignace Township of Mackinac County, Michigan, approximately 1.8 miles from the town of St. Ignace. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 1964).

Topography

Hiawatha National Forest Wetland has 60 feet of relief and a maximum elevation of 640 feet above mean sea level (60 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is variable, being predominantly flat in the northern area and irregular with small hills (elevations up to 745 feet above mean sea level) in the southern area (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Hiawatha National Forest Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Pointe aux Chenes formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Rabbit Back Creek, Foley Creek, Martineau Creek, and one unnamed creek flow through Hiawatha National Forest Wetland (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 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 Hiawatha National Forest Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing

season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Hiawatha National Forest Wetland (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 1964).

BIOTIC SETTING LH 138

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 Hiawatha National Forest Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Hiawatha National Forest 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 Hiawatha National Forest Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Hiawatha National Forest Wetland.

Avifauna

Michigan Department of Natural Resources personnel (1974) surveyed the coastal zone of Horseshoe Bay which includes this wetland. Geese (Branta spp., Anser spp., Chen spp.), diving ducks, dabbling ducks, mergansers (Lophodytes spp. or Mergus spp.) and shorebirds were using the area during migration and for nesting and feeding. Gulls (Larus spp.) and terns (Sterna spp. or Hydroprogne sp. or Chlidonias sp.) were also observed feeding and resting.

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 Hiawatha National Forest Wetland.

Mammals

Muskrat (Ondatra zibethicus) and mink (Mustela vison) have been observed on Hiawatha National Forest Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 Hiawatha National Forest 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 LH 138

Population

Hiawatha National Forest Wetland is located in St. Ignace Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 6-18 indicates that Mackinac County and St. Ignace Township experienced a rapid rate of population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 6-18. Population Data for the Vicinity of Hiawatha National Forest Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
St. Ignace Township	637	15.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Interstate 75 and another primary highway cross the wetland. A campground is located in the wetland area, as well as some housing and a few short, unimproved roads. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 1964).

Recreation

Hiawatha National Forest Wetland is within the Hiawatha National Forest, but specific recreational activities are unknown.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of Hiawatha National Forest Wetland (Great Lakes Basin Commission, 1974). There are a few gravel pits in the area.

The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Hiawatha National Forest Wetland (U.S.G.S. quadrangle map, Evergreen Shores, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Hiawatha National Forest Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Hiawatha National Forest Wetland.

RESEARCH PROJECTS LH 138

The literature search identified no on-going or impending research projects pertaining to Hiawatha National Forest Wetland.

Table 6-19. Data Gaps-Lake Section 6

Data Gap*		Wetland Number	108	109	110	111	112	113-116	117	118-120	121	122-127	128-131	132	133-137	138
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 7

INTRODUCTION

Lake Section 7 extends from Grosse Point to Huron Point, in Mackinac County, Michigan. The region features irregular topography. The predominant shore type is non-erodible low bluff.

Figure 7-1 shows the approximate location of the 40 coastal wetlands in Lake Section 7. Latitude, longitude, acreage, and classification for each of these wetlands are recorded in Table 7-1. The wetlands of Lake Section 7 lie at elevations between 580 and 660 feet above sea level. These wetlands are all classified as Palustrine Systems.

Available information related to physiographic and cultural features of these 40 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.

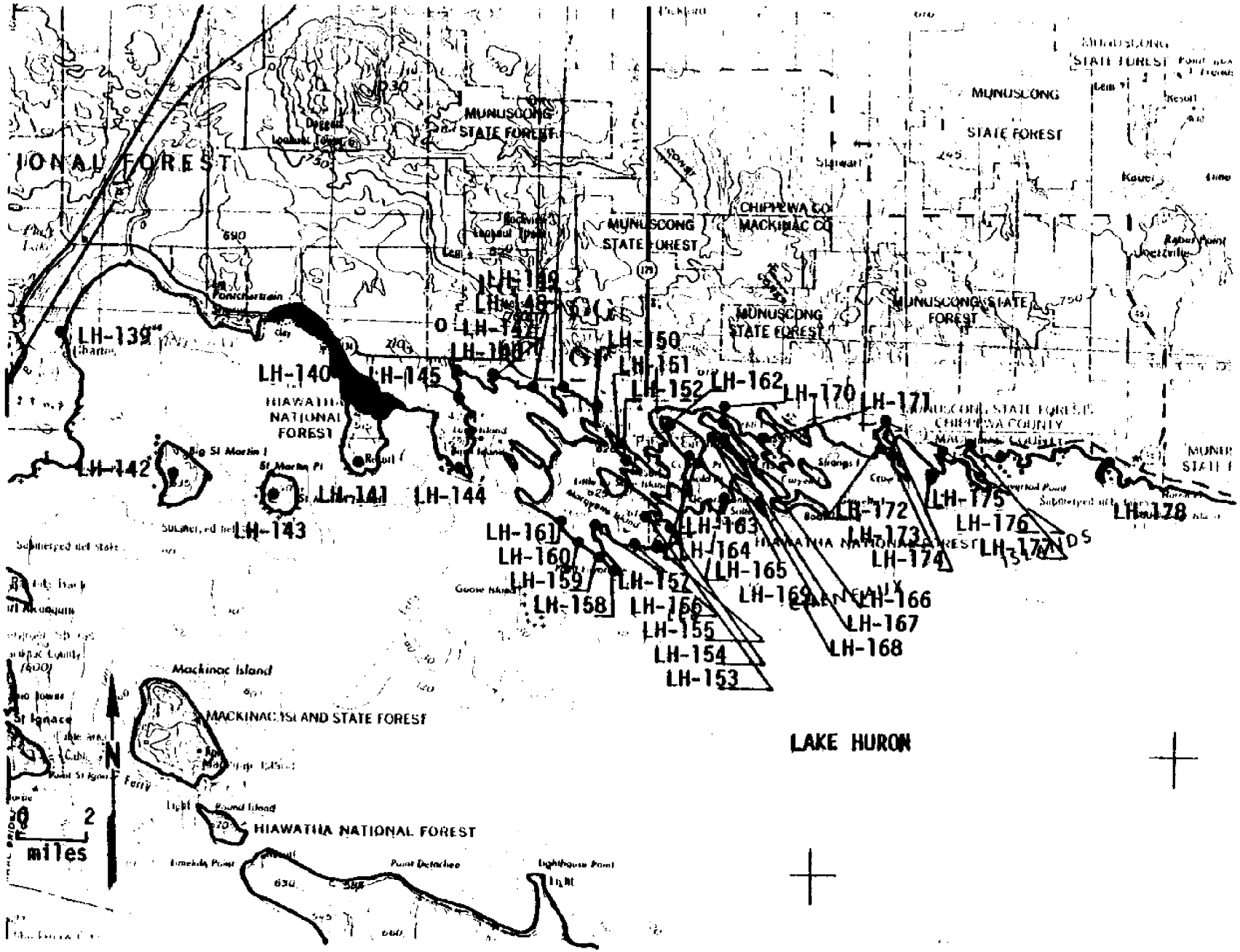


Figure 7-1. Lake Section 7

Table 7-1. Location, Acreage, and Classification of Wetlands in Lake Section 7

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
LH 139	Charles Wetland	46°01'10"	84°42'02"	86	P
LH 140	St. Martin Bay Wetland	46°01'12"	84°30'47"	4109	P
LH 141	St. Martin Point Wetland	45°58'41"	84°31'25"	240	P
LH 142	Big St. Martin Island Wetland	map not available			
LH 143	St. Martin Island Wetland	45°58'44"	84°34'15"	100	P
LH 144	Brulee Point Wetland	45°58'16"	84°28'07"	12	P
	MISNER-HESSEL BAY WETLAND COMPLEX				
LH 145	Loon Lake Wetland	45°59'59"	84°28'32"	20	P
LH 146	Steel Creek Wetland	46°00'46"	84°28'29"	375	P
LH 147	Mortsen Point Wetland	46°00'28"	84°26'53"	50	P
LH 148	Mill Pond Wetland	46°00'26"	84°26'02"	15	P
	MACKINAC BAY WETLAND COMPLEX				
LH 149	Mackinac Creek Wetland	46°00'19"	84°24'42"	25	P
LH 150	Mackinac Bay Wetland	45°59'58"	84°23'24"	35	P
	MARQUETTE ISLAND WETLAND COMPLEX				
LH 151	Marquette Island Wetland #1	45°58'56"	84°23'04"	2	P
LH 152	Duck Bay Wetland	45°58'04"	84°23'04"	60	P
LH 153	Peck Bay Wetland	45°57'17"	84°21'45"	17	P
LH 154	Marquette Island Wetland #2	45°56'53"	84°20'51"	1	P
LH 155	Marquette Island Wetland #3	45°56'30"	84°21'14"	1	P
LH 156	Marquette Island Wetland #4	45°56'28"	84°21'50"	25	P
LH 157	Voight Bay Wetland	45°56'55"	84°23'14"	90	P
LH 158	Point Fuyards Area Wetland	45°56'07"	84°23'04"	5	P
LH 159	Marquette Island Wetland #5	45°56'39"	84°24'00"	15	P
LH 160	Marquette Island Wetland #6	45°56'55"	84°24'28"	25	P
LH 161	Marquette Island Wetland #7	45°57'12"	84°24'52"	3	P
	LASALLE ISLAND WETLAND COMPLEX				
LH 162	Ailes Point Area Wetland	45°59'13"	84°20'52"	60	P
LH 163	Lasalle Island Wetland #1	45°58'35"	84°20'15"	1	P
LH 164	Lasalle Island Wetland #2	45°58'28"	84°20'02"	5	P
LH 165	Bass Cove Lake Wetland	45°57'53"	84°19'19"	5	P
	HILL ISLAND - ISLAND NO. 8 WETLAND COMPLEX				
LH 166	Island No. 8 Wetland	45°59'02"	84°19'13"	5	P
LH 167	Flowers Bay Wetland	45°59'24"	84°19'19"	15	P
LH 168	Hill Channel Wetland	45°59'03"	84°19'00"	10	P
LH 169	Government Island Wetland	45°57'25"	84°17'56"	1	P
LH 170	Flowers Creek Wetland	45°59'44"	84°19'05"	40	P
LH 171	Lakeside Road Wetland	45°58'47"	84°17'24"	1	P
LH 172	Bush Bay Wetland	45°59'09"	84°15'08"	45	P
LH 173	Prentiss Bay Area Wetland	45°58'53"	84°14'05"	5	P
LH 174	Prentiss Bay Wetland	45°59'26"	84°13'43"	90	P
LH 175	Rover Island Wetland	45°58'09"	84°12'05"	2	P
LH 176	Scotty Bay Wetland	45°58'52"	84°12'12"	40	P
LH 177	Beaver Tail Bay Wetland	45°58'45"	84°11'00"	10	P
LH 178	Albany Bay Wetland	45°58'39"	84°06'00"	25	P

P=palustrine

CHARLES WETLAND

PHYSIOGRAPHIC SETTING LH 139

Setting

Charles Wetland is located approximately 0.1 mile from the shoreline of St. Martin Bay, which is directly connected to Lake Huron, in St. Ignace Township of Mackinac County, Michigan, 9.2 miles from the town of St. Ignace. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Charles, Michigan, 1964).

Topography

Charles Wetland 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 Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises fairly quickly to the south, and on the north rises gently, then slopes down gently to the Carp River on the north. The natural terrain has been modified on the west by the construction of Interstate Route 75 (U.S.G.S. quadrangle map, Charles, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Charles Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Pointe aux Chenes formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Charles Wetland (U.S.G.S. quadrangle map, Charles, Michigan, 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 Charles Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1^{0}F based on the normal period from 1941-1970. The mean monthly low for January is 16.9^{0}F and the mean monthly high for July is 79.0^{0}F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28^{0}F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

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

BIOTIC SETTING LH 139

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 Charles Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Charles 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 Charles Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Charles 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 Charles 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 Charles 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 Charles 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 LH 139

Population

Charles Wetland is located in St. Ignace Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-2 indicates that Mackinac County and St. Ignace Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-2. Population Data for the Vicinity of Charles Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
St. Ignace Township	637	15.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Interstate 75 and two other paved roads are close to 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, Charles, Michigan, 1964).

Recreation

Charles Wetland is within the Hiawatha National Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of Charles Wetland. The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Charles Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Charles Wetland.

RESEARCH PROJECTS LH 139

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

ST. MARTIN BAY WETLAND

PHYSIOGRAPHIC SETTING LH 140

Setting

St. Martin Bay Wetland is located on the shoreline of St. Martin Bay, which is directly connected to Lake Huron, within Clark and Marquette Townships of Mackinac County, Michigan, 3.3 miles from the community of Hessel. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle maps, Pontchartrain Shores, Michigan, 1964; Hessel, Michigan, 1964; St. Martin Island, Michigan, 1964; Goose Island, Michigan, 1964).

Topography

St. Martin Bay Wetland has 80 feet of relief and a maximum elevation of 660 feet above mean sea level (80 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area consists of small irregular hills with elevations up to about 725 feet above mean sea level (U.S.G.S. quadrangle maps, Pontchartrain Shores, Michigan, 1964; Hessel, Michigan, 1964; St. Martin Island, Michigan, 1964; Goose Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which St. Martin Bay Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Nunns Creek flows through St. Martin Bay Wetland (U.S.G.S. quadrangle maps, St. Martin, Michigan, 1964; Goose Island, Michigan, 1964; Pontchartrain Shores, Michigan, 1964; Hessel, Michigan, 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 St. Martin Bay Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 16.9^{o}F and the mean monthly high for July is 79.0^{o}F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately

five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of St. Martin Bay Wetland (U.S.G.S. quadrangle maps, St. Martin, Michigan, 1964; Goose Island, Michigan, 1964; Pontchartrain Shores, Michigan, 1964; Hessel, Michigan, 1964).

BIOTIC SETTING LH 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 St. Martin Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize St. Martin 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 St. Martin Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in St. Martin Bay Wetland.

Avifauna

Eagles (*Aquila chrysaetos* or *Haliaeetus* spp.), ospreys (*Pandion haliaetus*), gulls and terns were observed feeding and resting in the coastal zone of St. Martin Bay, which includes this wetland, during a survey conducted by Michigan Department of Natural Resources personnel (1974). The bald eagle (*Haliaeetus leucocephalus*) is currently on the Federal list of Endangered Species and is included with the osprey on the Michigan State Threatened list. This area is a significant migration stopover for redheads (*Aythya americana*), scaup (*Aythya* spp.) and loons (*Gavia* spp.). In addition, mallards (*Anas platyrhynchos*), black ducks (*A. rubripes*), blue-winged teal (*A. discors*), wood ducks (*Aix sponsa*), goldeneyes (*Bucephala* spp.), buffleheads (*Bucephala albeola*), common mergansers (*Mergus merganser*), hooded mergansers (*Lophodytes cucullatus*) and red-breasted mergansers (*M. serrator*) are known to breed here. Table 7-3 presents a list of water fowl that utilize this wetland during migration.

Table 7-3. Waterfowl Observed in St. Martin Bay Wetland During Migration in 1974[a]

Common name	Common name
whistling swan	redhead
Canada goose	ring-necked duck
snow goose	canvasback
mallard	greater scaup
black duck	lesser scaup
gadwall	common goldeneye
pintail	bufflehead
green-winged teal	ruddy duck
blue-winged teal	hooded merganser
American wigeon	common merganser
northern shoveler	red-breasted merganser
wood duck	

[a] Michigan Department of Natural Resources 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 St. Martin Bay Wetland.

Mammals

Muskrat (*Ondatra zibethicus*) and mink (*Mustela vison*) have been observed on St. Martin Bay Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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

Bald eagles and ospreys, both threatened species in Michigan, were observed on St. Martin Bay Wetland in 1974 (Michigan Department of Natural Resources, 1974).

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, St. Martin Bay Wetland is utilized by a diversity of avifauna.

CULTURAL SETTING LH 140

Population

St. Martin Bay Wetland is located in Clark and Marquette Townships of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-4 indicates that Mackinac County and Clark Township experienced rapid population growth, while Marquette Township underwent slow population growth, between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-4. Population Data for the Vicinity of St. Martin Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--
Marquette Township	485	3.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134, two light duty roads, and a few unimproved roads cross the wetland. Some housing borders the wetland in the Pontchartrain Point area. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, St. Martin Island, Michigan, 1964; Hessel, Michigan, 1964; Pontchartrain Shores, Michigan, 1964; Goose Island, Michigan, 1964).

Recreation

St. Martin Bay Wetland is within the Hiawatha National Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

Potential mineral resource in the vicinity of St. Martin Bay Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974). A gravel pit is located in the wetland.

The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of St. Martin Bay Wetland (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Pontchartrain Shores, Michigan, 1964; St. Martin Island, Michigan, 1964; Goose Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to St. Martin Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of St. Martin Bay Wetland.

RESEARCH PROJECTS LH 140

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

ST. MARTIN POINT WETLAND

PHYSIOGRAPHIC SETTING LH 141

Setting

St. Martin Point Wetland is located along the shoreline of St. Martin Bay, which is directly connected to Lake Huron, in Marquette Township of Mackinac County, Michigan. The various component parts of the wetland extend from the shoreline to approximately 0.6 mile inland and lie 8.5 miles from Mackinac Island, Michigan. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

Topography

St. Martin Point Wetland has 15 feet of relief and a maximum elevation of 595 feet above mean sea level (15 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area is irregular, with little relief (St. Martin Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which St. Martin Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through St. Martin Point Wetland (U.S.G.S. quadrangle maps, St. Martin, Michigan, 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 St. Martin Point Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of St. Martin Point Wetland (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

BIOTIC SETTING LH 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 St. Martin Point Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize St. Martin Point 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 St. Martin Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in St. Martin 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 St. Martin 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 St. Martin 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 St. Martin 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 LH 141

Population

St. Martin Point Wetland is located in Marquette Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-5 indicates that Mackinac County experienced rapid population growth, while Marquette Township underwent slow population growth, between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-5. Population Data for the Vicinity of St. Martin Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Marquette Township	485	3.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. An unimproved road crosses the wetland and a paved road is nearby. The

wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle maps, St. Martin Island, Michigan, 1964).

Recreation

St. Martin Point Wetland is within the Hiawatha National Forest, but specific recreational facilities are unknown.

Mineral, Energy, and Forest Resources

St. Martin Point Wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of St. Martin Point Wetland (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to St. Martin Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of St. Martin Point Wetland.

RESEARCH PROJECTS LH 141

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

BIG ST. MARTIN ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 142

Setting

Big St. Martin Island Wetland is located on Big St. Martin Island in Lake Huron, within St. Ignace Township of Mackinac County, Michigan, 6.5 miles from the town of St. Ignace. The various component parts of the wetland extend from the Lake Huron shoreline to approximately 0.2 mile inland. This Palustrine System occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Evergreen Shores, Michigan, 1964; St. Martin Island, Michigan, 1964).

