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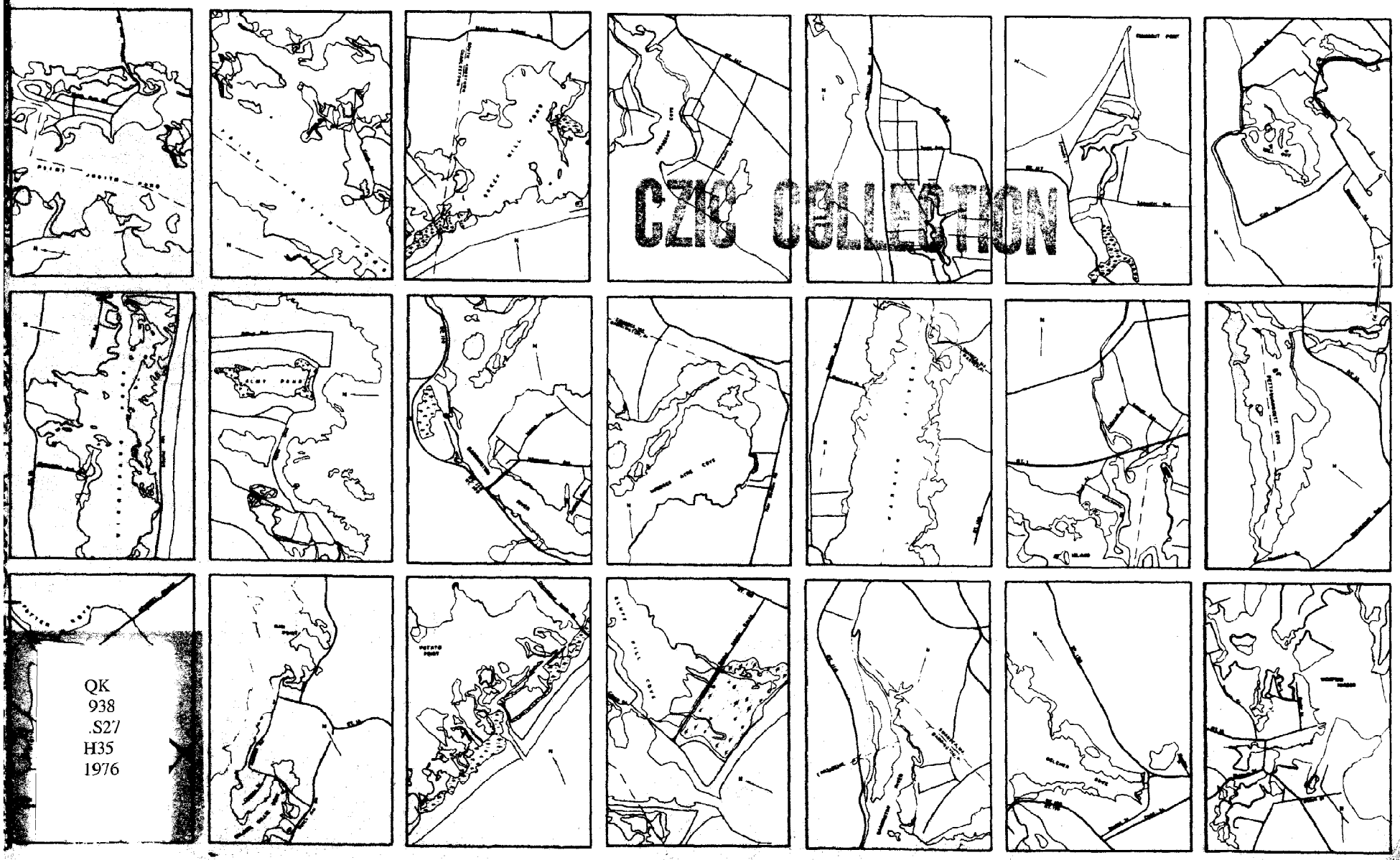
COASTAL ZONE
INFORMATION CENTER

Atlas of Rhode Island Salt Marshes



CZIC COLLECTION

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Rhode Island Coastal Resources Management Council
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Halvorson, William L.
15359

COASTAL ZONE
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Atlas of Rhode Island Salt Marshes

William L. Halvorson
William E. Gardiner

Prepared for
The Rhode Island Coastal Resources Management Council

by The Coastal Resources Center

University of Rhode Island
Marine Memorandum No. 44
1976

CZIC COLLECTION

The preparation of this report was financed in part by a planning grant from the National Oceanic and Atmospheric Administration, under the provisions of the Coastal Zone Management Act of 1972 (Public Law 92-583), as amended through the Joint Funding Simplification Act Program administered as part of Federal Regional Council grant FRC-JF-01-09.