Topography

Big St. Martin Island Wetland has ten feet of relief and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate to mean elevation of Lake Huron. The remainder of the island is irregular, with comparatively little relief (U.S.G.S. quadrangle maps, St. Martin Island, Michigan, 1964; Evergreen Shores, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Big St. Martin Island Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Big St. Martin Island Wetland (U.S.G.S. quadrangle maps, St. Martin, Michigan, 1964; Evergreen Shores, Michigan, 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 Big St. Martin Island Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of Big St. Martin Island Wetland (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964; Evergreen Shores, Michigan, 1964).

BIOTIC SETTING

LH 142

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 St. Martin Island Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Big St. Martin Island 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 Big St. Martin Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Big St. Martin 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 Big St. Martin 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 Big St. Martin 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 Big St. Martin 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 LH 142

Population

Big St. Martin Island Wetland is located in St. Ignace Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-6 indicates that Mackinac County and St. Ignace Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-6. Population Data for the Vicinity of Big St. Martin Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
St. Ignace Township	637	15.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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 maps, St. Martin Island, Michigan, 1964; Evergreen Shores, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Big St. Martin Island Wetland.

Mineral, Energy, and Forest Resources

The area surrounding Big St. Martin Island Wetland is predominantly wooded, representing a potential forest resource, but no significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Big St. Martin Island Wetland (U.S.G.S. quadrangle maps, Evergreen Shores, Michigan, 1964; St. Martin Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Big St. Martin Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Big St. Martin Island Wetland.

RESEARCH PROJECTS LH 142

The literature search identified no on-going or impending research projects pertaining to Big St. Martin Island Wetland.

ST. MARTIN ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 143

Setting

St. Martin Island Wetland is located on the shoreline of St. Martin Island in Lake Huron, within Marquette Township of Mackinac County, Michigan, approximately 8.6 miles from the town of St. Ignace. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

Topography

St. Martin island 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 island has a gentle upward slope inland with an overall elevation of 650 feet above mean sea level (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which St. Martin Island Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through St. Martin Island Wetland (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 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 St. Martin Island Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1^{o}F based on the normal period from 1941-1970. The mean monthly low for January is 16.9^{o}F and the mean monthly high for July is 79.0^{o}F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five 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 October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of St. Martin Island Wetland (U.S.G.S. quadrangle map, St. Martin Island, Michigan, 1964).

BIOTIC SETTING LH 143

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 St. Martin Island Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize St. Martin Island 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 St. Martin Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in St. Martin 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 St. Martin 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 St. Martin 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 St. Martin 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 LH 143

Population

St. Martin Island Wetland is located in Marquette Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-7 indicates that Mackinac County experienced rapid population growth, while Marquette Township underwent slow population growth, between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-7. Population Data for the Vicinity of St. Martin Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Marquette Township	485	3.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of 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, St. Martin Island, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of St. Martin Island Wetland.

Mineral, Energy, and Forest Resources

The area surrounding St. Martin Island Wetland is predominantly wooded, representing a potential forest resource, but no significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to St. Martin Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of St. Martin Island Wetland.

RESEARCH PROJECTS LH 143

The literature search identified no on-going or impending research projects pertaining to St. Martin Island Wetland.

BRULEE POINT WETLAND

PHYSIOGRAPHIC SETTING

LH 144

Setting

Brulee Point Wetland is located on the shoreline of Lake Huron in Clark Township of Mackinac County, Michigan, approximately 3.0 miles from the community of Hessel. This Palustrine wetland occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Goose Island, Michigan, 1964).

Topography

Brulee Point Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low plain. The surrounding area rises gently inland and then is flat (U.S.G.S. quadrangle map, Goose Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Brulee Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Brulee Point Wetland (U.S.G.S. quadrangle map, Goose Island, Michigan, 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 Brulee Point Wetland is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

Numerous rocks lie offshore (U.S.G.S. quadrangle map, Goose Island, Michigan, 1964).

BIOTIC SETTING LH 144

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 Brulee Point Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Brulee Point 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 Brulee Point Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Brulee 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 Brulee 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 Brulee 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 Brulee 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 LH 144

Population

Brulee Point Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-8 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-8. Population Data for the Vicinity of Brulee Point Wetland

	Estimated population 1975[a]	Estimated % Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland is rural open space, and the surrounding area is predominantly rural wooded open space. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Goose Island, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Brulee Point Wetland.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of Brulee Point Wetland. The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Brulee Point Wetland (U.S.G.S. quadrangle map, Goose Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Brulee Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Brulee Point Wetland.

RESEARCH PROJECTS LH 144

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

MISMER-HESSEL BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 145-148

Setting

The Mismer-Hessel Bay Wetland Complex is located on the shorelines of Mismer Bay, Hessel Bay, and Mill Pond, which are directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan. The various parts of the complex lie from approximately 200 feet to 1.5 miles in distance from the community of Hessel, Michigan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Topography

The Mismer-Hessel Bay Wetland Complex has an overall relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area rises with a varying grade, depending on the location (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Mismer-Hessel Bay Wetland Complex lies is characterized by rocks at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Loon Lake Wetland, Mortsen Point Wetland, or Mill Pond Wetland, but Steel Creek, Law Creek, and an intermittent stream flow through Steel Creek Wetland (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 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 Mismer-Hessel Bay Wetland Complex is located in Cheboygan, Michigan. The average annual temperature is 44.1°F based on the normal period from 1941-1970. The mean monthly low for January is 16.9°F and the mean monthly high for July is 79.0°F. The average annual precipitation is 27.23 inches, with a mean monthly

precipitation of 1.53 inches in January and 2.55 inches in July. The growing season is approximately five and one-half months long, with the last killing frost (28°F) in 1975 occurring on May 13 and the first killing frost on October 30 (National Oceanic and Atmospheric Administration, 1975).

Special Features

No natural special features are found in the vicinity of the Mismer-Hessel Bay Wetland Complex (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

BIOTIC SETTING LH 145-148

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 Mismer-Hessel Bay Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Loon Lake Wetland, Steel Creek Wetland, Mortsen Point Wetland, and Mill Pond 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 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 Mismer-Hessel Bay Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Mismer-Hessel Bay Wetland Complex.

Avifauna

Michigan Department of Natural Resources personnel (1976) described Steel Creek Wetland as a critical migration stopover for diving ducks and an important production area for dabbling ducks. Mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), wood ducks (Aix sponsa), goldeneyes (Bucephala spp.), buffleheads (Bucephala albeola), red-breasted mergansers (Mergus serrator), and hooded mergansers (Lophodytes cucullatus) are known to breed here. It also provides wading bird and shorebirds habitat. Table 7-9 presents a list of waterfowl that utilize the area during migration.

Table 7-9. Waterfowl Observed in Steel Creek Wetland During Migration in 1976[a]

Common name	Common name
whistling swan	wood duck
Canada goose	redhead
snow goose	ring-necked duck
mallard	greater scaup
black duck	lesser scaup
gadwall	common goldeneye
pintail	bufflehead
green-winged teal	ruddy duck
blue-winged teal	hooded merganser
American wigeon	red-breasted merganser
northern shoveler	

[a] Michigan Department of Natural Resources, 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 Mismer-Hessel Bay Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus) and mink (Mustela vison) have been observed on Steel Creek Wetland (U.S. Army Corps of Engineers 1977; Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 the Mismer-Hessel Bay Wetland Complex, nor to species composition in Loon Lake Wetland, Mortsen Point Wetland, or Mill 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 the Mismer-Hessel 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 wetlands of the Mismer-Hessel Bay Wetland Complex serve as a critical migration stopover place for diving ducks and as important production areas for dabbling ducks.

CULTURAL SETTING LH 144-148

Population

The Mismer-Hessel Bay Wetland Complex is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-10 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-10. Population Data for the Vicinity of the Mismer-Hessel Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. State Route 134 parallels the complex and bisects Steel Creek Wetland. Two light-duty roads pass through the wetlands. Scattered housing lies in the surrounding area and becomes increasingly dense as one progresses toward the city of Hessel. The wetlands are under undetermined ownership, but their location suggests that they are subject to moderate development pressure

(U.S.G.S. quadrangle map, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Recreation

Loon Lake Wetland and a small portion of Steel Creek Wetland are within the Hiawatha National Forest. Recreational facilities available in the Hiawatha National Forest are unknown.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of the Mismer-Hessel Bay Wetland Complex. The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Mismer-Hessel Bay Wetland Complex (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Hessel, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Mismer-Hessel 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 or archaeological features are present within 500 feet of the Mismer-Hessel Bay Wetland Complex.

RESEARCH PROJECTS LH 145-148

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

MACKINAC BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 149-150

Setting

The Mackinac Bay Wetland Complex is located on the shoreline of Mackinac Bay, which is directly connected to Lake Huron, within Clark Township of Mackinac County, Michigan. Mackinac Creek Wetland lies approximately 0.3 miles from the community of Hessel, Michigan, and Mackinac Bay Wetland is approximately 1.4 miles from Hessel. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Topography

The Mackinac Bay Wetland Complex has an overall relief of ten feet and a maximum elevation of 590 feet above mean sea level (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as erodible low bluff. The surrounding area rises irregularly inland with little grade until the 650-foot contour, where it rises steeply to 720 feet above mean sea level at Peek-a-Boo Hill (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Mackinac Bay Wetland Complex lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Mackinac Creek flows through Mackinac Bay Creek Wetland. An unnamed stream flows through Mackinac Bay Wetland (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Hessel, Michigan, 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 Mackinac Bay Wetland Complex is located in De Tour, Michigan . The average daily 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

No natural special features are found in the vicinity of the Mackinac Bay Wetland Complex (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

BIOTIC SETTING LH 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 Mackinac Bay Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Mackinac Creek Wetland and Mackinac 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 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 Mackinac Bay Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no

site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Mackinac Bay Wetland Complex.

Avifauna

The Michigan Department of Natural Resources (1976) described these wetlands as important habitat for wading birds, shorebirds and American coots (Fulica americana). In addition mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), wood ducks (Aix sponsa), goldeneyes (Bucephala spp.), buffleheads (Bucephala albeola), hooded mergansers (Lophodytes cucullatus), red-breasted mergansers (Mergus serrator) and common mergansers (M. merganser) are known to breed here. Table 7-11 presents a list of waterfowl that utilize the area during migration.

Table 7-11. Waterfowl Observed in the Mackinac Bay Wetland Complex During Migration in 1976[a]

Common name	Common name
whistling swan	redhead
Canada goose	ring-necked duck
snow goose	canvasback
mallard	greater scaup
black duck	lesser scaup
gadwall	common goldeneye
pintail	bufflehead
green-winged teal	ruddy duck
blue-winged teal	hooded merganser
American wigeon	common merganser
northern shoveler	red-breasted merganser
wood duck	

[a] Michigan Department of Natural Resources, 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 Mackinac Bay Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus) and mink (Mustela vison) have been observed on Mackinac Creek Wetland (Michigan Department of Natural Resources, open file report).

The literature search yielded no site-specific information pertaining to 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 the Mackinac Bay Wetland Complex, nor to species composition in Mackinac 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 the Mackinac 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 Mackinac Bay Wetland Complex provides important habitat for wading birds, shorebirds and American coots.

CULTURAL SETTING LH 149-150

Population

The Mackinac Bay Wetland Complex is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-12 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-12. Population Data for the Vicinity of the Mackinac Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. State Route 34 adjoins the wetlands. The wetlands are under undetermined ownership, but their location suggests that they are subject to moderate development pressure (U.S.G.S. quadrangle maps, Hessel, Michigan, 1964; Goose Island, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Mackinac Bay Wetland Complex.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of the Mackinac Bay Wetland Complex. The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Mackinac Bay Wetland Complex (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Hessel, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Mackinac 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 or archaeological features are present within 500 feet of the Mackinac Bay Wetland Complex.

RESEARCH PROJECTS LH 149-150

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

MARQUETTE ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 151-161

Setting

The Marquette Island Wetland Complex is located on Marquette Island in Lake Huron, within Clark Township of Mackinac County, Michigan. The various component parts of the complex lie on the shorelines of Lake Huron, Voight Bay, Peck Bay, and Duck Bay, 1.4 to 4.3 miles from Cedarville, Michigan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Cedarville, Michigan, 1964).

Topography

The Marquette Island Wetland Complex has an overall relief of ten feet and a maximum elevation of 590 feet above the mean sea level (ten feet above the approximate mean elevation of Lake Huron). The island itself is comparatively flat with a maximum elevation of 632 feet above mean sea level (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Marquette Island Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through any part of the Marquette Island Wetland Complex (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Cedarville, Michigan, 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 Marquette Island Wetland Complex is located in De Tour, Michigan. The average daily 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 Marquette Island Wetland Complex (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Cedarville, Michigan, 1964).

BIOTIC SETTING LH 151-161

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 Marquette Island Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the Marquette 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 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 Marquette Island Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Marquette Island Wetland Complex.

Avifauna

The Michigan Department of Natural Resources (1976) described Duck Bay Wetland (LH 152) as important habitat for waders and shorebirds. Mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), wood ducks (Aix sponsa), goldeneyes (Bucephala spp.), buffleheads (Bucephala albeola), hooded mergansers (Lophodytes cucullatus), red-breasted mergansers (Mergus serrator) and common mergansers (M. merganser) breed here. Table 7-13 presents a list of waterfowl that utilize the area during migration.

Table 7-13. Waterfowl Observed in Duck Bay Wetland During Migration in 1976[a]

Common name	Common name
whistling swan	wood duck
Canada goose	redhead
snow goose	ring-necked duck
mallard	canvasback
black duck	greater scaup
gadwall	lesser scaup
pintail	common goldeneye
green-winged teal	bufflehead
blue-winged teal	hooded merganser
American wigeon	common merganser
northern shoveler	red-breasted merganser

[a] Michigan Department of Natural Resources, 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 any of the wetlands of the Marquette Island 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 Marquette 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 Marquette 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, Duck Bay Wetland provides important habitat for waders and shore birds.

CULTURAL SETTING LH 151-161

Population

The Marquette Island Wetland Complex is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-14 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-14. Population Data for the Vicinity of the Marquette Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. Marquette Island contains some scattered residences, but few houses are located near the wetland areas. The wetlands are under undetermined ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle maps, Goose Island, Michigan, 1964; Cedarville, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Marquette Island Wetland Complex.

Mineral, Energy, and Forest Resources

Marquette Island is wooded, representing a potential forest resource in the vicinity of the Marquette Island Wetland Complex. No significant mineral, oil, or gas resources are known to be present in or near the wetlands.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Marquette Island Wetland Complex (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Goose Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Marquette 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 or archaeological features are present within 500 feet of the Marquette Island Wetland Complex.

RESEARCH PROJECTS LH 151-161

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

LA SALLE ISLAND WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 162-165

Setting

The La Salle Island Wetland Complex is located on La Salle Island in Lake Huron, within Clark Township of Mackinac County, Michigan. The various component parts of the complex extend from the island shoreline to approximately 0.2 mile inland, and lie between 0.6 and 2.6 miles from the town of Cedarville, Michigan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Topography

The La Salle Island Wetland Complex has an overall relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The island itself contains a small hill with a maximum elevation of 650 feet above mean sea level (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the La Salle Island Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through any part of the La Salle Island Wetland Complex (U.S.G.S. quadrangle map, Cedarville, Michigan, 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 La Salle Island Wetland Complex is located in De Tour, Michigan. The average daily 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 ($28^{0}F$) 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 La Salle Island Wetland Complex (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

BIOTIC SETTING LH 162-165

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 La Salle Island Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Ailes Point Area Wetland, Lasalle Island Wetlands #1 and #2, and Bass Cove 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 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 La Salle Island Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the La Salle 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 La Salle Island Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus) have been observed in the four wetlands of the La Salle Island Wetland Complex (U.S. Army Corps of Engineers, 1977). A little brown myotis (Myotis lucifugus) was observed foraging over water at the northern end of La Salle Island near Ailes Point Area Wetland.

The literature search yielded no site-specific information pertaining to 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 La Salle 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 LH 162-165

Population

The La Salle Island Wetland Complex is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-15 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-15. Population Data for the Vicinity of the La Salle Island Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. The perimeter of La Salle Island contains scattered houses and numerous small private piers. Some housing adjoins the wetland areas. The wetlands are under undetermined ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the La Salle Island Wetland Complex.

Mineral, Energy, and Forest Resources

La Salle Island is wooded, representing a potential forest resource in the vicinity of the La Salle Island Wetland Complex. No significant mineral, oil, or gas resources are known to be present in or near the wetlands.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to the La Salle 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 or archaeological features are present within 500 feet of the La Salle Island Wetland Complex.

RESEARCH PROJECTS LH 162-165

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

HILL ISLAND-ISLAND NO. 8 WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 166-168

Setting

The Hill Island-Island No. 8 Wetland Complex is located on Hill and No. 8 Islands in Lake Huron, within Clark Township of Mackinac County, Michigan. Island No. 8 Wetland lies on the shoreline of Hill Island approximately 1.9 miles from Cedarville, Michigan. Flowers Bay Wetland lies on the shoreline of Hill Island at Flowers Bay, which is directly connected to Lake Huron, and is approximately 1.6 miles from Cedarville. Hill Channel Wetland lies on the shoreline of Hill Island approximately 1.9 miles from Cedarville. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Topography

The Hill Island-Island No. 8 Wetland Complex has little overall relief, and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). Island No. 8 has about ten feet of relief and Hill Island about 20 feet (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Hill Island-Island No. 8 Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through any part of the Hill Island-Island No. 8 Wetland Complex (U.S.G.S. quadrangle map, Cedarville, Michigan, 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 Hill Island-Island No. 8 Wetland Complex is located in De Tour, Michigan*. The average daily 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 Hill Island-Island No. 8 Wetland Complex (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

BIOTIC SETTING LH 166-168

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 Hill Island-Island No. 8 Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Island No. 8 Wetland, Flowers Bay Wetland, and Hill Channel 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 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 Hill Island-Island No. 8 Wetland Complex.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no

site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in the Island #8 Wetland, Flowers Bay Wetland, and Hill Channel 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 the Hill Island-Island No. 8 Wetland Complex.

Mammals

Muskrat (Ondatra zibethicus) have been observed in the three wetlands of the Hill Island-Island No. 8 Wetland Complex (U.S. Army Corps of Engineers, 1977).

The literature search yielded no site-specific information pertaining to 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 Hill Island-Island No. 8 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 LH 166-168

Population

The Hill Island-Island No. 8 Wetland Complex is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-16 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-16. Population Data for the Vicinity of the Hill Island-Island No. 8 Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. Hill Island is well populated, and contains considerable housing and roads. Island No. 8 contains one light road and a few scattered houses. The wetlands are under undetermined ownership, but their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of the Hill Island-Island No. 8 Wetland Complex.

Mineral, Energy, and Forest Resources

Hill Island and Island No. 8 are predominantly wooded, representing a potential forest resource in the vicinity of the Hill Island-Island No. 8 Wetland Complex, but no significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the Hill Island-Island No. 8 Wetland Complex (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the Hill Island-Island No. 8 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 or archaeological features are present within 500 feet of the Hill Island-Island No. 8 Wetland Complex.

RESEARCH PROJECTS

LH 166-168

The literature search identified no on-going or impending research projects pertaining to the Hill Island-Island No. 8 Wetland Complex.

GOVERNMENT ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 169

Setting

Government Island Wetland is located on Government Island in Lake Huron, within Clark Township of Mackinac County, Michigan. The wetland lies approximately 100 feet from the Lake Huron shoreline and 3.8 miles from Cedarville, Michigan. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Topography

Government Island Wetland has little relief and lies at an elevation of about 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The island topography rises steadily to an elevation of about 610 feet above mean sea level (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Government Island Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Government Island Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 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 Government Island Wetland is located in De Tour, Michigan. The average daily 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 from the wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

BIOTIC SETTING LH 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 Government Island Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Government Island 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 Government Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Government 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 Government 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 Government 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 Government 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 LH 169

Population

Government Island Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-17 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-17. Population Data for the Vicinity of Government Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is primarily rural open space. One light-duty road adjoins the wetland and services a few houses contained within the wetland area. The wetland is under federal ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Recreation

Government Island Wetland is within the Hiawatha National Forest, but specific recreational facilities provided in Hiawatha National Forest are unknown.

Mineral, Energy, and Forest Resources

Government Island is wooded, representing a potential forest resource, but no significant mineral, oil, or gas 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 Government Island Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Government Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Government Island Wetland.

RESEARCH PROJECTS LH 169

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

FLOWERS CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 170

Setting

Flowers Creek Wetland is located on the shoreline of Flowers Bay, which is directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan, at the mouth of Flowers Creek. The wetland lies approximately 1.9 miles from Cedarville, Michigan. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Topography

Flowers Creek Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron, (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is primarily flat (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Flowers Creek Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Flowers Creek flows through Flowers Creek Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 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 Flowers Creek Wetland is located in De Tour, Michigan*. The average daily 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 Flowers Creek Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

BIOTIC SETTING LH 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 Flowers Creek Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Flowers Creek 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 Flowers Creek Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Flowers Creek Wetland.

Avifauna

The Michigan Department of Natural Resources (1976) described this wetland as important habitat for wading birds and shorebirds. It is utilized by American coots (Fulica americana) for breeding and during migration. Mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), wood ducks (Aix sponsa), red-breasted mergansers (Mergus serrator) and hooded mergansers (Lophodytes cucullatus) also breed here. Table 7-18 presents a list of waterfowl that utilize the area during migration.

Table 7-18. Waterfowl in Flowers Creek Wetland During Migration in 1976[a]

Common name	Common name
whistling swan	northern shoveler
Canada goose	wood duck
snow goose	ring-necked duck
mallard	greater scaup
black duck	lesser scaup
gadwall	common goldeneye
pintail	ruddy duck
green-winged teal	hooded merganser
blue-winged teal	red-breasted merganser
American wigeon	

[a] Michigan Department of Natural Resources, 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 Flowers Creek Wetland.

Mammals

Muskrat (Ondatra zibethicus) have been observed on Flowers Creek Wetland (U.S. Army Corps of Engineers, 1977).

The literature search yielded no site-specific information pertaining to 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 Flowers Creek Wetland by the literature search.

Health

The available information is not sufficient to allow an evaluation of the environmental quality of this wetland. However, Flowers Creek Wetland is important habitat for wading birds and shorebirds.

CULTURAL SETTING LH 170

Population

Flowers Creek Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-19 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-19. Population Data for the Vicinity of Flowers Creek Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There are beach houses and service roads in the immediate area. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Flowers Creek Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Flowers Creek Wetland include limestone, dolomite, and gravel (Great Lakes Basin Commission, 1974). The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Flowers Creek Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Flowers Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Flowers Creek Wetland.

RESEARCH PROJECTS LH 170

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

LAKESIDE ROAD WETLAND

PHYSIOGRAPHIC SETTING LH 171

Setting

Lakeside Road Wetland is located approximately 200 feet from the shoreline of McKay Bay, which is directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan, 3.4 miles from the town of Cedarville. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Topography

Lakeside Road Wetland has very little relief and lies at elevation of about 585 feet above mean sea level (five feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is fairly flat; however, a small steep hill with a maximum elevation of 650 feet above mean sea level is close by (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Lakeside Road Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Lakeside Road Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 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 Lakeside Road Wetland is located in De Tour, Michigan*. The average daily 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 Lakeside Road Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

BIOTIC SETTING LH 171

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 Lakeside Road Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Lakeside Road Wetland. However, a search of the literature provided no site-specific information pertatining 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 Lakeside Road Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Lakeside Road 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 Lakeside Road 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 Lakeside Road 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 Lakeside Road 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 LH 171

Population

Lakeside Road Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-20 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-20. Population Data for the Vicinity of Lakeside Road Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

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

Recreation

No known state or federal recreational facilities are present in the vicinity of Lakeside Road Wetland.

Mineral, Energy, and Forest Resources

Gravel is a potential mineral resource in the vicinity of Lakeside Road Wetland. The surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Lakeside Road Wetland (U.S.G.S. quadrangle map, Cedarville, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Lakeside Road Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Lakeside Road Wetland.

RESEARCH PROJECTS LH 171

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

BUSH BAY WETLAND

PHYSIOGRAPHIC SETTING LH 172

Setting

Bush Bay Wetland is located on the shoreline of Bush Bay, which is directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan, 4.5 miles from the town of Cedarville. This Palustrine wetland is wooded (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Prentiss Bay, Michigan, 1964).

Topography

Bush 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 Great Lakes Basin Commission(1975) has described the shoreline as non-erodible low bluff. The surrounding area rises in elevation in an irregular manner as it progresses inland (U.S.G.S. quadrangle maps, Prentiss Bay, Michigan, 1964; Cedarville, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Bush Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Bush Bay Wetland (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Prentiss Bay, Michigan, 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 Bush Bay Wetland is located in De Tour, Michigan*. The average daily 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 Bush Bay Wetland (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 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 Bush Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Bush 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 Bush Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bush 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 Bush 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 Bush 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 Bush 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 LH 172

Population

Bush Bay Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-21 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-21. Population Data for the Vicinity of Bush Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134 and a dirt road are close to the wetland. The wetland is

under undetermined ownership, and information is not sufficient to evaluate development pressure (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Prentiss Bay, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bush Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Bush Bay Wetland include limestone, dolomite, and gravel (Great Lakes Basin commission, 1974). The surrounding area is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

A radio tower is located approximately 0.4 mile north of Bush Bay Wetland (U.S.G.S. quadrangle maps, Cedarville, Michigan, 1964; Prentiss Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Bush Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Bush Bay Wetland.

RESEARCH PROJECTS LH 172

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

PRENTISS BAY AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 173

Setting

Prentiss Bay Area Wetland is located approximately 0.1 mile from the northern shoreline of Lake Huron in Clark Township of Mackinac County, Michigan, 6.0 miles from the town of Cedarville. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Topography

Prentiss Bay Area Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is irregular, with a slightly-rising slope inland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Prentiss 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 (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Prentiss Bay Area Wetland (U.S.G.S. quadrangle maps, Prentiss Bay, Michigan, 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 Prentiss Bay Area Wetland is located in De Tour, Michigan*. The average daily 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 from the wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 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 Prentiss Bay Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Prentiss Bay Area Wetland. However, a search of the literature provided no site-specific information pertatining 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 Prentiss Bay Area Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Prentiss 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 Prentiss Bay 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 Prentiss Bay 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 Prentiss 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

LH 173

Population

Prentiss Bay Area Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-22 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-22. Population Data for the Vicinity of Prentiss Bay Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There are scattered buildings and a dirt road along the shore. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Prentiss Bay Area Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Prentiss Bay Area Wetland include limestone, dolomite, and gravel (Great Lakes Basin commission, 1974). The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

A radio tower is located approximately 0.4 mile north of Prentiss Bay Area Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Prentiss Bay Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Prentiss Bay Area Wetland.

RESEARCH PROJECTS LH 173

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

PRENTISS BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 174

Setting

Prentiss Bay Wetland is located on the shoreline of Prentiss Bay, which is directly connected to Lake Huron, in Raber Township of Chippewa County, Michigan, 6.0 miles from the town of Cedarville. This Palustrine wetland is predominantly non-wooded (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Topography

Prentiss 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area features an interior ridge (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Prentiss Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Prentiss Bay Wetland. These are moderately well-drained to poorly drained and medium-textured soils (Duwe, 1976).

Hydrology

Prentiss Creek flows through Prentiss Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 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 Prentiss Bay Wetland is located in De Tour, Michigan . The average daily 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 Prentiss Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 174

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 Prentiss Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Prentiss 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 Prentiss Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Prentiss Bay Wetland.

Avifauna

The Michigan Department of Natural Resources (1976) described this wetland as important habitat for wading birds, shorebirds and American coots (Fulica americana). In addition, mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), goldeneyes (Bucephala spp.), buffleheads (Bucephala albeola), red-breasted mergansers (Mergus serrator), and hooded mergansers (Lophodytes cucullatus) breed here. Table 7-23 presents a list of waterfowl that use the general area during migration.

Table 7-23. Waterfowl Observed in Prentiss Bay Wetland During Migration in 1976[a]

Common name	Common name
Canada goose	northern shoveler
snow goose	wood duck
mallard	ring-necked duck
black duck	greater scaup
gadwall	lesser scaup
pintail	common goldeneye
green-winged teal	bufflehead
blue-winged teal	hooded merganser
American wigeon	red-breasted merganser

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 Prentiss 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 Prentiss 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 Prentiss 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, Prentiss Bay Wetland provides important habitat for wading birds, shore birds, and American coots.

Population

Prentiss Bay Wetland is located in Raber Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 7-24 indicates that Chippewa County and Raber Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 7-24. Population Data for the Vicinity of Prentiss Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
fChippewa County	35,993	11.0	32,065
Raber Township	513	14.0	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134 crosses 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, Prentiss Bay, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Prentiss Bay Wetland.

Mineral, Energy, and Forest Resources

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

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Prentiss Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Prentiss Bay Wetland.

RESEARCH PROJECTS LH 174

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

ROVER ISLAND WETLAND

PHYSIOGRAPHIC SETTING

LH 175

Setting

Rover Island Wetland is located on Rover Island in Lake Huron, within Clark Township of Mackinac County, Michigan. The wetland lies approximately 100 feet from the Lake Huron shoreline and 7.3 miles from Cedarville, Michigan. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Topography

Rover Island Wetland has little relief and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The island itself is comparatively flat (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Rover Island Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Rover Island Wetland (U.S.G.S. quadrangle maps, Prentiss Bay, Michigan, 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 Rover Island Wetland is located in De Tour, Michigan*. The average daily 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 from the wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 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 Rover Island Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Rover Island Wetland. However, a search of the literature provided no site-specific information pertatining 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 Rover Island Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Rover 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 Rover 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 Rover 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 Rover 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 LH 175

Population

Rover Island Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-25 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-25. Population Data for the Vicinity of Rover Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the 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, Prentiss Bay, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Rover Island Wetland.

Mineral, Energy, and Forest Resources

No significant mineral, forest, oil, or gas resources are known to be present on Rover Island.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Rover Island Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Rover Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Rover Island Wetland.

RESEARCH PROJECTS LH 175

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

SCOTTY BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 176

Setting

Scotty Bay Wetland is located on the shoreline of Scotty Bay, which is directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan, at the mouth of Beaver Tail Creek. The wetland lies approximately 7.2 miles from Cedarville, Michigan. This Palustrine wetland occupies a predominantly non-wooded site with wooded areas along the boundaries (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Topography

Scotty 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area consists of low terrain between two small ridges (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Scotty Bay Wetland lies is characterized by rock at or near surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Beaver Tail Creek flows through Scotty Bay Wetland (U.S.G.S. quadrangle maps, Prentiss Bay, Michigan, 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 Scotty Bay Wetland is located in De Tour, Michigan*. The average daily 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 Scotty Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 176

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 Scotty Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Scotty 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 Scotty Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Scotty 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 Scotty 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 Scotty 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 Scotty 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 LH 176

Population

Scotty Bay Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-26 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-26. Population Data for the Vicinity of Scotty Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134 passes through 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, Prentiss Bay, Michigan, 1964).

Recreation

Scotty Bay Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

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

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Scotty Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Scotty Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Scotty Bay Wetland.

RESEARCH PROJECTS LH 176

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

BEAVER TAIL BAY WETLAND

PHYSIOGRAPHIC SETTING LH 177

Setting

Beaver Tail Bay Wetland is located on the shoreline of Beaver Tail Bay, which is directly connected to Lake Huron, in Clark Township of Mackinac County, Michigan, approximately 8.4 miles from the town of Cedarville. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Topography

Beaver Tail 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding topography is flat in the immediate vicinity but rises quickly about 1,000 feet inland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Beaver Tail Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

No streams flow through Beaver Tail Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 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 Beaver Tail Bay Wetland is located in De Tour, Michigan. The average daily 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 Beaver Tail Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

BIOTIC SETTING LH 177

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 Beaver Tail Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Beaver Tail Bay Wetland. However, a search of the literature provided no site-specific information pertatining 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 Beaver Tail Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1 . The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Beaver Tail 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 Beaver Tail 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 Beaver Tail 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 Beaver Tail 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 LH 177

Population

Beaver Tail Bay Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-27indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-27. Population Data for the Vicinity of Beaver Tail Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. An unimproved road passes through the wetland from nearby State Route 134, and services many scattered houses 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, Prentiss Bay, Michigan, 1964).

Recreation

Beaver Tail Bay Wetland is located in Munuscong State Forest. A variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

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

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Beaver Tail Bay Wetland (U.S.G.S. quadrangle map, Prentiss Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Beaver Tail Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Beaver Tail Bay Wetland.

RESEARCH PROJECTS LH 177

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

ALBANY BAY WETLAND

PHYSIOGRAPHIC SETTING LH 178

Setting

Albany Bay Wetland is located on the shoreline of Albany Bay, which is directly connected to Lake Huron, within Clark Township of Mackinac County, Michigan, approximately 9.4 miles from DeTour Village. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Albany Island, Michigan, 1964).

Topography

Albany Bay Wetland has eight feet of relief and a maximum elevation of 588 feet above mean sea level (eight feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area slopes upward in an irregular manner (U.S.G.S. quadrangle map, Albany Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Albany Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

No recent soil survey is available for Mackinac County.

Hydrology

Trout Creek flows through Albany Bay Wetland (U.S.G.S. quadrangle map, Albany Island, Michigan, 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 Albany Bay Wetland is located in De Tour, Michigan*. The average daily 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 Albany Bay Wetland (U.S.G.S. quadrangle map, Albany Island, Michigan, 1964).

BIOTIC SETTING LH 178

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 Albany Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Albany 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 Albany Bay Wetland.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Mackinac County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Albany 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 Albany 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 Albany 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 Albany 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 LH 178

Population

Albany Bay Wetland is located in Clark Township of Mackinac County, Michigan. The county is sparsely populated, having a density of 11 persons per square mile. Table 7-28 indicates that Mackinac County and Clark Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Mackinac County is expected to have a moderate rate of population growth in the future.

Table 7-28. Population Data for the Vicinity of Albany Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Mackinac County	10,714	10.9	12,208
Clark Township	2,092	18.1	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. Artificial fill has been used to extend an unimproved road out to Albany

Island. This construction forms a harbor near the wetland. The unimproved road joins State Route 134 within 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, Albany Island, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Albany Bay Wetland.

Mineral, Energy, and Forest Resources

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

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Albany Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Albany Bay Wetland.

RESEARCH PROJECTS LH 178

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

Table 7-29. Data Gaps-Lake Section 7

Data Gap*		Wetland Number	139	140	141	142	143	144	145-148	149-150	151-161	162-165	166-168	169	170	171	172	173	174	175	176	177	178
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 Huron Point to False Detour Channel in Chippewa County, Michigan. The region features flat to irregular topography. The predominant shore type along this 35 mile stretch of shoreline is non-erodible low bluff or plain.

Figure 8-1 shows the approximate location of the 19 coastal wetlands in Lake Section 8. Latitude, longitude, acreage, and classification for each of the wetlands of Lake Section 8 are recorded in Table 8-1. These wetlands all lie at elevations between 590 and 600 feet above sea level, and are classified as Palustrine Systems.

Available information related to physiographic and cultural features of these 19 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

Table 8-1. Location, Acreage, and Classification of Wetlands in Lake Section 8

Wetland Number	Wetland	Latitude	Longitude	Acreage	Classification[a]
	ST. VITAL BAY WETLAND COMPLEX				
LH 179	St. Vital Bay Wetland #1	45°57'52"	83°59'43"	4	P
LH 180	St. Vital Bay Wetland #2	45°58'08"	83°58'09"	10	P
LH 181	St. Vital Bay Wetland #3	45°58'15"	83°57'39"	2	P
LH 182	St. Vital Bay Wetland #4	45°58'20"	83°57'08"	12	P
LH 183	Carlton Bay Wetland	45°58'18"	83°56'17"	5	P
LH 184	Seymour Point Wetland	45°58'31"	83°55'53"	12	P
LH 185	Bennett Point Wetland	45°58'04"	83°54'23"	5	P
	WHITNEY BAY WETLAND COMPLEX				
LH 186	Whitney Bay Wetland #1	45°58'29"	83°50'47"	5	P
LH 187	Whitney Bay Wetland #2	45°58'23"	83°50'36"	2	P
LH 188	Scamen Lake Wetland	45°57'58"	83°49'40"	75	P
	PIKE BAY WETLAND COMPLEX				
LH 189	Pike Bay Wetland #1	45°57'48"	83°48'45"	5	P
LH 190	Pike Bay Wetland #2	45°57'24"	83°48'20"	5	P
LH 191	Knutsen Lake Area Wetland	45°56'34"	83°44'08"	2	P
LH 192	Warners Cove Wetland	45°56'59"	83°43'49"	2	P
LH 193	Toivola Lake Area Wetland	45°56'50"	83°39'28"	20	P
LH 194	Scammon Cove Wetland	45°57"04"	83°38'22"	10	P
LH 195	Meade Island Wetland	45°56'55"	83°38'17"	11	P
LH 196	Big Shoal Cove Area Wetland	45°55'50"	83°36'05"	10	P
LH 197	Dickenson Creek Wetland	45°55'24"	83°34'52"	30	P

P=palustrine

ST. VITAL BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING LH 179-182

Setting

The St. Vital Bay Wetland complex is located along the shoreline of St. Vital Bay, which is directly connected to Lake Huron, in DeTour Township of Chippewa County, Michigan. The various parts of the complex extend from the shoreline to approximately 0.3 mile inland, and lie from 2.4 to 4.6 miles from DeTour Village, Michigan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Topography

The St. Vital Bay 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low plain and non-erodible low bluff. The surrounding area is comparatively flat in the western section, but rises sharply in the eastern section (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the St. Vital Bay Wetland Complex lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in the St. Vital Bay Wetland Complex. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through any part of the St. Vital Bay Wetland Complex (U.S.G.S. quadrangle map, DeTour Village, Michigan, 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 St. Vital Bay Wetland Complex is located in DeTour, Michigan . The average daily 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

No natural special features are found in the vicinity of the St. Vital Bay Wetland Complex (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

BIOTIC SETTING LH 179-182

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 the St. Vital Bay Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize the St. Vital Bay Wetlands. 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

Species of molluscs listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, and may occur in the St. Vital Bay Wetland Complex. However, 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 these wetlands.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major

food sources, or relationship to water levels of the reptiles and amphibians in St. Vital Bay 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 St. Vital 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 St. Vital 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 St. Vital 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 LH 179-182

Population

The St. Vital Bay Wetland Complex is located in DeTour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-2 indicates that Chippewa County and DeTour Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population growth in the future.