Forward

This inventory was undertaken as one element of an extensive effort by the Coastal Resources Center to catalog and assess the coastal resources of Rhode Island. This assessment is the foundation for the development of the Rhode Island coastal management plan.

The coastal management plan, which is being developed incrementally, is administered by the Rhode Island Coastal Resources Management Council (CRMC), which was created in 1971 by the state legislature and charged to

> *". . . preserve, protect, develop and where possible restore the coastal resources of the state for this and succeeding generations. . . ."*
> *(46-23-1, G.L.R.I.)*

The CRMC has direct jurisdiction over all resources and activities below the mean high water mark and over shoreline features including salt marshes. The CRMC operates through the granting of permits for activities within its jurisdiction.

A special effort to map salt marshes was undertaken because their importance has long been recognized, and because they are found at the water's edge along protected shorelines, where human pressures to modify or destroy them are frequently intense. Although the alteration of Rhode Island's marshes has been taking place since the seventeenth century, attempts to learn their precise locations and acreage have begun only recently. Until the release of this document, a detailed and consistent series of maps that have been thoroughly checked in the field has not been available.

It is important to recognize that salt marshes are dynamic features whose borders are constantly changing in response to land drainage patterns, the use of abutting land, storms, and such gradual, long-term processes as rising sea level. While these maps provide reliable information on the location of salt marsh in 1975 and the shape and size of individual marshes, they cannot be used to infer the precise borders of any marsh at a specific site. Where the boundary of a salt marsh must be precisely established, an on-site inspection is always necessary.

It is our hope that this atlas will assist not only the Coastal Resources Management Council, but also town officials and private citizens concerned with this resource and involved in the management of our shoreline.

Stephen Olsen
Coordinator, Coastal Resources Center

Acknowledgements

Many hours were spent in the field by Buddy Alves, who assisted William Gardiner in the final survey. Preliminary fieldwork was undertaken by Jane Miner. We also thank Dr. Irene Stuckey and biologists with the Rhode Island Department of Natural Resources, who shared with us their knowledge of the state's salt marshes and reviewed the final maps.

Introduction

The salt marshes shown in this atlas have been identified according to the definition found in the *State of Rhode Island Coastal Resources Management Council Plan; Policies and Regulations:*

> *"An intertidal salt marsh shall be defined as any land which borders or lies beneath the tidal waters of this state and upon which grow one or more of the following plant species: cordgrass* (Spartina alterniflora); *salt meadow grass* (Spartina patens); *spike grass* (Distichlis spicata); *black rush* (Juncus gerardi); *saltworts* (Salicornia spp.); *seaside lavender* (Limonium carolinianum)."

Sophisticated techniques, including the use of aerial infrared photography, have been successfully used to map vegetation. The small size of Rhode Island, funding constraints, and the existence of a recent series of black-and-white aerial photographs and land use maps persuaded us, however, to rely on existing data with verification by complete field checking.

Base maps were prepared from land-use and vegetation maps produced by MacConnell (5) from black-and-white aerial photographs of the entire state taken in 1970 at a uniform scale of 1:12,000. Also noted on the base maps were salt marshes identified in a number of other studies. The base maps were then taken into the field, where the entire shoreline of the state was covered on foot or observed from a small boat. Where previously unidentified salt marsh was found, or the base maps deviated from what was observed, direct measurements and field notes were taken.

Black-and-white aerials taken in 1974 were examined stereoscopically in the lab to determine the precise outline of any newly identified marsh. In this manner numerous areas of salt marsh that had not appeared in previous surveys were mapped, and mistakes concerning the presence or size of identified marshes were corrected. For the first time, fringe marsh, defined as a band of marsh vegetation five yards or less in width, was mapped. Fringe marshes, however, were noted merely as present or absent. The acreage of fringe marsh was calculated assuming an average width of 2.75 yards.

Summary results: A total of 3,668 acres of salt marsh was mapped, including 76 miles (76 acres) of fringe marsh. Tables 1, 2 and 3 list, by town, the acreage, the number of marshes by size class, and the length of fringe marsh.

The salt marshes are concentrated in the following areas: the south shore, Barrington and Warren, Portsmouth, Tiverton, and Warwick. Salt marsh is least abundant in upper Narragansett Bay from Cranston to Pawtucket.

Rhode Island's salt marshes generally show clear patterns of zonation:

— Along the water's edge, salt marsh cordgrass *(Spartina alterniflora)* dominates. The cordgrass growing closest to the water is often significantly taller than the cordgrass behind.