Table 8-2. Population Data for the Vicinity of the St. Vital Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
DeTour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. State Route 134 passes between the wetlands and there are scattered houses in the area. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Recreation

All but a small portion of the St. Vital Bay Wetland Complex is within the boundaries of Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the St. Vital Bay Wetland Complex include sand and gravel. The areas surrounding the wetlands are wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of the St. Vital Bay Wetland Complex (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to the St. Vital 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 or archaeological features are present within 500 feet of the St. Vital Bay Wetland Complex.

RESEARCH PROJECTS LH 179-182

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

CARLTON BAY WETLAND

PHYSIOGRAPHIC SETTING LH 183

Setting

Carlton Bay Wetland is located on the shoreline of Carlton Bay, which is directly connected to Lake Huron, in DeTour Township of Chippewa County, Michigan, 2.0 miles from DeTour Village. This Palustrine wetland occupies a wooded site (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Topography

Carlton 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area has a steady upward grade to the 750-foot contour (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Carlton Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Carlton Bay Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Carlton Bay Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 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 Carlton Bay Wetland is located in DeTour, Michigan*. The average daily 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

Strawberry Island lies just off shore from the wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

BIOTIC SETTING LH 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 Carlton Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Carlton 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

Species of molluscs listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, and may occur in Carlton Bay Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Carlton 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 Carlton 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 Carlton 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 Carlton 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 LH 183

Population

Carlton Bay Wetland is located in DeTour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-3 indicates that Chippewa County and DeTour Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population growth in the future.

Table 8-3. Population Data for the Vicinity of Carlton Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
DeTour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134 crosses the wetland. The wetland is under state ownership, but information is not sufficient to evaluate development pressure (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Carlton Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Carlton Bay Wetland include sand and gravel. The wetland and surrounding areas are predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Carlton Bay Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Carlton Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Carlton Bay Wetland.

RESEARCH PROJECTS LH 183

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

SEYMOUR BAY WETLAND

PHYSIOGRAPHIC SETTING

LH 184

Setting

Seymour Bay Wetland is located on the shoreline of Seymour Bay, which is directly connected to Lake Huron, in DeTour Township of Chippewa County, Michigan, approximately 1.5 miles from DeTour Village. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Topography

Seymour 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 Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area rises steadily to an elevation of 750 feet above sea level (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Seymour Bay Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Carlton Bay Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Seymour Bay Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 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 Seymour Bay Wetland is located in DeTour, Michigan*. The average daily 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 Seymour Bay Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

BIOTIC SETTING LH 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 Seymour Bay Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Seymour 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

Species of molluscs listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, and may occur in Seymour Bay Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Seymour 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 Seymour 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 Seymour 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 Seymour 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 LH 184

Population

Seymour Bay Wetland is located in DeTour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-4 indicates that Chippewa County and DeTour Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population growth in the future.

Table 8-4. Population Data for the Vicinity of Seymour Bay Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
DeTour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. State Route 134 crosses the wetland. The wetland is under state ownership, but information is not sufficient to evaluate development pressure (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Seymour Bay Wetland.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Seymour Bay Wetland include sand and gravel. The surrounding area is predominantly wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Seymour Bay Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Seymour Bay Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Seymour Bay Wetland.

RESEARCH PROJECTS LH 184

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

BENNETT POINT WETLAND

PHYSIOGRAPHIC SETTING LH 185

Setting

Bennett Point Wetland is located on the shoreline of the St. Marys River at its mouth, which is directly connected to Lake Huron, in DeTour Township of Chippewa County, Michigan, approximately 1.5 miles from DeTour Village. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Topography

Bennett Point Wetland has ten feet of relief and a maximum elevation of 590 feet (ten feet above the approximate mean elevation of Lake Huron). The Great Lakes Basin Commission (1975) has described the shoreline as non-erodible low bluff. The surrounding area is comparatively flat (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Bennett Point Wetland lies is characterized by lake bed sand. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Bennett Point Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Bennett Point Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 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 Bennett Point Wetland is located in DeTour, Michigan*. The average daily 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 Bennett Point Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

BIOTIC SETTING LH 185

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 Bennett Point Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Bennett Point 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

Species of molluscs listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, and may occur in Bennett Point Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Bennett 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 Bennett 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 Bennett 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 Bennett 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 LH 185

Population

Bennett Point Wetland is located in DeTour Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-5 indicates that Chippewa County and DeTour Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population growth in the future.

Table 8-5. Population Data for the Vicinity of Bennett Point Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
DeTour Township	813	10.6	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. The wetland is under undetermined ownership, but its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Recreation

No known state or federal recreational facilities are present in the vicinity of Bennett Point Wetland.

Mineral, Energy, and Forest Resources

The area surrounding Bennett Point Wetland is wooded, representing a potential forest resource. No significant mineral, oil, or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Bennett Point Wetland (U.S.G.S. quadrangle map, DeTour Village, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Bennett Point Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Bennett Point Wetland.

RESEARCH PROJECTS LH 185

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

WHITNEY BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 186-187

Setting

The Whitney Bay Wetland Complex is located on Drummond Island on the shoreline of Whitney Bay, which is directly connected to Lake Huron, within Drummond Township of Chippewa County, Michigan. The component parts of the complex lie approximately 2.7 miles from DeTour Village, Michigan. These Palustrine wetlands occupy both wooded and non-wooded sites (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Topography

The Whitney Bay 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 slopes upward in an irregular manner to 655 feet above mean sea level (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Whitney Bay Wetland Complex lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in the Whitney Bay Wetland Complex. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through any part of the Whitney Bay Wetland Complex (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 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 Whitney Bay Wetland Complex is located in DeTour, Michigan*. The average daily 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 Whitney Bay Wetland Complex (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

BIOTIC SETTING LH 186-187

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 Whitney Bay Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Whitney Bay Wetlands #1 and #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 these wetlands.

Invertebrates

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in the Whitney Bay Wetland Complex. However, 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 these wetlands.

Reptiles and Amphibians

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no

site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Whitney Bay Wetlands #1 and #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 the Whitney 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 two wetlands of the Whitney Bay Wetland Complex (Appendix E-3). 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, 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 Whitney 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 LH 186-187

Population

The Whitney Bay Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-6 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-6. Population Data for the Vicinity of the Whitney Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. An unimproved road and scattered housing are in the wetlands. The wetlands are under state ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Recreation

The Whitney Bay Wetland Complex is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Whitney Bay Wetland Complex include limestone, dolomite, and gravel. Two quarries are located nearby.

The areas surrounding the wetland are wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to the Whitney 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 or archaeological features are present within 500 feet of the Whitney Bay Wetland Complex.

RESEARCH PROJECTS LH 186-187

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

SEAMAN LAKE WETLAND

PHYSIOGRAPHIC SETTING LH 188

Setting

Seaman Lake Wetland is located on Drummond Island on the shoreline of Fairview Cove, which is directly connected to Lake Huron, within Drummond Township of Chippewa County, Michigan, at Seaman Lake. The wetland lies approximately 3.7 miles from DeTour Village, Michigan. This Palustrine wetland occupies a predominantly wooded site, with a non-wooded area on the western boundary (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Topography

Seaman Lake Wetland has a relief of 20 feet and a maximum elevation of 600 feet above mean sea level (20 feet above the approximate mean elevation of Lake Huron). The surrounding area consists of ridges and hills, with elevations up to 650 feet above sea level (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Seaman Lake Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Seaman Lake Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Seaman Lake Wetland (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 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 Seaman Lake Wetland is located in DeTour, Michigan*. The average daily 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 Seaman Lake Wetland (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

BIOTIC SETTING LH 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 Seaman Lake Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Seaman Lake Wetland. However, a search of the literature provided no site-specific information pertatining 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Seaman Lake Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and

distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Seaman 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 Seaman Lake Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Seaman Lake Wetland (Appendix E-3). 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, 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 Seaman 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 LH 188

Population

Seaman Lake Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-7 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-7. Population Data for the Vicinity of Seaman Lake Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A few houses and a dirt road are nearby, and a paved road connecting two quarries. The wetland is under state ownership, and its location suggests that it is subject to minimal development pressure (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Recreation

Seaman Lake Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Seaman Lake Wetland include limestone, dolomite and gravel. Two quarries are located nearby.

The wetland and surrounding areas are wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Seaman Lake Wetland (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Seaman Lake Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Seaman Lake Wetland.

RESEARCH PROJECTS LH 188

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

PIKE BAY WETLAND COMPLEX

PHYSIOGRAPHIC SETTING

LH 189-190

Setting

The Pike Bay Wetland Complex is located on Drummond Island along the shoreline of Pike Bay, which is directly connected to Lake Huron, within Drummond Township of Chippewa County, Michigan. The component parts of the complex lie approximately 400 feet from the Pike Bay shoreline and from 4.5 to 5.0 miles from DeTour Village, Michigan. This Palustrine wetland complex occupies both wooded and non-wooded sites (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Topography

The Pike Bay 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 consists of irregular ridges and hills, with elevations up to approximately 670 feet above sea level (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which the Pike Bay Wetland Complex lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in the Pike Bay Wetland Complex. These are moderately well-drained to poorly drained, medium-textured soils (Ouwe, 1976).

Hydrology

No streams flow through any part of the Pike Bay Wetland Complex (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 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 Pike Bay Wetland Complex is located in DeTour, Michigan*. The average daily 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 Pike Bay Wetland Complex (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

BIOTIC SETTING LH 189-190

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 Pike Bay Wetland Complex.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Pike Bay Wetlands #1 and #2. However, a search of the literature provided no site-specific information pertatining 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in the Whitney Bay Wetland Complex. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no

site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Pike Bay Wetlands #1 and #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 the Pike 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 two wetlands of the Pike Bay Wetland Complex (Appendix E-3). 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, 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 Pike 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 LH 189-190

Population

The Pike Bay Wetland Complex is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-8 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-8. Population Data for the Vicinity of the Pike Bay Wetland Complex

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland complex and most of the surrounding area is rural open space. One unimproved road crosses Pike Bay Wetland #1. A hard surface road connecting two quarries is located less than a mile away. The wetlands are under state ownership, and their location suggests that they are subject to minimal development pressure (U.S.G.S. quadrangle map, Whitney Bay, Michigan, 1964).

Recreation

The Pike Bay Wetland Complex is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of the Pike Bay Wetland Complex include limestone, dolomite, and gravel. A quarry is located to the northeast of the wetlands.

The wetlands and surrounding areas are wooded, representing potential forest resources, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to the Pike 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 or archaeological features are present within 500 feet of the Pike Bay Wetland Complex.

RESEARCH PROJECTS

LH 186-187

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

KNUTSEN LAKE AREA WETLAND

PHYSIOGRAPHIC SETTING LH 191

Setting

Knutsen Lake Area Wetland is located on Drummond Island in Lake Huron, within Drummond Township of Chippewa County, Michigan. The wetland lies approximately 300 feet from the Lake Huron shoreline. There is no major population center in the area. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Topography

Knutsen Lake Area 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 comparatively flat, with some low inland hills (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Knutsen Lake Area Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Knutsen Lake Area Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Knutsen Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 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 Knutsen Lake Area Wetland is located in DeTour, Michigan*. The average daily 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 Knutsen Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

BIOTIC SETTING LH 191

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 Knutsen Lake Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Knutsen Lake Area Wetland. However, a search of the literature provided no site-specific information pertatining 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Knutsen Lake Area Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major

food sources, or relationship to water levels of the reptiles and amphibians in Knutsen Lake 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 Knutsen Lake Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Knutsen Lake Area Wetland (Appendix E-3). 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, 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 Knutsen Lake 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 LH 191

Population

Knutsen Lake Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-9 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-9. Population Data for the Vicinity of Knutsen Lake Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the 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, Meade Island, Michigan, 1964).

Recreation

Knutsen Lake Area Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Knutsen Lake Area Wetland include limestone, dolomite and gravel.

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Knutsen Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Knutsen Lake Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Knutsen Lake Area Wetland.

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

WARNERS COVE WETLAND

PHYSIOGRAPHIC SETTING LH 192

Setting

Warners Cove Wetland is located on Drummond Island, approximately 400 feet from the shoreline of Warners Cove, which is directly connected to Lake Huron, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Topography

Warners Cove Wetland 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 consists of low ground in the immediate area with low hills rising on either side (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Warners Cove Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Warners Cove Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Warners Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 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 Warners Cove Wetland is located in DeTour, Michigan*. The average daily 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 Warners Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

BIOTIC SETTING LH 192

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 Warners Cove Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Warners Cove 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Warners Cove Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and

distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Warners Cove 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 Warners Cove Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Warners Cove Wetland (Appendix E-3). 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, 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 Warners Cove 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 LH 192

Population

Warners Cove Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-10 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-10. Population Data for the Vicinity of Warners Cove Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A dirt road crosses 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, Meade Island, Michigan, 1964).

Recreation

Warners Cove Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Warners Cove Wetland include limestone, dolomite and gravel.

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Warners Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Warners Cove Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Warners Cove Wetland.

RESEARCH PROJECTS LH 192

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

TOIVOLA LAKE AREA WETLAND

PHYSIOGRAPHIC SETTING

LH 193

Setting

Toivola Lake Area Wetland is located on Drummond Island in Lake Huron, within Drummond Township of Chippewa County, Michigan. The wetland lies approximately 500 feet from the Lake Huron shoreline. There are no major population centers in the vicinity. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Topography

Toivola Lake Area Wetland 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 consists of low hills (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Toivola Lake Area Wetland lies is characterized by rock at or near the surface. Rock occurring at or near the surface is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Toivola Lake Area Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Toivola Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 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 Toivola Lake Area Wetland is located in DeTour, Michigan*. The average daily 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 Toivola Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

BIOTIC SETTING LH 193

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 Toivola Lake Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Toivola Lake 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Toivola Lake Area Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Toivola Lake 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 Toivola Lake Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Toivola Lake Area Wetland (Appendix E-3). 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, 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 Toivola Lake 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 LH 193

Population

Toivola Lake Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-11 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-11. Population Data for the Vicinity of Toivola Lake Area Wetland

	Estimated population 1975[a]	Estimated $\%\Delta$ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A dirt road and a building adjoin 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, Meade Island, Michigan, 1964).

Recreation

Toivola Lake Area Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Toivola Lake Area Wetland include limestone, dolomite, and gravel.

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Toivola Lake Area Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Toivola Lake Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Toivola Lake Area Wetland.

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

SCAMMON COVE WETLAND

PHYSIOGRAPHIC SETTING LH 194

Setting

Scammon Cove Wetland is located on Drummond Island on the shoreline of Scammon Cove, which is directly connected to Lake Huron, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This Palustrine wetland occupies a non-wooded site (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Topography

Scammon Cove Wetland has little relief, and lies at an elevation slightly above the approximate mean elevation of Lake Huron (580 feet above mean sea level). The surrounding area is irregular, with small hills (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Scammon Cove Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Scammon Cove Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Scammon Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 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 Scammon Cove Wetland is located in DeTour, Michigan*. The average daily 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 Scammon Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

BIOTIC SETTING LH 194

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 Scammon Cove Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Scammon Cove 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix 3-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Scammon Cove Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Scammon Cove 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 Scammon Cove Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Scammon Cove Wetland (Appendix E-3). 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, 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 Scammon Cove 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 LH 194

Population

Scammon Cove Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-12 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-12. Population Data for the Vicinity of Scammon Cove Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There is an unimproved road within 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, Meade Island, Michigan, 1964).

Recreation

Scammon Cove Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Scammon Cove Wetland include limestone, dolomite, and gravel.

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

No public utilities or facilities are located within 0.5 mile of Scammon Cove Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Pollution Sources

There are no NPDES permit holders adjacent to Scammon Cove Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Scammon Cove Wetland.

RESEARCH PROJECTS LH 194

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

MEADE ISLAND WETLAND

PHYSIOGRAPHIC SETTING LH 195

Setting

Meade Island Wetland is located on the shoreline of Meade Island in Lake Huron, within Drummond Township of Chippewa County, Michigan. There are no major population centers in the area. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Topography

Meade Island 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 island itself is comparatively flat (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

Surficial Geology

The surficial geology of the area in which Meade Island Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Meade Island Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Meade Island Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 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 Meade Island Wetland is located in DeTour, Michigan*. The average daily 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 Meade Island Wetland (U.S.G.S. quadrangle map, Meade Island, Michigan, 1964).

BIOTIC SETTING LH 195

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 Meade Island Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Meade Island 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

Species of molluscs listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, and may occur in Meade Island Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Meade 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 Meade Island Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Meade Island Wetland (Appendix E-3). 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, 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 Meade 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 LH 195

Population

Meade Island Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-13 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-13. Population Data for the Vicinity of Meade Island Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A dirt road and several houses adjoin 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, Meade Island, Michigan, 1964).

Recreation

Meade Island Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Meade Island is wooded, representing a small potential forest resource. No significant mineral, oil, or gas resources are known to be present in the vicinity of Meade Island Wetland.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Meade Island Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Meade Island Wetland.

RESEARCH PROJECTS LH 195

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

BIG SHOAL COVE AREA WETLAND

PHYSIOGRAPHIC SETTING LH 196

Setting

Big Shoal Cove Area Wetland is located on Drummond Island in Lake Huron, within Drummond Township of Chippewa County, Michigan. The wetland lies approximately 500 feet from the Lake Huron shoreline. There are no major population centers in the area. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Topography

Big Shoal Cove Area 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 gently rolling (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Big Shoal Cove Area Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Big Shoal Cove Area Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Big Shoal Cove Area 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 Big Shoal Cove Area Wetland is located in DeTour, Michigan. The average daily 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 Big Shoal Cove Area Wetland (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

BIOTIC SETTING LH 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 Big Shoal Cove Area Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Big Shoal Cove 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Big Shoal Cove Area Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Big Shoal Cove 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 Big Shoal Cove Area Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Big Shoal Cove Area Wetland (Appendix E-3). 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, 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 Big Shoal Cove 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 LH 196

Population

Big Shoal Cove Area Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-14 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-14. Population Data for the Vicinity of Big Shoal Cove Area Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. There is a dirt road near 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, Marble Head, Michigan-Ontario, 1964).