— The second zone is usually dominated by salt meadow cordgrass *(Spartina patens)*. On the larger salt marshes this is usually the most extensive plant community present.

— The third zone is made up of two communities: one dominated by spike grass *(Distichlis spicata)*, and the other by the black rush *(Juncus gerardi)*. Spike grass is frequently concentrated closer to salt water than is black rush.

Other species that may be locally dense but are usually scattered among the dominant species include the following: *Aster tenuifolius* (salt aster), *Atriplex spp.* (orach), *Gerardi maritima* (purple gerardia), *Limonium carolinianum* (sea lavender), *Plantago maritima* (seaside plantain), *Salicornia europaea* (salt wort), *Scirpus maritimus* (salt marsh bullrush), *Spergularia marina* (sand spurrey), *Suaeda maritima* (sea blite) and *Triglochin maritima* (arrow grass).

In general, the variety and complexity of plant communities are greater in the larger marshes. In some marshes the zonation pattern described above is broken into a mosaic pattern; in other — usually smaller — marshes, one or more of the three zones may be present. Fringe marsh is frequently composed almost exclusively of cordgrass.

A comparison between the results of this inventory and others shows the following:

1955 (1)	2,315 acres	Includes only marshes greater than 40 acres
1959 (2)	2,244 acres	
1964 (3)	2,192 acres	
1962 (4)	4,238 acres	Includes only marshes greater than approximately five acres
1972 (5)	3,243 acres	
1975 (this survey)	3,668 acres	All marsh including fringe marsh

The earlier surveys of larger marshes show a clear reduction of salt marsh acreage, but the trend in later studies is less clear. The work presented here provides a baseline from which further changes may be accurately monitored.

Table 1. Salt marshes in Rhode Island, by town.

Towns	*Fringe Marshes (yds.)*	*Other Marshes (acres)*
Westerly	13,745.47	236.69
Charlestown	11,502.73	297.09
South Kingstown	12,623.06	313.79
Narragansett	7,037.83	337.00
North Kingstown	13,627.52	192.51
Warwick	19,582.19	248.86
East Greenwich	367.25	2.30
Cranston	26.23	4.82
Providence	0	3.21
Pawtucket	0	0
East Providence	4,852.92	83.57
Barrington	9,955.04	449.11
Warren	4,354.51	239.66
Bristol	6,361.26	125.34
Tiverton	5,521.84	320.47
Little Compton	393.48	64.07
Portsmouth	14,978.47	437.33
Middletown	262.47	13.77
Newport	1,862.47	35.81
Jamestown	2,715.01	138.88
New Shoreham	4,000.38	48.20
	*133,770.08**	*3,592.48***

**133,770.08 yds. = 76.01 miles = 122,300.09 meters = 122.30 km*
***3,592.48 acres = 1,454.95 hectares*

Table 2. Rhode Island's salt marshes, by size class, by town.

Towns	*1**	*2**	*3**	*4**	*5**
Westerly	42	40	7	1	0
Charlestown	40	36	14	2	0
South Kingstown	63	35	6	3	0
Narragansett	27	35	7	5	0
North Kingstown	61	49	10	0	0
Warwick	48	31	13	1	0
East Greenwich	1	0	0	0	0
Cranston	1	1	0	0	0
Providence	0	1	0	0	0
Pawtucket	0	0	0	0	0
East Providence	25	15	3	1	0
Barrington	44	27	8	4	1
Warren	15	13	6	2	0
Bristol	50	21	3	1	0
Tiverton	24	23	4	0	1
Little Compton	4	7	4	0	0
Portsmouth	79	17	10	5	0
Middletown	1	1	0	0	0
Newport	17	8	2	0	0
Jamestown	20	3	3	2	0
New Shoreham	12	13	3	0	0
Totals	574	376	103	27	2

**1 = fringe marshes*
2 = 0.23-4.9 acres
3 = 5.0-24.9 acres
4 = 25.0-99.9 acres
5 = 100+ acres

Table 3. Acreage of Rhode Island salt marshes by town.