Recreation

Big Shoal Cove Area Wetland is located in Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Big Shoal Cove Area Wetland include limestone, dolomite, and gravel.

The area surrounding the wetland is wooded, representing a potential forest resource, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Big Shoal Cove Area Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Big Shoal Cove Area Wetland.

RESEARCH PROJECTS LH 196

The literature search identified no on-going or impending research projects pertaining to Big Shoal Cove Area Wetland.

DICKENSON CREEK WETLAND

PHYSIOGRAPHIC SETTING LH 197

Setting

Dickenson Creek Wetland is located on Drummond Island in Lake Huron, within Drummond Township of Chippewa County, Michigan. The wetland lies approximately 0.1 mile from the Lake Huron shoreline. There are no major population centers in the vicinity. This Palustrine wetland is partially wooded (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Topography

Dickenson Creek 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 slightly rolling (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

Surficial Geology

The surficial geology of the area in which Dickenson Creek Wetland lies is characterized by rock at or near the surface. This rock is of the Silurian period and the Engadine formation (Martin, 1955).

Soils

Stony calcareous soils are present in Dickenson Creek Wetland. These are moderately well-drained to poorly drained, medium-textured soils (Duwe, 1976).

Hydrology

No streams flow through Dickenson Creek 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 Dickenson Creek Wetland is located in DeTour, Michigan*. The average daily 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 Dickenson Creek Wetland (U.S.G.S. quadrangle map, Marble Head, Michigan-Ontario, 1964).

BIOTIC SETTING LH 197

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 Dickenson Creek Wetland.

Fish

A list of common fish species utilizing coastal wetlands of Michigan is presented in Appendix A-1, and some of these species probably utilize Dickenson Creek 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

Information on the molluscs of Drummond Island is available in Goodrich et al. (1939). The species listed in Appendix B-6 were collected in eastern Chippewa County, Michigan, including Drummond Island, so they may occur in Dickenson Creek Wetland. However, 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

Ruthven et al. (1928) provided distributional and life history information for the reptiles and amphibians of Michigan. Although the distribution information is county-specific only and the life history information is general, most of the species listed from coastal counties may occur in wetlands or in lowland woods, moist meadows, sand beaches and ridges, or scrublands that may adjoin wetlands, (Ruthven et al., 1928; Conant, 1975). The species found in Chippewa County are listed in Appendix C-1. The literature search yielded no site-specific information pertaining to major species, seasonal abundance and distribution, density, recreational or commercial use, life histories, major food sources, or relationship to water levels of the reptiles and amphibians in Dickenson 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 Dickenson Creek Wetland.

Mammals

A survey of the mammals of Drummond Island (Manville, 1950) provides information concerning the mammalian species which may be found in Dickenson Creek Wetland (Appendix E-3). 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, 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 Dickenson 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 LH 197

Population

Dickenson Creek Wetland is located in Drummond Township of Chippewa County, Michigan. The county is sparsely populated, having a density of 23 persons per square mile. Table 8-15 indicates that Chippewa County and Drummond Township experienced rapid population growth between 1970 and 1975. Projections for 1990 indicate that Chippewa County is expected to undergo a moderate decline in population in the future.

Table 8-15. Population Data for the Vicinity of Dickenson Creek Wetland

	Estimated population 1975[a]	Estimated %Δ 1970-1975[a]	Projected population 1990[b]
Chippewa County	35,993	11.0	32,065
Drummond Township	602	25.7	--

[a] U.S. Bureau of the Census (1977)
[b] Michigan Department of Management and Budget, Office of the Budget, Information System Division

Land Use and Ownership

Land use within the wetland and most of the surrounding area is rural open space. A dirt road and a building are within 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, Marble Head, Michigan-Ontario, 1964).

Recreation

Dickenson Creek Wetland is located within Munuscong State Forest, where a variety of outdoor activities are available.

Mineral, Energy, and Forest Resources

Potential mineral resources in the vicinity of Dickenson Creek Wetland include limestone, dolomite, and gravel.

The wetland and surrounding areas are predominantly wooded, representing potential forest resources, but no significant oil or gas resources are known to be present.

Public Utilities and Facilities

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

Pollution Sources

There are no NPDES permit holders adjacent to Dickenson Creek Wetland. No site-specific information was located through the literature search pertaining to non-point sources of pollution.

Historical and Archaeological Features

No known historical or archaeological features are present within 500 feet of Dickenson Creek Wetland.

RESEARCH PROJECTS LH 197

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

Table 8-16 Data Gaps-Lake Section 8

Data Gap*		Wetland Number	179-182	183	184	185	186-187	188	189-190	191	192	193	194	195	196	197
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 feature elements for each wetland description was gathered from U.S.G.S. quadrangle maps and publications of the Great Lakes Basin Commission, National Oceanographic and Atmospheric Administration, and various agencies of the State of Michigan. The coastal wetlands of Lake Huron are almost without exception Palustrine Systems and frequently are wooded or partially wooded. These areas typically have little relief and are likely to be influenced by water level fluctuations in Lake Huron. Lake sand or lake clay underlie most wetlands; the remainder are underlain by bedrock or waterlaid moraine. A diversity of soil types occurs within these wetlands, but recent soil surveys are not available for Huron, Iosco, or Mackinac Counties. The average annual temperature ranges from 43.4°F at the northern end of the lake to 50.8°F at the southern end. The growing season for wetland vegetation ranges from five and one-half months in the north to seven months in the south. The average annual precipitation ranges from 27.09 inches in the north to 33.35 inches in the south.

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 Huron. However, a small body of information characterizes the vegetation of the St. Clair Flats Wetland Complex. Of the coastal wetlands in Lake Huron proper, only East Saginaw Bay Wetland is represented in the literature.

Wetlands of the Lake Huron coastal zone are largely associated with inland topographic depressions, or with extensive shallow littoral areas, such as Saginaw Bay. Inland depressional wetlands are predominantly wooded, but there are open areas in which bogs occur. These wetlands lie in depressions associated with relic beach ridges. Throughout much of Lake Huron's littoral zone, vegetation is lacking; however, some shallow bays support emergent vegetation composed of bulrushes (*Scirpus* spp.), cattails (*Typha* spp.) and associated species.

Fish

There have been no extensive, systematic surveys of the fishes in coastal wetlands of Lake Huron. However, it is possible to extrapolate the species likely to be present in some of the wetlands, based on known habitat preferences, by using existing surveys of adjacent deepwater habitats (i.e., lakes, ponds, rivers, and nearshore waters of Lake Huron) to identify species in the vicinities of the wetlands.

Fishery surveys of deepwater habitats adjacent to Lake Huron coastal wetlands were found primarily in unpublished reports of the Michigan Department of Natural Resources, including reports of the Institute for Fisheries Research, the Water Resources Commission, the Division of Fisheries, and the Division of Wildlife. Secondary sources included environmental impact assessment surveys regarding coastal operations of the U.S. Army Corps of Engineers, and reports of regional, county, and township planning agencies. Most of the literature concerned the wetlands of the St. Clair Delta and of Saginaw Bay. There was little published information pertaining to any single wetland, other than general reports by Leathers (1911) on the fish fauna of the coastal wetlands of Saginaw Bay and some cursory descriptions of the fishes and fishing in wetlands of the St. Clair Delta by Pospichal (1977). The report of Jaworski and Raphael (1978) should be consulted regarding the fisheries values of Lake Huron coastal wetlands. Unpublished data regarding fishes in Lake Huron coastal wetlands may be obtained from the Michigan State agencies mentioned above as well as the U.S. Fish and Wildlife Service Great Lakes Fisheries Laboratory in Ann Arbor, the Univeristy of Michigan Museum of Zoology, and the academic departments and museum collections of other Michigan colleges and universities.

The scarcity of current and historical published data regarding the distribution and abundance of most fishes in Lake Huron leads to difficulty in compiling an overall list of species which utilize coastal wetlands along the lake and their relative abundances in the wetlands. Although siltation, eutrophication, and thermal pollution have affected fish communities near major areas of human activity (e.g. Saginaw Bay, Lake St. Clair), Lake Huron has changed very little limnologically since the 1800's. Many of the more valuable commercial species (i.e., salmonids, lake sturgeon (Acipenser fulvescens), walleye (Stizostedion vitreum), and sauger (Stizostedion canadense) have suffered major declines owing to a combination of factors including overexploitation, sea lamprey predation, and competition with introduced rainbow smelt (Osmerus mordax) and alewife (Alosa pseudoharengus). It is assumed that the relative abundance of the majority of other species in the lake as a whole has not changed greatly since the 1800's. A list of fish species known or presumed to utilize the coastal wetlands of Lake Huron, with a comparison of past and present abundance of each species, appears in Table 4.

Many species of fish utilize coastal wetlands, but comparatively few species are strongly dependent on aquatic vegetation for spawning, feeding, or cover. The more common wetland-dependent species found in Lake Huron and which probably occur frequently in the coastal wetlands include longnose gar (Lepisosteus osseus), bowfin (Amia calva), northern pike (Esox lucius), grass pickerel (Esox americanus), central mudminnow (Umbra limi), goldenshiner (Notemigonus crysoleucas), blacknose shiner (Notropis heterolepis), blackchin shiner (Notropis heterodon), tadpole madtom (Noturus gyrinus), banded killifish (Fundulus diaphanus), brook stickleback (Culea inconstans), Iowa darter (Etheostoma exile), and pumpkinseed (Lepomis gibbosus). Several other species are largely restricted to vegetated waters but are either uncommon or rare in Lake Huron in general. These are the spotted gar (Lepisosteus oculatus), muskellunge (Esox masquinongy), pugnose shiner (Notropis anogenus), and pugnose minnow (Notropis emiliae). The northern pike, muskellunge, and pumpkinseed are important game fishes in the Lake Huron basin, including coastal wetlands, bays,

Table 4. Fish Species Known or Presumed to Utilize the Coastal Wetlands of Lake Huron, St. Clair River, Lake St. Clair and Detroit River

Family and Species	Abundance[a] Pre-1900	1979
Lepistosteidae		
longnose gar	C	C
spotted gar	U	U
Amnidae		
bowfin	C	C
Esocidae		
northern pike	A	C
muskellunge	C	U
grass pickerel	C	C
Umbridae		
central mudminnow	C	C
Clupeidae		
gizzard shad	U	C
Cyprinidae		
carp	U	C
goldfish	U	U
goldenshiner	C	C
pugnose minnow	R	R
pugnose shiner	R	R
blacknose shiner	C	C
blackchin shiner	C	C
spottail shiner	A	A
emerald shiner	A	A
sand shiner	C	C
mimic shiner	C	C
bluntnose minnow	A	A
fathead minnow	A	A
Catostomidae		
white sucker	A	A
lake chubsucker	C	C
spotted sucker	C	C
Ictaluridae		
channel catfish	C	C
black bullhead	U	U
brown bullhead	C	C
yellow bullhead	C	C
tadpole madtom	C	C
Cyprinodontidae		
banded killifish	C	C
Centrarchidae		
largemouth bass	C	C
smallmouth bass	C	C
rock bass	C	C
black crappie	C	C
white crappie	U	U
bluegill	C	C
pumpkinseed	A	A
green sunfish	C	C
Percidae		
yellow perch	A	C
walleye	A	C
johnny darter	A	A
logperch	C	C
Iowa darter	C	C
Percichthyidae		
white bass	C	C
Sciaenidae		
freshwater drum	C	C
Gasterosteidae		
brook stickleback	C	C
Cottidae		
mottled sculpin	C	C

[a]A=abundant, C=common, U=uncommon, R=rare; conservative estimates based on known ranges of the species and inferred from limited site-specific data cited under individual wetland narratives. Species may be common or abundant locally, although listed as uncommon or rare on a lakewide basis.

and tributaries, although the muskellunge is not common and is apparently maintained in inland waters by stocking. However, a significant native, self-sustaining population of muskellunge apparently exists in Lake St. Clair and spawns in the St. Clair delta wetlands, where the species is harvested by Indians on the Walpole Reservation of Ontario.

Several fish species found in the Lake Huron basin are common to abundant in wetlands and adjacent waters, although they are often associated with non-vegetated habitats as well. The gizzard shad (Dorosoma cepedianum), goldfish (Carassius auratus), carp (Cyprinus carpio), fathead minnow (Pimephales promelas), bluntnose minnow (Pimephales notatus), white sucker (Catostomus commersoni), black bullhead (Ictalurus melas), brown bullhead (Ictalurus nebulosus), yellow bullhead (Ictalurus natalis), bluegill (Lepomis macrochirus), largemouth bass (Micropterus salmoides), white crappie (Pomoxis annularis), and black crappie (Pomoxis nigromaculatus) generally occur in quiet, low-gradient waters with bottoms of mud or clay. These species are generally cover-oriented and may be common in sheltered riverine and lacustrine coastal wetlands along Lake Huron. All except the gizzard shad, goldfish, bluntnose minnow, and fathead minnow are significant game species.

The smallmouth bass (Micropterus dolomieui), mimic shiner (Notropis volucellus), sand shiner (Notropis stramineus), lake chubsucker (Erimyzon sucetta), spotted sucker (Minytrema melanops), rock bass (Ambloplites rupestris), green sunfish (Lepomis cyanellus), johnny darter (Etheostoma nigrum), logperch (Percina caprodes), and mottled sculpin (Cottus bairdi) are generally associated with lotic waters and clean sand or gravel bottoms, but they are also common in coastal lake waters, where they may utilize deep lacustrine coastal wetlands with sand or gravel bottoms. The green sunfish, rock bass, and smallmouth bass are significant game species. Among commercial and game species the walleye and native or introduced salmonids apparently have little direct association with coastal wetlands. Other species of recreational or commercial importance, including yellow perch (Perca flavescens), white bass (Morone chrysops), and freshwater drum (Aplodinotus grunniens), as well as important forage species, including spottail shiner (Notropis hudsonius) and emerald shiner (Notropis atherinoides), are ubiquitous in the coastal zone of Lake Huron and may be locally common in certain coastal wetlands.

Beyond a general knowledge of species composition and recreational use of the fish fauna of Lake Huron coastal wetlands, little is known about the actual relationships of the species to the wetlands in terms of their utilization for spawning, nursery, and feeding areas, or about fish community structure, niche occupation, and interspecific relationships within wetlands. The coastal wetlands of Lake Huron appear to support a mixed fish fauna of coldwater and warmwater species. At least 17 species, including three game species, are largely dependent on wetlands for spawning, juvenile cover, adult habitat, and feeding. In addition to these species, many species common in other coastal habitats are also common in coastal wetlands, depending on conditions of shelter, bottom type, water clarity, water depth, and density of vegetation. The more extensive lacustrine and riverine wetlands are clearly of greater importance in terms of biomass and diversity of economically important species, including forage fish, which they support. However, larger palustrine wetlands, given sufficient oxygen levels or at least seasonal surface water

connections to Lake Huron or its tributaries, can be significant fish habitat units. The removal of significant areas of coastal wetlands along Lake Huron would probably result in a degradation of fish habitat, a decline in abundance of many species, and deterioration of recreational and commercial fishing quality. However, the scarcity of site-specific data permits few value judgements for individual wetlands in terms of their importance to fish production for profit or recreation or as preserves for unique fish species or communities.

Invertebrates

The invertebrate fauna of Lake Huron wetlands is poorly documented, and 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 coastal wetlands of Lake Huron and its downstream connecting waters is available in published sources. The general and dated work of Ruthven et al. (1928) 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 preferences of the species. Ruthven (1911) provided some early site-specific observations on the herpetology of the coastal sand dune region of Huron County. Unpublished collection data probably comprise the bulk of available information on reptiles and amphibians of Lake Huron coastal wetlands. The University of Michigan Museum of Zoology in particular, as well as collections at other academic institutions in Michigan, should be consulted for such data.

The total assemblage of reptiles and amphibians recorded in the Michigan coastal region of Lake Huron 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 semiaquatic species found in a wide range of lowland wet habitats, including coastal wetlands; (3) terrestrial species which enter water or wetlands only incidentally or to breed; and (4) aquatic and semiaquatic species found primarily in upland or lotic waters and not common to coastal wetlands. The latter are not discussed here. Five species and subspecies recorded in the literature as occurring in the coastal zone of Lake Huron are largely wetland dependent: the mudpuppy (Necturus maculosus), the red-spotted newt (Notophthalmus viridescens), the central newt (Notophthalmus viridescens louisianensis), the eastern fox snake (Elaphe vulpina gloydi), and the eastern massasauga (Sistrurus catenatus catenatus). The mudpuppy is largely an open lake species which is apparently most common around large lacustrine wetlands with submersed vegetation, whereas the red-spotted newt is found primarily in small ponds and sheltered palustrine or riverine wetlands. The eastern fox snake is common in large coastal emergent-type wetlands, but the rarer eastern massasauga is primarily restricted to swamp forest and bogs.

Amphibians found in a wide range of lowland wet or aquatic habitats in the Lake Huron coastal zone include the blue-spotted salamander (Ambystoma laterale), spotted salamander (Ambystoma maculatum), four-toed salamander (Hemidactylium scutatum), eastern tiger salamander (Ambystoma tigrinum tigrinum), gray treefrog (Hyla versicolor), northern spring peeper (Hyla crucifer crucifer), western chorus frog (Pseudacris triseriata triseriata), Blanchard's cricket frog (Acris crepitans blanchardi), bullfrog (Rana catesbeiana), green frog (Rana clamitans melanota), pickerel frog (Rana palustris), northern leopard frog (Rana pipiens), and mink frog (Rana septentrionalis). The salamanders may often occur in moist terrestrial habitats, but their larvae are always aquatic. The mink frog is a northern species which appears to occur as far as the U.S. Lake Huron drainage is concerned, only in Chippewa and Mackinac Counties, Michigan. Aquatic and semi-aquatic reptiles which probably occur in lake Huron coastal wetlands or their border lands include the northern ringneck snake (Diadophis punctatus edwardsi), eastern milk snake (Lampropeltis triangulum triangulum), northern water snake (Natrix sipedon sipedon), northern brown snake (Storeria dekayi dekayi), northern red-bellied snake (Storeria occipitomaculata occipitomaculata), Butler's garter snake (Thamnophis butleri), northern ribbon snake (Thamnophis sauritus septentrionalis), eastern garter snake (Thamnophis sirtalis sirtalis), snapping turtle (Chelydra serpentina), Blanding's turtle (Emydoidea blandingi), eastern spiny softshell (Trionyx spiniferus spiniferus), midland painted turtle (Chrysemys picta marginata), and western painted turtle (Chrysemys picta belli). The western painted turtle is restricted in Lake Huron to the Mackinac and Chippewa County drainages.

Several amphibians of the Lake Huron coastal zone 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), the American toad (Bufo americanus americanus), and the wood frog (Rana sylvatica). Terrestrial reptiles which may

Table 5. Relative Abundance and Distribution in the Coastal Zone of Amphibians and Reptiles Which Probably Occur in Coastal Wetlands of Lake Huron[a]

Order and Species	Relative Abundance[b]	Distribution
Caudata		
mudpuppy	C	entire coast
central newt	C	north of Saginaw Bay
red-spotted newt	C	south of Saginaw Bay
eastern tiger salamander	C	St. Clair River, Lake St. Clair, Detroit River only
blue-spotted salamander	C	entire coast
spotted salamander	C	entire coast
red-backed salamander	A	entire coast
four-toed salamander	R	entire coast
Anura		
American toad	A	entire coast
northern spring peeper	C	entire coast
gray treefrog	C	entire coast
western chorus frog	C	entire coast
Blanchard's cricket frog	C	entire coast
green frog	C	entire coast
bullfrog	C	entire coast
northern leopard frog	A	entire coast
pickerel frog	C	entire coast
mink frog	C	Mackinac and Chippewa counties only
wood frog	C	entire coast
Squamata		
northern water snake	A	entire coast
eastern garter snake	A	entire coast
Butler's garter snake	U	entire coast south of Alpena County
northern ribbon snake	A	entire coast
northern red-bellied snake	U	entire coast
northern brown snake	C	entire coast
midland brown snake	C	entire coast
eastern hognose snake	C	entire coast
northern ringneck snake	C	
eastern smooth green snake	C	entire coast
blue racer	C	south of Saginaw Bay
eastern fox snake	R	St. Clair River, Lake
black rat snake	R	St. Clair, Detroit River only
eastern milk snake	C	entire coast
eastern massasauga	U	entire coast, mainly Huron and Mackinac counties

-continued-

Table 5. (concluded)

Order and Species	Relative Abundance[b]	Distribution
Testudines		
snapping turtle	C	entire coast
spotted turtle	R	Lake St. Clair, St. Clair River, Detroit River, and upper Saginaw Bay only
stinkpot	C	entire coast south of Saginaw Bay
map turtle	C	entire coast south of Saginaw Bay
western painted turtle	A	Mackinac and Chippewa counties only
midland painted turtle	A	entire coast
Blanding's turtle	C	entire coast except Mackinac and Chippewa counties
eastern spiny softshell	R	entire coast of Iosco Countt

[a]Ruthven et al. (1928), Ruthven (1911), Conant (1975)
[b]A=abundant; C=common; U=uncommon; R=rare

occur in the margins of Lake Huron coastal wetlands or incidentally in the wetlands themselves include the eastern smooth green snake (Opheodrys vernalis vernalis), the blue racer (Coluber constrictor foxi), and the black rat snake (Elaphe obsoleta obsoleta).

Although few species of reptiles and amphibians are absolutely dependent on the coastal wetlands of Lake Huron for habitat, the continued abundance of most species in the coastal zone is probably dependent on the presence of extensive coastal wetlands. The relatively undisturbed coastal habitat along most of Lake Huron probably supports a present herpetofauna similar to that of pre-settlement times, both in composition and relative abundance of species. Table 5 lists the species known or presumed to occur in or adjacent to the coastal wetlands of Lake Huron, as well as their relative abundances and distributions along the coast. Given the scarcity of published records, Table 5 is speculative. The presence of water, food, and cover, as well as relative isolation from the cultural development which occurs around most other 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 herpetofauna, but the bullfrog, green frog, eastern spiny softshell, and snapping turtle are edible species which may be harvested. In addition, reptiles and amphibians such as the northern water snake and the snapping turtle, may serve as food sources for many species of fish, birds, and mammals, or may themselves be predators of economically important fish and wildlife. Beyond general background on the occurrence and relative abundance of reptiles and amphibians in the coastal wetlands, no published information was found pertaining to population and community structure and dynamics of the herpetofauna.

Avifauna

Most of the information pertaining to the avifauna of the coastal wetlands of Lake Huron consisted of general qualitative data provided by the Michigan Department of Natural Resources (1975-1977) and by Jaworski and Raphael (1978). In addition, the Michigan Department of Natural Resources furnished site-specific data regarding seasonal abundance, density, and productivity of waterfowl in some wetlands. Intensive studies of bird life in East Saginaw Bay Coastal Wetland were reported by Koechlein (1973), Reichard (1971) and Schinner and Cauley (1974); in the St. Clair Flats Wetland Complex by the Michigan Department of Natural Resources (1975) and Pospichal (1977); and in the Cheboygan Area Wetland Complex by Thobaben (1974). The status of nongame wetland species was reported by Johnston (1959), Kelley and Kelley (1973), and Wolf and Grefe (1961).

The extensive wetland areas along Lake Huron are utilized for nesting and during migration by waterfowl, wading birds, gulls, terns, and shorebirds. Table 6 lists the bird species recorded for Lake Huron wetlands. Nesting colonies of yellow-headed blackbirds (Xanthocephalus xanthocephalus), black terns (Chlidonias niger), and common terns (Sterna hirundo) have been observed in several wetlands. The common tern is presently on the Michigan State Endangered Species List.

Table 6 . Birds Recorded for Lake Huron

Common name	Common name
Waterfowl	**Wading Birds (continued)**
mute swan	green heron
whistling swan	black-crowned night heron
Canada goose	American bittern
white-fronted goose	least bittern
snow (blue) goose	
mallard	**Shorebirds**
black duck	
gadwall	semipalmated plover
pintail	killdeer
green-winged teal	black-bellied plover
blue-winged teal	ruddy turnstone
American wigeon	American woodcock
northern shoveler	common snipe
wood duck	spotted sandpiper
redhead	solitary sandpiper
ring-necked duck	greater yellowlegs
canvasback	lesser yellowlegs
greater scaup	pectoral sandpiper
lesser scaup	least sandpiper
common goldeneye	dunlin
bufflehead	long-billed dowitcher
oldsquaw	sanderling
ruddy duck	
hooded merganser	**Gulls and Terns**
common merganser	
red-breasted merganser	glaucous gull
	Iceland gull
Waterbirds	great black-backed gull
	herring gull
horned grebe	ring-billed gull
pied-billed grebe	Bonaparte's gull
white pelican	Forster's tern
king rail	common tern
Virginia rail	Caspian tern
sora	black tern
common gallinule	
American coot	**Raptors**
Wading Birds	bald eagle
	golden eagle
great blue heron	osprey
great egret	Cooper's hawk
cattle egret	sharp-shinned hawk

-continued-

Table 6 . (concluded)

Common name	Common name
Raptors (continued)	Perching Birds (continued)
red-tailed hawk	eastern meadowlark
broad-winged hawk	yellow-headed blackbird
rough-legged hawk	red-winged blackbird
marsh hawk	common grackle
American kestrel	yellow warbler
short-eared owl	common yellowthroat
	swamp sparrow
Perching Birds	savannah sparrow
long-billed marsh wren	Other Birds
short-billed marsh wren	
veery	belted kingfisher

The wetlands of northern Lake Huron are particularly important production areas for redheads (Aythya americana), ring-necked ducks (A. collaris), and American coots (Fulica americana). In addition, canvasbacks (Aythya valisineria), scaup (Aythya spp.), ruddy ducks (Oxyura jamaicensis), and hooded mergansers (Lophodytes cucullatus) utilize the habitat for nesting. Waterfowl commonly observed in the wetlands of Lake Huron include mallards (Anas platyrhynchos), black ducks (A. rubripes), blue-winged teal (A. discors), wood ducks (Aix sponsa), American wigeon (Anas americana), and northern shoveler (A. clypeata).

Mammals

The literature search indicated that little site-specific information concerning mammals is available for the wetlands of Lake Huron. Management plans and environmental impact statements were the major literature sources for site-specific material regarding key and major species and recreational and commercial use of wetland mammals. Open file reports of the Michigan Department of Natural Resources from the Wildlife Division and Coastal Zone Management Program contain site-specific information. Although some data from these sources have been included in this document, complete analysis of these sources was beyond the slope of this study. Technical reports (U.S. Fish and Wildlife Service, 1970) and regional surveys (Ruthven 1911; Manville 1950) provided general information for characterizing the key and major species of some Lake Huron wetlands. An assessment of the value of Michigan's coastal wetlands by Jaworski and Raphael (1978) supplied general material relating to the recreational and commercial use of wetland mammals.

The wetlands of Lake Huron are important habitat for several species of mammals (Table 7). Wetlands are essential for beaver (Castor canadensis), muskrat (Ondatra zibethicus), mink (Mustela vison), and river otter (Lutra canadensis). The snowshoe hare (Lepus americanus) and river otter are found most typically on the wetlands in northern Lake Huron. The Virginia opossum (Didelphis virginiana) and striped skunk (Mephitis mephitis) are observed most commonly on the wetlands of the southern part of the lake. Furbearers are a valuable resource in many coastal wetlands, particularly those associated with Saginaw Bay and with Lake St. Clair.

Table 7. Mammals Which May Utilize the Coastal Wetlands of Lake Huron

Common name	Common name
Virginia opossum	raccoon
eastern cottontail	long-tailed weasel
snowshoe hare	mink
beaver	river otter
meadow vole	striped skunk
muskrat	white-tailed deer
red fox	

Endangered Species

Several endangered and threatened species of birds have been reported along the coastal zone of Lake Huron. Caspian terns (Sterna caspia) and nesting common terns (Sterna hirundo) have been reported in scattered localities along the shoreline. In addition, ospreys (Pandion haliaetus) were sighted along St. Martin Bay.

The black rat snake (Elaphe obsoleta obsoleta) is also listed as threatened in Michigan and may occur in drier margins of Lake Huron coastal wetlands. The following species, condsidered rare in Michigan, may also occur in certain Lake Huron coastal wetlands (see Table 5): eastern spiny softshell (Trionyx spiniferus spiniferus), spotted turtle (Clemmys guttata), and four-toed salamander (Hemidactylium scutatum).

CULTURAL SETTING

The information necessary to prepare the population data for each wetland description was gathered from publications of the various regional planning agencies, the state of Michigan, and the U.S. Census Bureau. With the exception of wetlands located in the vicinity of metropolitan Detroit, counties and townships in which coastal wetlands are located are sparsely populated. Recently, these sparsely populated counties have undergone rapid rates of population increase, and this trend is expected to continue in most of them.

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, and U.S.G.S. quadrangle maps. Coastal wetlands typically exist as rural open or wooded space surrounded by rural open space. The majority are privately owned. Public ownership is largely represented by wetlands wholly or partially within the confines of county parks, state parks, state forests, and state management areas. Developmental pressures range from minimal to severe. When subject to nearby residential or commercial development, pressure is high to severe. Facilities located in the near vicinity of coastal wetlands include boat basins, canals, fill areas, housing developments, piers, quarries, railroad beds, and numerous improved and unimproved roads. Little information is available concerning recreation facilities or use within a wetland proper, and facilities are probably limited in scope. However, wetlands located within state forest boundaries are subject to the regulation that all Michigan State forest lands are open for camping unless otherwise posted. Hunting and fishing are also major activities in state forests (Henry H. Webster, Michigan Department of Natural Resources, personal communication).

The majority of coastal wetlands bordering Lake Huron contain potential mineral deposits and forest resources. A limited number contain potential oil and gas resources. No point source discharges of pollutants were pinpointed within the limits of a coastal wetland, and the impact of the few closely

adjacent discharges was impossible to determine from available sources. Archaeological and historical sites were documented within the confines of several wetlands. There are very few wetland research efforts presently under way in Lake Huron coastal wetlands.

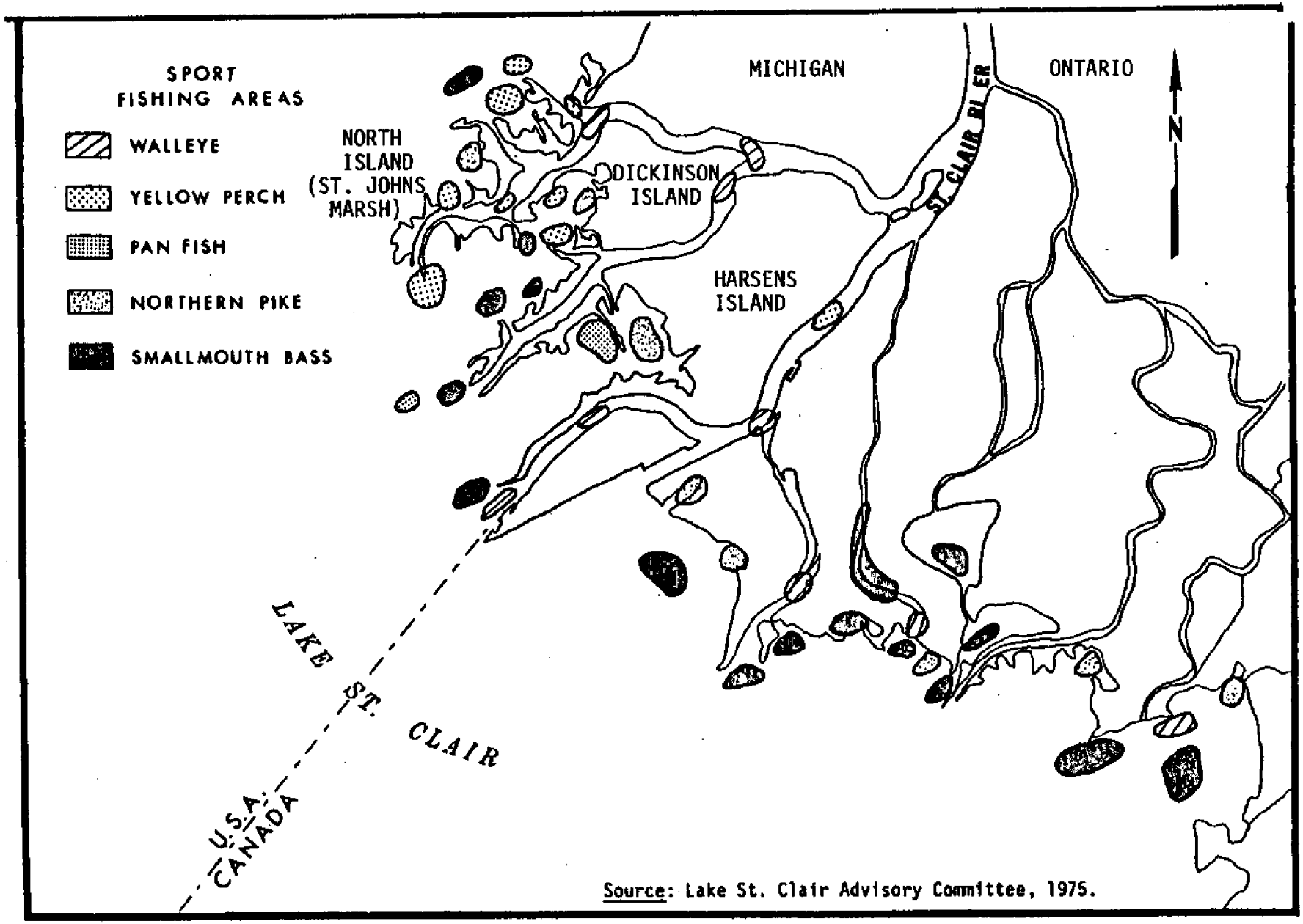
LIST OF APPENDICES

		Page No.
Appendix A - Fish		
A-1.	List of Common Fish Species Utilizing the Coastal Wetlands of Michigan	763
A-2.	Sport Fishing Areas in the Coastal Wetlands of the St. Clair Delta	764
A-3.	List of Fish Species Presumed to Utilize the Coastal Wetlands of Saginaw Bay	765
Appendix B - Invertebrates		
B-1.	Taxa Collected in the Vicinity of Islands in the Lower Detroit River	766
B-2.	Species of Molluscs Collected in the Vicinity of Islands in the Lower Detroit River	767
B-3.	Relative Abundance of Aquatic Acari in Littoral Habitat in the Great Lakes	768
B-4.	List of Naiad Molluscs Found in Lake St. Clair	769
B-5.	Benthic Fauna Collected in Saginaw Bay	770
B-6.	Molluscs of Eastern Chippewa County, Michigan	771
Appendix C - Reptiles and Amphibians		
C-1.	Records of Reptiles and Amphibians from Coastal Counties of Michigan or Lake Huron and St. Clair River	772
C-2.	The Herptofauna of the Coastal Sand Dune Region of Huron County, Michigan, from Flat Rock Point to Sand Point	774
Appendix D - Avifauna		
D-1.	Seasonal Abundance, Density and Productivity of Waterfowl on the St. Clair River, 1976.	776
Appendix E - Mammals		
E-1.	Mammalian Species of the Sand Dune Region of the South Shore of Saginaw Bay Which Utilize Wetlands	778
E-2.	Mammalian Species Which May be Found on the Wetlands of Saginaw Bay	778
E-3.	Mammals of Drummond Island Which May Utilize Wetlands of Drummond Island	779
Appendix F - Endangered Species		
F-1.	Endangered or Threatened Species in Lake Huron	780

Appendix A-1 . List of Common Fish Species Utilizing the Coastal Wetlands of Michigan[a]

Family and Species	Family and Species
Lepisosteidae	Aphredoderidae
longnose gar	pirate perch
Amiidae	Percopsidae
bowfin	trout-perch
Esocidae	Centrarchidae
northern pike	largemouth bass
muskellunge	smallmouth bass
	bluegill
Clupeidae	pumpkinseed
gizzard shad	green sunfish
	black crappie
Cyprinidae	
carp	Percidae
goldfish	walleye
pugnose minnow	yellow perch
blackchin shiner	johnny darter
blacknose shiner	
spottail shiner	Sciaenidae
emerald shiner	freshwater drum
goldenshiner	
Catostomidae	
redhorses (several spp.)	
white sucker	
Ictaluridae	
channel catfish	
black bullhead	
brown bullhead	
yellow bullhead	
Cyprinodontidae	
banded killifish	

[a]Jaworski and Raphael (1978)



Appendix A-2. Sport fishing areas in the coastal wetlands of the St. Clair Delta.

Appendix A-3. List of Fish Species Presumed to Utilize the Coastal Wetlands of Saginaw Bay[a]

Family and common name	Family and common name
Lepisosteidae	Ictaluridae
longnose gar	brown bullhead
	black bullhead
Amiidae	yellow bullhead
bowfin	tadpole madtom
Clupeidae	Cyprinodontidae
gizzard shad	banded killifish
Esocidae	Centrarchidae
muskellunge	largemouth bass
grass pickerel	smallmouth bass
northern pike	rock bass
	black crappie
Umbridae	white crappie
central mudminnow	pumpkinseed
	bluegill
Catostomidae	
white sucker	Percidae
	yellow perch
Gasterosteidae	johnny darter
brook stickleback	logperch
	Iowa darter
Cyprinidae	
carp	
fathead minnow	
bluntnose minnow	
sand shiner	
mimic shiner	
goldenshiner	
blacknose minnow	

[a]composite list based on Leathers (1911), Carr (1962), U.S. Army Corps of Engineers (1975), U.S. Department of the Interior (1970), Locke (1951), Michigan Department of Natural Resources (1976), and Michigan Water Resources Commission (1971).