Towns	*Fringe marshes (acres)*	*Other marshes (acres)*	*Total acreage*
Westerly	7.80	236.69	244.49
Charlestown	6.53	297.09	303.62
South Kingstown	7.17	313.79	320.96
Narragansett	4.00	337.00	341.00
North Kingstown	7.74	192.51	200.25
Warwick	11.12	248.86	259.98
East Greenwich	0.21	2.30	2.51
Cranston	0.01	4.82	4.83
Providence	0.00	3.21	3.21
Pawtucket	0.00	0.00	0.00
East Providence	2.76	83.57	86.33
Barrington	5.65	449.11	454.76
Warren	2.47	239.66	242.13
Bristol	3.61	125.34	128.95
Tiverton	3.14	320.47	323.61
Little Compton	0.22	64.07	64.29
Portsmouth	8.51	437.33	445.84
Middletown	0.15	13.77	13.92
Newport	1.06	35.81	36.87
Jamestown	1.54	138.88	140.42
New Shoreham	2.27	48.20	50.47
Total	75.96	3,592.48	*3,668.44**

**3,668.44 acres = 1,485.72 hectares*

References Cited

1. Anom. 1965. A Supplementary Report on the Coastal Wetlands Inventory of Rhode Island. U.S. Dept. of the Interior. Fish and Wildlife Service, Div. of River Basin Studies, Boston, MA, 10 pp.
2. Anom., *op. cit.*
3. Anom., *op. cit.*
4. Kupa, J. J. and W. R. Whitman. 1972. Land Cover Types of Rhode Island: an ecological inventory. University of Rhode Island, Agricultural Experiment Station Bulletin 439, 30 pp.
5. MacConnell, W. P. 1974. Remote Sensing Land Use and Vegetative Cover in Rhode Island. Bull. 200, URI-Cooperative Extension Service, 93 pp.

How To Use This Atlas:

To find, for example, a salt marsh in the upper Providence River, turn first to the orientation map on the following page to locate the general area. In this case it would be area E. Next, turn to Map E and select the numbered inventory map or maps that cover the specific area you're interested in. The inventory maps are numbered consecutively from west to east; they have been prepared using US Geological Survey quadrangle maps as a base.