Appendix B-1. Taxa Collected in the Vicinity of Islands in the Lower Detroit River[a]

Tubificid Worm Aggregation
- Oligochaeta
- Gastropoda
- Sphaeriidae
- Coenagrionidae
- Crustacea

Snail Aggregation
- Gastropoda
- Sphaeriidae
- Oligochaeta
- Crustacea

Snail Aggregation (continued)
- Hirudinea
- Coenagrionidae
- Ephemeroptera
- Tipulidae
- Hydracarina
- Bryozoa
- *Dugesia tigrina*

[a]Hunt, 1962

Appendix B-2 . Species of Molluscs Collected in the Vicinity of Islands in the Lower Detroit River[a]

Snails	Snails (continued)
Amnicola limosa	*Physa* sp.
Bithinia tentaculata	*Pleurocera acuta*
Campeloma decisum	*Valvata sincera*
C. integrum	*V. tricarinata*
Gyraulus sp.	
Helisoma antrosa	Fingernail Clams
H. trivolvis	*Musculium* sp.
Lymnaea catascopium	*Pisidum* sp.
L. columella	*Sphaerium* sp.

[a]Hunt, 1962

Table B-3 . Relative Abundance of Aquatic Acari in Littoral Habitat in the Great Lakes[a]

Trombidiformes	
Hydracarina	
Arrenurus americanus	P
A. apetiolata	P
A. manubriator	P
Arrenurus sp.	R
Atractides indistinctus	P
Axonopsis sp.	P
Eylais desecta	P
E. extendens	R
Hygrobates longipalpis	C
Lebertia porosa	R
Limnesia fulgica	C
L. histrionica	C
L. maculata	R
L. paucispina	P
L. undulata	R
Limnesiopsis anomala	P
Piona crassa	R
P. inconstans	P
P. media	P
P. pugilis	P
P. reighardi	C
P. rotunda	C
P. turgida	P
Piona sp.	R
Sperchon glandulosus	C
Torrenticola indistincta	C
T. bittikoferae	P
Tyrrellia circularis	P
Unionicola anormipes	P
U. crassipes	P
Unionicola sp.	C

[a]Modlin et al., 1973
C=common
R=rare
P-present in collections of other investigators

Table B-4 . List of Naiad Molluscs found in Lake St. Clair [a]

Alasmidonta calceolus (Lea)
Amblema costata plicata (Say)
Anodonta grandis fottiana (Lea)
Anodontoides ferussacianus buchanensis (Lea)
Dysnomia triquetra (Rafinesque)
Elliptio dilatatus sterkii Grier
Fusconaia flava parvula Grier
Lampsilis siliquoidea (Barnes)
Lampsilis ventricosa canadensis (Lea)
Lasmigona costata eriganensis Grier
Leptodea fragilis (Rafinesque)
Ligumia nasuta (Say)
Ligumia recta (Lamarck)
Micromya iris (Lea)
Obovaria lelbii (Lea)
Obovaria olivaria (Rafinesque)
Pleurobema cordatum pauperculum (Conrad)
Proptera alata (Say)
Ptychobranchus fasciolare (Rafinesque)
Truncilla truncata (Rafinesque)

[a] Goodrich et al., 1932

Table B-5. Benthic Fauna Collected in Saginaw Bay[a]

Amphipoda
- Gammarus
- Hyalella azteca
- Pontoporeia affinis

Isopoda
- Asellus
- Lirceus

Mysidacea
- Mysis relicta

Gastropoda

Pelecypoda[b]
- Pisidium amnicum
- P. casertanum
- P. compressum
- P. fallax
- P. ferrugineum
- P. lilljeborgi
- P. nitidum
- P. obtusale
- Sphaerium occidentale
- S. striatinum

Hirudinea
- Helobdella

Oligochaeta[c]
- Limnodrilus hoffmeisteri
- Peloscolex ferox
- Aulodrilus americanus
- Tubifex templetoni
- Euilyodrilus vejdovskyi
- Rhyacodrilus montanus
- Limnodrilus angustipenis
- L. claparedeanus
- Arcteonais lomondi
- Stylaria fossularis
- Limnodrilus cervix
- Euilyodrilus moldaviensis
- Tubifex newaensis
- Peloscolex freyi

Nematoda

Turbellaria

Diptera
- Ceratopogonidae
- Chironomidae
  - Clinotanypus
  - Coelotanypus
  - Pelopia
  - Pentaneura
  - Procladius
  - Psilodiamesa fulva
  - Monodiamesa bathyphila
  - Hydrobaenus spp.
  - Pentapedilum
  - Metriocnemus
  - Harnischia
  - Calopsectra spp.
  - Cryptochironomus spp.
  - Tanytarsus spp.
  - Microtendipes
  - Paratendipes
  - Polypedilum spp.
  - Limnochironomus
  - Pseudochironomus
  - Endochironomus
  - Chironomus decorus
  - Chironomus plumosus
  - Stenochironomus
  - Stictochironomus
  - Glyptotendipes

Ephemeroptera
- Hexagenia
- Ephemera
- Caenis
- Brachycerus

Trichoptera
- Oecetis
- Polycentropus

Coleoptera
- Limidae

Ostracoda

Hydrazoa

Hyracarina
- Hydrobates
- Piona
- Unionicolla
- Lebertia
- Limnesia
- Mideopsis

[a] Modified from Schneider et al. (1969)
[b] Taken from Heard (1962)
[c] Taken from Brinkhurst (1967)

Table B-6 . Molluscs of Eastern Chippewa County, Michigan[a]

Lymnaea stagnalis appressa	Valvata tricarinata
Lymnaea stagnalis sanctaemariae	Valvata tricarinata perconfusa
Lymnaea megasoma	Amnicola integra
Lymnaea dalli	Amnicola limosa
Lymnaea emarginata	Amnicola lustrica
Lymnaea humilis modicella	Amnicola walkeri
Lymnaea lanceata	Pomatiopsis lapidaria
Lymnaea obrussa peninsulae	Goniobasis livescens
Lymnaea palustris	Sphaerium abruptum
Helisoma antrosum	Sphaerium crassum
Helisoma campanulatum	Sphaerium fallax
Helisoma trivolvis	Sphaerium occidentale
Helisoma trivolvis binneyi	Sphaerium rhomboideum
Gyraulus deflectus	Sphaerium striatinum
Gyraulus hirsutus	Sphaerium sulcatum
Gyraulus parvus	Sphaerium sulcatum planulatum
Gyraulus parvus walkeri	Musculium declive
Gyraulus umbilicatellus	Musculium securis
Planorbula armigera	Musculium truncatum
Physa ancillaria vinosa	Pisidium abditum
Physa elliptica	Pisidium adamsi affine
Physa gyrina hildrethiana	Pisidium canadense
Physa heterostropha	Pisidium compressum
Physa integra	Pisidium compressum laevigatum
Physa michiganensis	Pisidium fallax
Physa sayii	Pisidium sargentii
Aplexa hypnorum	Pisidium scutellatum
Campeloma decisum	Pisidium superius
Campeloma integrum	Pisidium variabile brevius
Valvata sincera nylanderi	Pisidium virginicum

[a]Goodrich et al., 1939

Appendix C-1. Records of Reptiles and Amphibians from Coastal Counties of Michigan or Lake Huron and St. Clair River[a,b]

Order and Species	Michigan Counties														
	Wayne	Macomb	St. Clair	Sanilac	Huron	Tuscola	Bay	Arenac	Iosco	Alcona	Alpena	Presque Isle	Cheboygan	Mackinac	Chippewa
Caudata															
mudpuppy	X		X		X				X		X		X		
red-spotted newt[c]	X		X		X			X		X			X		X
Jefferson salamander	X				X			X		X	X		X		X
spotted salamander													X		
eastern tiger salamander	X														
four-toed salamander													X		X
red-backed salamander	X				X				X	X		X	X		X
Anura															
American toad					X		X	X		X	X	X	X	X	X
cricket frog[d]	X														
western chorus frog					X										
northern spring peeper	X	X	X		X					X			X		X
gray treefrog	X				X								X		
wood frog	X		X		X				X	X	X	X	X		X
bullfrog	X		X		X				X				X		
green frog	X	X	X	X	X			X	X	X	X	X	X	X	X
pickerel frog	X							X	X	X			X		
northern leopard frog	X		X		X	X	X	X	X	X	X	X	X	X	X
mink frog															X
Squamata															
northern ringneck snake													X		
eastern smooth green snake	X		X	X					X	X	X	X	X	X	X
blue racer	X														
eastern fox snake	X		X		X										
eastern milk snake	X				X			X	X	X		X	X		
queen snake	X		X												
northern water snake	X				X			X	X	X	X	X	X	X	X
northern brown snake	X		X		X				X	X	X	X	X		

-continued-

Appendix C-1 . (concluded)

Order and Species	Michigan Counties														
	Wayne	Macomb	St. Clair	Sanilac	Huron	Tuscola	Bay	Arenac	Iosco	Alcona	Alpena	Presque Isle	Cheboygan	Mackinac	Chippewa
Squamata (continued)															
red-bellied snake					X								X	X	X
Butler's garter snake					X										
northern ribbon snake	X		X		X					X	X		X		
eastern garter snake	X		X		X		X	X	X	X	X	X	X	X	X
eastern massasauga					X									X	
Testudines															
snapping turtle	X				X			X	X		X		X	X	X
wood turtle									X						
Blanding's turtle	X				X			X					X		
midland painted turtle					X				X		X		X		
western painted turtle															X

[a] from Ruthven et al., 1928

[b] Only those species which may occur in or around wetlands are listed.

[c] more probably the central newt

[d] probably Blanchard's cricket frog

Appendix C-2. The Herpetofauna of the Coastal Sand Dune Region of Huron County, Michigan, from Flat Rock Point to Sand Point[a]

Order and Species	Abundance	Habitat
Caudata		
mudpuppy	common	open waters of Saginaw Bay around Sand Point
red-backed salamander	common	east of Caseville, in and under decaying moist logs in swamp forest between sand ridges and adjacent woods
Jefferson salamander	common	throughout the region, in habitats similar to red-backed salamander
red-spotted newt	common	throughout the region, aquatic adults in permanent ponds and terrestrial efts under logs in adjacent woods
Anura		
American toad	occasional	on low ground at Pigeon River mouth and in woods east of Rush Lake, in wooded swamps and grassy marshes
gray treefrog	common	adult ubiquitous on trees, plants, shacks, and immature stages along margins of ponds or recently dried ponds
northern spring peeper	common	adults ubiquitous on vegetation in wooded swamps and pond margins, immature stages around recently dried pond margins
western chorus frog	adults occasional immatures abundant	Sand Point and east end of Rush Lake, adults in grassy areas, immature stages on mud of dried ponds
wood frog	common	ubiquitous, mainly in swamps between sand ridges
northern leopard frog	abundant	ubiquitous in all wet areas
green frog	common	between Sand Point and Hat Point, in ponds, swamps, occasionally on beaches
bullfrog	common locally	in Rush Lake and connecting ditches

-continued-

Appendix C-2. concluded

Order and Species	Abundance	Habitat
Squamata		
five-lined skink[b]	common	in dry woods and sand ridges
eastern hognose snake	common	in dry woods and sand ridges
eastern fox snake[c]	common	none given
northern brown snake	occasional	Sand Point and Rush Lake, pinewoods and grassy "swamps"
red-bellied snake	uncommon	on pine ridges
eastern smooth green snake	uncommon	woods on sand ridge, generally in grass marshes
eastern milk snake[d]	common	in decaying logs on sand ridges
eastern garter snake	abundant	ubiquitous, mostly in low wet or moist areas
Butler's garter snake[e]	rare	none given
northern ribbon snake	abundant	ubiquitous
northern water snake	common	ubiquitous in or near water, usually under logs, rocks, or boards
eastern massasauga	common	mainly in marshes and swamps on Sand Point, North Island, and Stony Island
Testudines		
snapping turtle	common	mainly in Pigeon River and Turtle Bay
Blanding's turtle	uncommon	mainly in ponds and Turtle Bay or crossing sand ridges
midland painted turtle	abundant	in ponds and Pigeon River

[a]Ruthven, 1911
[b]Gravid females were taken on June 19, and nests with eggs were common after July 2. Eggs in a nest numbered from six to fourteen. Nesting behavior of the female was described in detail. Young-of-the-year were observed after July 31.
[c]A specimen from Sand Point had eaten four young rabbits.
[d]This species was found to feed on mice and five-lined skinks.
[e]A specimen was found to have eaten on earthworm and a number of leeches.
[f]Two specimens of this ovoviviparous species were about to give birth in the middle of August.
[g]Frogs and snakes, including other massasaugas, formed the bulk of the diet.

Appendix D-1. Seasonal Abundance, Density, and Productivity of Waterfowl on the St. Clair River, 1976[a]

Waterfowl Use	Production		Spring Migration				Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Spring Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Ducks										
mallard			500	2	3		200	200	15	
black duck										
gadwall										
mottled duck										
green-winged teal										
Am. wigeon										
blue-winged/ cinnamon teal										
shoveler										
pintail										
wood duck										
black-bellied tree duck										
fulvous tree duck										
TOTAL										
sub-dabblers			500	2			200	200		
redhead			10000	5	4		2000	1000	15	
canvasback			8000	3	4		8000	8000	15	
scaups			1500	1500	4		500	500	15	
redneck										
goldeneye/ bufflehead			1000	1	4		100	100	15	
ruddy duck										
TOTAL										
sub-divers			20500	10500			10600	10600		
other ducks (mergansers)			21500	11200						

-continued-

Appendix D-1. (concluded)

Waterfowl Use	Production			Spring Migration			Wintering			
Species	Avg Density (prs/sq mi)	Avg Young/ wetland acre	Avg Peak Pop.	Avg Spring Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?	Avg Peak Pop.	Avg Wintering Population	Avg Duration (no. weeks)	Special or Unique Pops. or Species?
Geese										
snow										
Ross'										
white-fronted										
Canada							10	10	15	
black brant										
brant										
TOTAL geese							10	10		
Swans										
whistling										
other										
TOTAL swans							0	0		
TOTAL waterfowl		21500	11200				10810	10810		

[a]Taken from Michigan Department of Natural Resources. Waterfowl Habitat Reconaissance, open file data, 1975-1977.

Appendix E-1. Mammalian Species of the Sand Dune Region of the South Shore of Saginaw Bay Which Utilize Wetlands[a]

Common name	Common name
silver-haired bat	red fox
snowshoe hare	black bear[b]
eastern cottontail	raccoon
woodchuck	ermine
red squirrel	mink
fox squirrel	striped skunk
white-footed mouse	marten[b]
meadow vole	lynx[b]
muskrat	bobcat[b]
meadow jumping mouse	white-tailed deer
wolf[b]	elk[b]

[a] Ruthven, 1911
[b] present status of species in this region is rare or absent

Appendix E-2. Mammalian Species Which May be Found on the Wetlands of Saginaw Bay[a]

Common name	Common name
Virginia opossum	raccoon
eastern cottontail	weasel
fox squirrel	mink
gray squirrel	striped skunk
muskrat	white-tailed deer
red fox	

[a] U.S. Fish and Wildlife Service, 1970b

Appendix E-3. Mammals of Drummond Island Which May Utilize 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]Manville, 1950

Appendix F-1. Endangered (E) or Threatened (T) Species of Michigan

	Michigan[a]
MOLLUSKS	
Actinonaias ellipsiformis	T
Anodonta subgibbosa	T
Cyclonais tuberculata	T
Dysnomia triquetra	T
Elliptio complanatus	T
Lampsilis fasciola	T
Obovaria leibii [b]	E
Pleurobema clava	T
Simpsoniconcha ambigua[b]	E
Amnicola binneyana [b]	T
Anguispira kochi [b]	T
Discus patulus [b]	T
Fontigens nicklineana[b]	T
Haplotrema concavum [b]	T
Mesodon elevatus [b]	T
Mesodon sayanus [b]	T
Mesomphix cupreus[b]	T
Pomatiopsis cincinnatiensis	T
Triodopsis notata	T
Lymnaea megasoma	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
redside dace (*Clinostomus elongatus*)	T
silver shiner (*Notropis photogenis*)	T

-continued-

Appendix F-1. (continued)

	Michigan[a]
river redhorse (*Moxostoma carinatum*)	T
northern madtom (*Noturus stigmosus*)	T
eastern sand darter (*Ammocrypta pellucida*)	T
blue pike (*Stizostedion vitreum vitreum*)	
REPTILES AND AMPHIBIANS	
marbled salamander (*Ambystoma opacum*)	T
small-mouthed salamander (*Ambystoma texanum*)	T
western lesser siren (*Siren intermedia nettingi*)	T
eastern box turtle (*Terrapene carolina carolina*)	T
black rat snake (*Elaphe obsoleta obsoleta*)	T
northern copperbelly (*Natrix erythrogaster neglecta*)	T
Kirtland's water snake (*Natrix kirtlandi*)	T
AVIFAUNA	
double-crested cormorant (*Phalacrocorax auritus*)	T
Cooper's hawk (*Accipiter cooperi*)	T
red-shouldered hawk (*Buteo lineatus*)	T
bald eagle (*Haliaeetus leucocephalus*)**	T
marsh hawk (*Circus cyaneus*)	T
osprey (*Pandion haliaetus*)	T
peregrine falcon (*Falco pereginus*)*	E
greater prairie chicken (*Tympanuchus cupido*)	T
piping plover (*Charad melodus*)	T

-continued-

Appendix F-1. (concluded)

	Michigan[a]
barn owl (*Tyto alba*)	T
loggerhead shrike (*Lanius ludovicianus*)	T
Kirtland's warbler (*Dendroica kirtlandii*)*	E
MAMMALS	
least shrew (*Cryptotis parva*)	T
Indiana bat (*Myotis sodalis*)*	E
pine vole (*Microtus pinetorum*)	T
southern bog lemming (*Synatomys cooperi*)	T
eastern timber wolf (*Canis lupus lycaon*)*	E
pine marten (*Martes americana*)	T

*Also on 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]Michigan Endangered and Threatened Species Program (1976).

[b]Scientific name equivalents for endangered and threatened mollusks: *Obovaria leibii* = *O. subrotunda*; *Simpsoniconcha* = *Simpsonaias*; *Amnicola binneyana* = *Cincinnatatia marginata*; *Anguispira kochi* = *A. solitaria*; *Discus patulus* = *Gonyodiscus perspectivus*; *Fontigens* = *Paludestrina*; *Haplotrema* = *Cincinnaria*; *Mesodon* = *Polygyra*; *Mesomphix* = *Omphalina*.

BIBLIOGRAPHY

Arbib, R. 1973. The blue list for 1973. Am. Birds 26(6): 932-933.

Berry, E.G. 1943. The Amnicolidae of Michigan: Distribution, Ecology, and Taxonomy. Misc. Publ. No. 57, Mus. Zool., Michigan, Ann Arbor. 68 pp.

Brinkhurst, R.O. 1967. The distribution of aquatic oligochaetes in Saginaw Bay, Lake Huron. Limnol. Oceanogr. 12(1): 137-143.

Carr, I.A. 1972. Distribution and Seasonal Movement of Saginaw Bay Fishes. U.S. Dept. of the Interior. Fish and Wildl. Serv., Spec. Sci. Rep. - Fish., No. 417. 13 pp.

Clausen, R.T. 1939. Aquatic Vegetation of the Lake Ontario Watershed. Suppl. 29th Ann. Rep., New York State Conserv. Dept. Biol. Surv., pp. 167-187.

Conant, R. 1975. A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Houghton Mifflin Co., Boston. 429 pp.

Consumers Power Company. no date. Environmental report. Quanicassee Plant, Units 1 and 2. Construction permit stage. Consumers Power Co., Michigan.

Cooper, G.P. 1952. Fish Fauna and Fishing of the Detroit River in the Vicinity of Sugar and Stony Islands. Michigan Dept. Natr. Resources, Inst. Fish. Res., Rep. No. 1350. Lansing. 37 pp.

Deeter, E.B., and A.E. Mathews. 1926. U.S. Dept. of Agri., Bureau of Chemistry and Soils: Soil Survey of Tuscola County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 40 pp.

Dorr, J.A., and D.L. Eschman. 1970. Geology of Michigan. Univ. of Michigan Press, Ann Arbor. 476 pp.

Duwe. 1976. Eastern Upper Peninsula Regional Planning and Development Commission: Chippewa County [Michigan] Recreation Plan. 246 pp.

Foster, Z.C., A.E. Shearir, C.E. Millar, J.O. Veatch, and R.L. Donahue. 1939. U.S. Dept. of Agri., Soil Survey, Cheboygan County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C.

Goodrich, C., and H. Van der Schalie. 1932. I. On an Increase in the Naiad Fauna of Saginaw Bay, Michigan. II. The Naiad Species of the Great Lakes. Occas. Pap. Mus. Zool., Univ. Michigan, Ann Arbor. No. 238, 14 pp.

Goodrich, C., and H. Van der Schalie. 1939. Aquatic Mollusks of the Upper Peninsula of Michigan. Publ. No. 43, Mus. Zool., Univ. Michigan, Ann Arbor. 45 pp.

Great Lakes Basin Commission. 1975. Great Lakes Basin Framework Study: Appendix 5, Mineral Resources. Ann Arbor, Mich. 135 pp.

Great Lakes Basin Commission. 1975. Great Lakes Basin Framework Study: Appendix 7, Water Quality. Great Lakes Basin Commission, Ann Arbor, Mich. 228 pp.

Heard, W.M. 1962. The Sphaeriidae (Mollusca: Pelecypode) of the North American Great Lakes. Amer. Midl. Natr. 67: 194-198.

Hunt, G.S. 1962. Water Pollution and the Ecology of Some Aquatic Invertebrates in the Lower Detroit River. Great Lakes Res. Div. Publ. No. 9, Inst. Sci. and Tech., Univ. Michigan. p. 29-49.

Jaworski, E., and C.N. Raphael. 1976. Modification of coastal wetlands in southeastern Michigan and management alternatives. Mich. Academician 8: 303-317.

Jaworski, E., and C.N. Raphael. 1978. Fish, Wildlife and Recreational Values of Michigan's Coastal Wetlands. Wetlands Values Study, Phase 1. Michigan Dept. of Natr. Resources, Lansing. 209 pp.

Johnson, W.E., R.D. Curtis, and R.I. Blouch. 1963. Region 2 Game Management Research. Island deer studies. Michigan Dept. Conserv., Lansing. 17 pp.

Johnston, B.J. 1959. Census report of a great blue heron colony on Dickenson Island, St. Clair County. Jack-Pine Warbler 37(3): 107 pp.

Kelley, N.T., and A.H. Kelley. 1973. Fall migration at Tawas Point. Jack-Pine Warbler. 51(3): 111-115.

Knutilla, R.L. 1969. Water Resources of the Belle River Basin, Southeastern Survey, Washington, D.C.

Knutilla, R.L. 1970. Water Resources of the Black River Basin, Southeastern Michigan: Hydrologic Investigations Atlas H A - 338. U.S. Geol. Survey, Washington, D.C.

Knutilla, R.L., and W.B. Allen. 1975. Water Resources of the River Raisin Basin, Southeastern Michigan: Hydrologic Investigations Atlas H A - 520. U.S. Geol. Survey. Washington, D.C.

Koechlien, A. 1973. Investigations of the Terrestial Biota on the Quanicassee Site, Autumn, 1972. Dames and Moore, Cincinnati, Ohio. 35 pp.

Landtiser. 1974. U.S. Dept. of Agri., Soil Conserv. Service: Soil Survey of St. Clair County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 113 pp.

Larson, J.D. 1977. U.S. Dept. of Agri., Soil Conserv. Service: Soil Survey of Wayne County Area, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 83 pp.

Larsen, R.L. 1971. U.S. Dept. of Agri., Soil Conserv. Service: Soil Survey Macomb County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 110 pp.

Larsen, R.W., W.B. Allen, and S.D. Hanson. 1975. Water Resources of the Huron River Basin, Southeastern Michigan: Hydrologic Investigations Atlas H A - 514. U.S. Geol. Survey, Washington, D.C.

Leathers, A.L. 1911. Fish, pp. 243-255. In A.G. Ruthven (ed.), Biological Survey Sand Dune Region on the South Shore of Saginaw Bay, Michigan. Michigan Geol. Biol. Surv., Publ. 4, Biol. Ser. 2. 347 pp.

Locke, F.E. 1951. A Survey of Rifle River System. Arenac and Ogenaw Counties, Michigan. Mich. Dept. Natr. Resources, Inst. Fish. Res., Rep. No. 182. 172 pp.

Manville, R.H. 1950. The mammals of Drummond Island, Michigan. J. Mammal 31(3): 358-369.

Martin, H.M. 1955. Surface Formations of the Southern Peninsula of Michigan. Mich. Dept. Conserv., Geol. Surv. Div. Publ. 49. Lansing. (map).

Michigan Department of Management and Budget, Office of the Budget, Information System Division. 1977. Michigan Population Projections. Lansing.

Michigan Department of Natural Resources, Game Division. Importance of Celeron Island to Waterfowl. Inf. Circ. No. 149. March 13, 1968. East Lansing.

Michigan Department of Natural Resources. 1975. Dickenson Island Waterfowl Management Project Involving Low-level Diking with Appropriate Water Level Control Structures and Pumps in St. Clair Flats Wildlife Area, Clay Township, St. Clair County. Unpublished Report. East Lansing.

Michigan Department of Natural Resources. 1975. Tobico Marsh State Game Area, Mich. Dept. of Natr. Resources. Lansing, Michigan. 2 pp.

Michigan Department of Natural Resources. 1976. Tobico Marsh State Game Area Management Plan. Div. Wildl., Lansing. 15 pp.

Michigan Department of Natural Resources. St. Johns' Marsh Environmental Assessment. Unpublished Report. 1977. East Lansing.

Michigan Department of Natural Resources. Environmental Areas Survey. Open File Data, 1975-1977. East Lansing.

Michigan Department of Natural Resources. Waterfowl Habitat Reconaissance. Open file data. 1974-1977. East Lansing.

Michigan Endangered and Threatened Species Program. 1976. Mich. Dept. Natr. Resources, East Lansing. 30 pp.

Michigan Water Resources Commission. 1971. Biological Survey of Sebewaing Bay in the Vicinity of Sebewaing, Michigan, Sept. 1970 - May, 1971. Michigan Dept. Natr. Resources, Bur. Water Mgmt., Lansing. 65 pp.

Michigan Water Resources Commission. 1973. Biological Survey of the Clinton River, Pontiac to Mouth. Mich. Dept. Natr. Resources, Lansing. 118 pp.

Miller, H.J. 1949. Waterfowl Breeding Ground Cover, 1949, in Michigan: Game Division Repot No. 1038, Mich. Dept. of Conserv., Lansing, 6 pp.

Modlin, R.F., and J. Gannon. 1973. A contribution to the ecology and distribution of aquatic acari in the St. Lawrence Great Lakes. Trans. Amer. Micros. Soc., 92(2): 217-224.

Muenscher, W.C. 1932b. Aquatic vegetation of the Oswegatchie and Black River Watersheds (including the eastern end of Lake Ontarion and the Upper stretch of the St. Lawrence River) pp. 199-221. In: New York State Conserv. Dept., Suppl. to 21st Annu. Rep.

Muenscher, W.C. 1932. Aquatic Vegetation of the St. Lawrence Watershed including the Grass, St. Regis, Salmon, Chateaugay Systems and the St. Lawrence Between Ogdensburg and the International Boundary, pp. 121-144. In a biological survey of the St. Lawrence Watershed supplemental to 20th Annu. Rep 1930. Conserv. Dept., State of New York. Biol. Survey No. 5 (1930).

National Oceanic and Atmospheric Administration. 1975. Climatological Data: Michigan. Asheville, N.C.

Nowlin, J.O. 1973. Water Resources of the Clinton River Basin, Southeastern Michigan: Hydrologica Investigations Atlas H A - 469. U.S. Geol. Survey, Washington, D.C.

Odell, T.T. 1940. Bays and ponds of the shore area, pp. 82-97. In A Biological Survey of the Lake Ontario Watershed. New York State Conserv. Dept., Suppl. 29th Annu. Rep.

Pospichal, L.B. no date. Preliminary Management Plan for St. Clair Flats Wildlife Area. St. Clair County, Michigan. Michigan Dept. of Natr. Resources, Wildl. Div., Lansing. 17 pp.

Pospichal, L.B. 1977. St. John's Marsh Management Plan, St. Clair County, Michigan. Mich. Dept. of Natr. Resources, Unpublished Rep., East Lansing.

Presque Isle Township Planning Commission. 1976. Presque Isle Township Comprehensive Plan. Presque Isle Township Planning Commission, Northeast Michigan Council of Governments, Gaylord, MI. 151 pp. plus app.

Redmond, E. 1967. U.S. Department of Agriculture, Soil Survey Arenac County, Michigan. U.S. Government Printing Office, Washington, D.C. 142 pp.

Reichard, T. 1971. Ecological Survey of the Quanicassee Plant Site. Unpublished Rep. Michigan Dept. of Natr. Resources, Lansing.

Ruthven, A.G. 1911. A Biological Survey of the Sand Dune Region on the South Shore of Saginaw Bay, Michigan. Mich. Geol. Biol. Surv. (1910). Publ. (4) Biol. Serv. 2: 347 pp.

Ruthven, A.G., C. Thompson, and H.T. Gaige. 1928. The Herpetology of Michigan. Univ. Mus., Univ. Michigan, Handbook Series, No. 3. Ann Arbor.

Schinner, J.R., and D.L. Cauley. 1974. Important Wildlife of the Quanicassee Site, Winter, 1974. The Consumers Power Company, Jackson, Mich., 65 pp.

Schinner, J.R., and D.L. Cauley. 1974. Survey of the Spring and Summer Avifauna of the Quanicassee Site. Unpublished Rep., Mich. Dept. of Natr. Resources, Lansing.

Schneider, J.C., F. F. Hooper, and A.M. Beeton. 1969. The Distribution and abundance of benthic fauna in Saginaw Bay, Lake Huron, pp. 80-90. In Proc. 12th Conf. Great Lakes Res., Internatl. Assoc. Great Lakes Res.

Schuytema, G.S. In R.E. Powers. 1966. The Distribution of Benthic Fauna in Lake Huron, pp. 155-163. Proc. 9th Conf. Great Lakes Res., Publ. No. 15, Great Lakes Res. Div., Univ. Michigan, Ann Arbor.

Thobaben, Jr., G. 1974. The Relative Abundance of Birds in the Cheboygan Marsh. Unpublished original study. Univ. Michigan Biol. Station. 3 pp.

Twenter, F.R. 1975. Southeastern Michigan Water-Resources Study: Ground Water and Geology. U.S. Geol. Survey, Washington, D.C. 143 pp.

Twenter, F.R., R.L. Knutilla, and T.R. Cummings. 1975. Water Resources of Basins for Minor Streams Draining into St. Clair River, Lake St. Clair, Detroit River, and Lake Erie, Southeastern Michigan: Hydrologic Investigations Atlas H A - 546. U.S. Geol. Survey, Washington, D.C.

U.S. Army Corps of Engineers. 1966. Final Environmental Statement. Maintenance Dredging of Federal Navigation Channel at Clinton River, Michigan. U.S. Army Eng. Dist., Detroit, Mich. 82 pp. plus app.

U.S. Army Corps of Engineers. 1974. Final Environmental Statement. Proposed Diked Disposal Area on Dickenson Island, St. Clair County, Michigan. U.S. Army Eng. Dist., Detroit, Mich. 235 pp.

U.S. Army Corps of Engineers. 1975. Final Environmental Statement. Maintenance Dredging of the Federal Navigation Channels in the Saginaw River and Saginaw Bay, Michigan. U.S. Army Eng. Dist., Detroit, Mich. 93 pp. plus app.

U.S. Army Corps of Engineers. 1976. Final Environmental Statement. Confined Disposal Facility for Maintenance Dredging at Clinton River, Michigan. U.S. Army Eng. Dist., Detroit, Mich. 57 pp. plus app.

U.S. Army Corps of Engineers. 1977. Draft Environmental Statement. Confined Disposal Facility and Maintenance Dredging of the Federal Navigational Channels, Les Cheneaux Island, Michigan. U.S. Army Eng. Dist., Detroit, Mich. 62 pp. plus app.

U.S. Bureau of the Census. 1977. Estimates of the Population of Counties and Metropolitan Areas: July 1, 1974 and July 1, 1975. Current Population Rep. Ser. P-25 No. 709. U.S. Govt. Printing Ofc., Washington, D.C.

U.S. Department of the Interior. 1970. National Estuary Study. Volume 3. U.S. Fish and Wildl. Serv., Washington, D.C. 326 pp. plus unnumbered maps.

U.S. Department of the Interior. 1970. National Estuary Study. Volume 5, U.S. Fish and Wildl. Serv., Washington, D.C.

U.S. Fish and Wildlife Service. 1969. Fish and Wildlife as Related to Water Quality of the Lake Huron Basin. 148 pp.

U.S. Fish and Wildlife Service. 1977. Endangered and Threatened Wildlife and Plants Federal Register, Vol. 42, No. 135.

U.S. Fish and Wildlife Service. 1977. Great Lakes Connecting Channels Follow-up Study. U.S. Fish and Wildlife Service, Great Lakes Region, Twin Cities, Minn. 56 pp. and species list.

Veatch, J.O., J.T. Stone, R.P. Matelski. 1954. U.S. Dept. of Agri.: Soil Associations Presque Isle County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 30 pp.

Walker, B. 1915. Results of the Mershow Expedition to the Charity Islands, Lake Huron. Occas. Pap. No. 7. Univ. Michigan, Ann Arbor.

Wildermuth, R.J., J.W. Moon, L.R. Schoenmann, and J.O. Veatch. 1924. U.S. Department of Agri. Bureau of Chemistry and Soils: Soil Survey of Alpena County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 30 pp.

Wolcott, R.M. 1903. The North American species of Limnesia. Trans. Am. Micros. Soc., 24: 85-107.

Wolf, L.L., and R.E. Grefe. 1961. Yellow-headed blackbirds nesting in lower peninsula of Michigan. Jack-Pine Warbler. 39(4): 158.

Wonser, C.H., J.O. Veatch, L.R. Jones, and L.R. Schoenmann. 1931. U.S. Department of Agri. Bureau of Chemistry and Soils: Soil Survey of Bay County, Michigan. U.S. Govt. Printing Ofc., Washington, D.C. 30 pp.

LIST OF U.S.G.S. QUADRANGLE MAPS

Adams Point, Michigan	1971
Alabaster, Michigan	1966
Algonac, Michigan-Ontario	1973
Alpena, Michigan	1971
Au Gres, Michigan	1966
Bay City Northeast, Michigan	1973
Bay Port East, Michigan	1970
Bay Port West, Michigan	1970
Black River, Michigan	1971
Caseville, Michigan	1970
Cedarville, Michigan	1964
Charity Island, Michigan	1970
Charles, Michigan	1964
Cheboygan, Michigan	1957
De Tour Village, Michigan	1964
East Tawas, Michigan	1959
Essexville, Michigan	1973
Evergreen Shores, Michigan	1964
Fairgrove, Michigan	1973
Fish Point, Michigan	1973
Forestville, Michigan	1963
Goose Island, Michigan	1964
Grace, Michigan	1958
Harbor Beach, Michigan	1970
Hessel, Michigan	1964
Huron City, Michigan	1970
Kawkawlin, Michigan	1973
Kinde West, Michigan	1970
Long Lake East, Michigan	1971
McRae Bay, Michigan	1964
Marble Head, Michigan-Ontario	1964
Maltke, Michigan	1971
Marine City, Michigan-Ontario	1973
Meade Island, Michigan	1964
Middle Island, Michigan	1971
Mt. Clemens East, Michigan	1973
Mullet Lake, Michigan	1957
New Baltimore, Michigan	1973
North Point, Michigan	1971
Omer, Michigan	1968
Ossineke, Michigan	1971
Pinconning, Michigan	1973
Point Lookout, Michigan	1966
Pontchartrain Shores, Michigan	1964
Port Austin East, Michigan	1970
Port Austin West, Michigan	1970
Port Hope, Michigan	1970
Port Huron, Michigan	1973
Prentiss Bay, Michigan	1964
Presque Isle, Michigan	1971

Quanicassee, Michigan	1973
Redman, Michigan	1970
Rockwood, Michigan-Ontario	1973
Rogers City, Michigan	1971
Round Island, Michigan	1964
Rush Lake, Michigan	1970
St. Clair Flats, Michigan-Ontario	1968
St. Ignace, Michigan	1964
St. Martin Island, Michigan	1964
Sand Point, Michigan	1970
Sebewaing, Michigan	1963
South Point, Michigan	1971
Standish, Michigan	1973
Standish Northeast, Michigan	1967
Thompson's Harbor, Michigan	1971
Thunder Bay Island, Michigan	1971
Whitney Bay, Michigan	1964
Wyandotte, Michigan-Ontario	1973