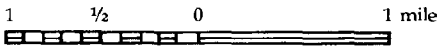
Map Symbols

Salt marsh

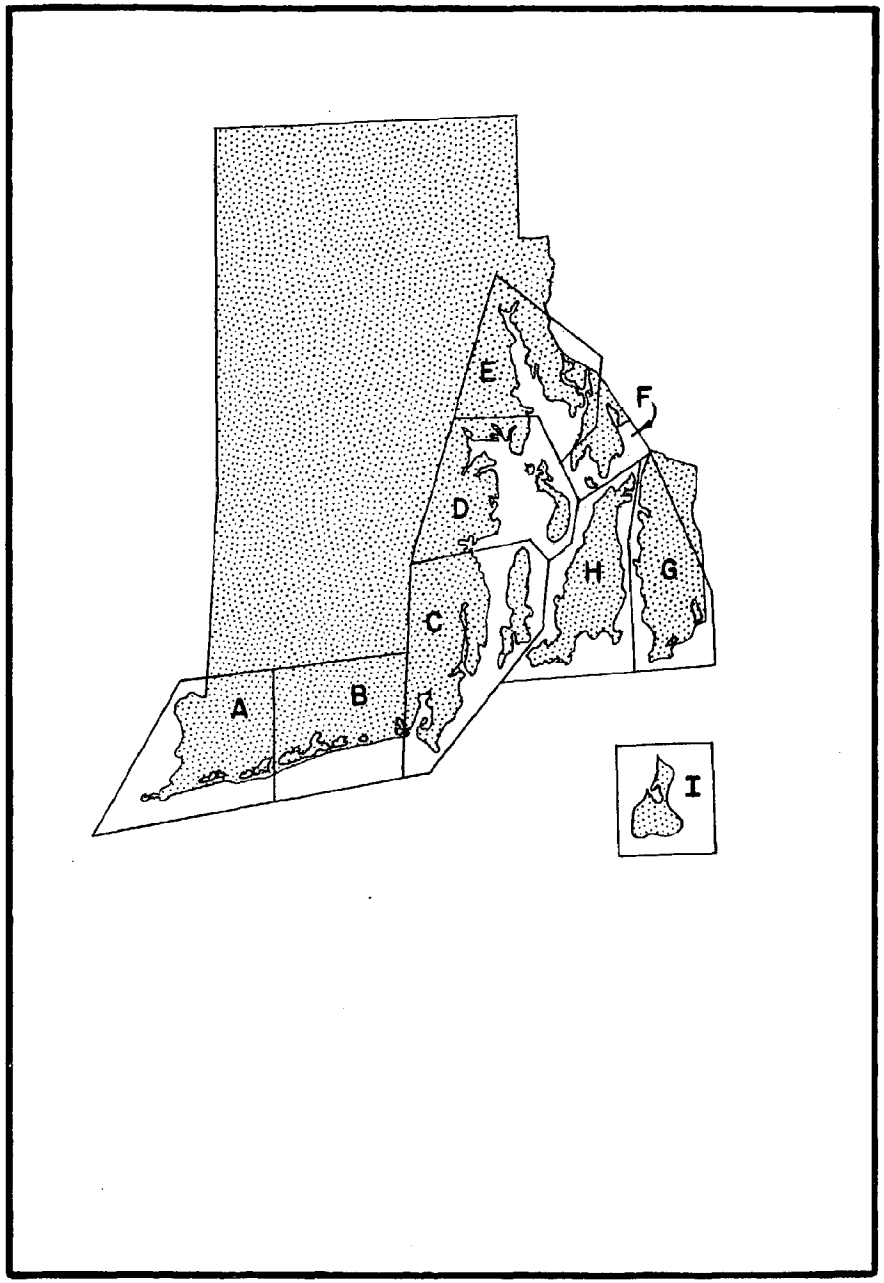
Freshwater marsh

Salt marsh,
less than 5 yards wide (fringe)

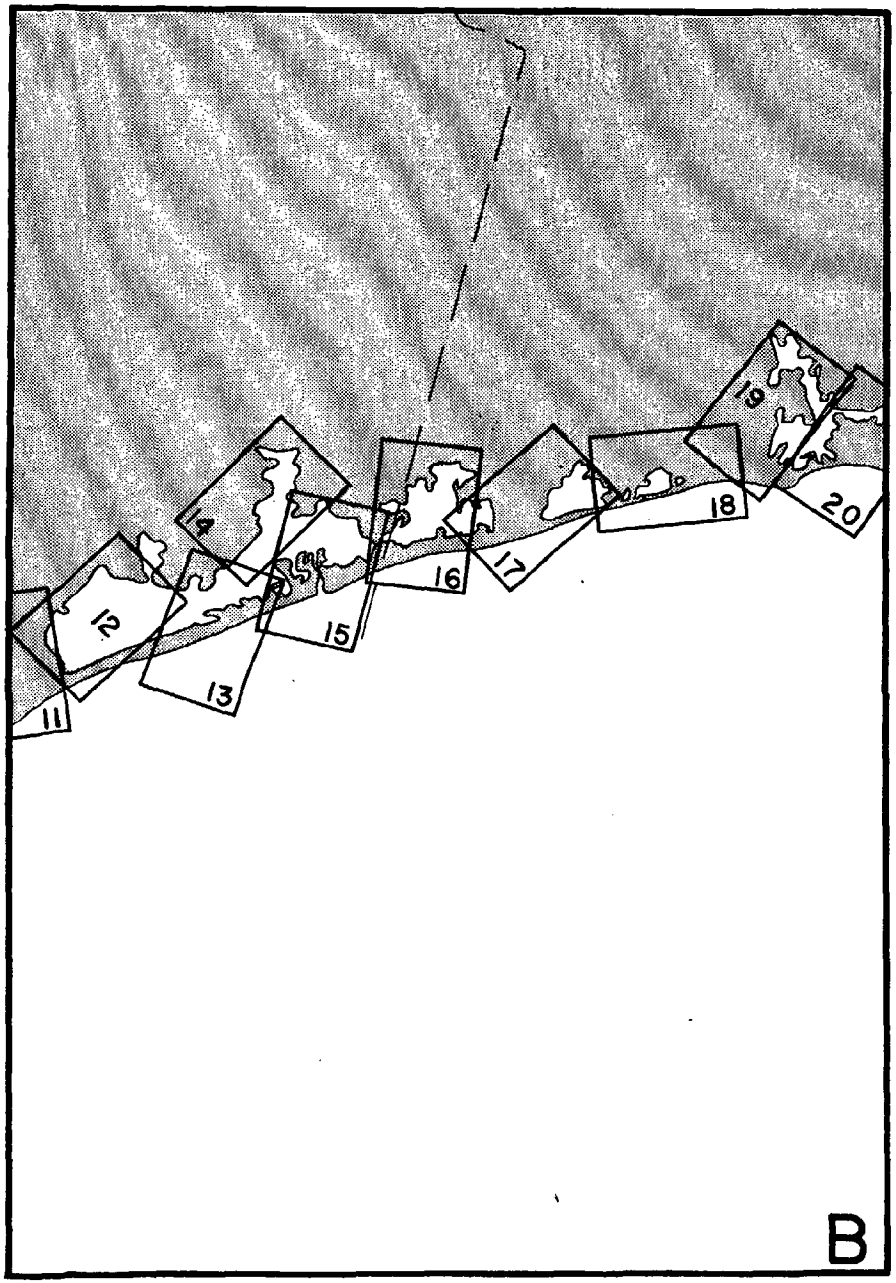
Map Scale 1:12,000



Orientation Map



Area Maps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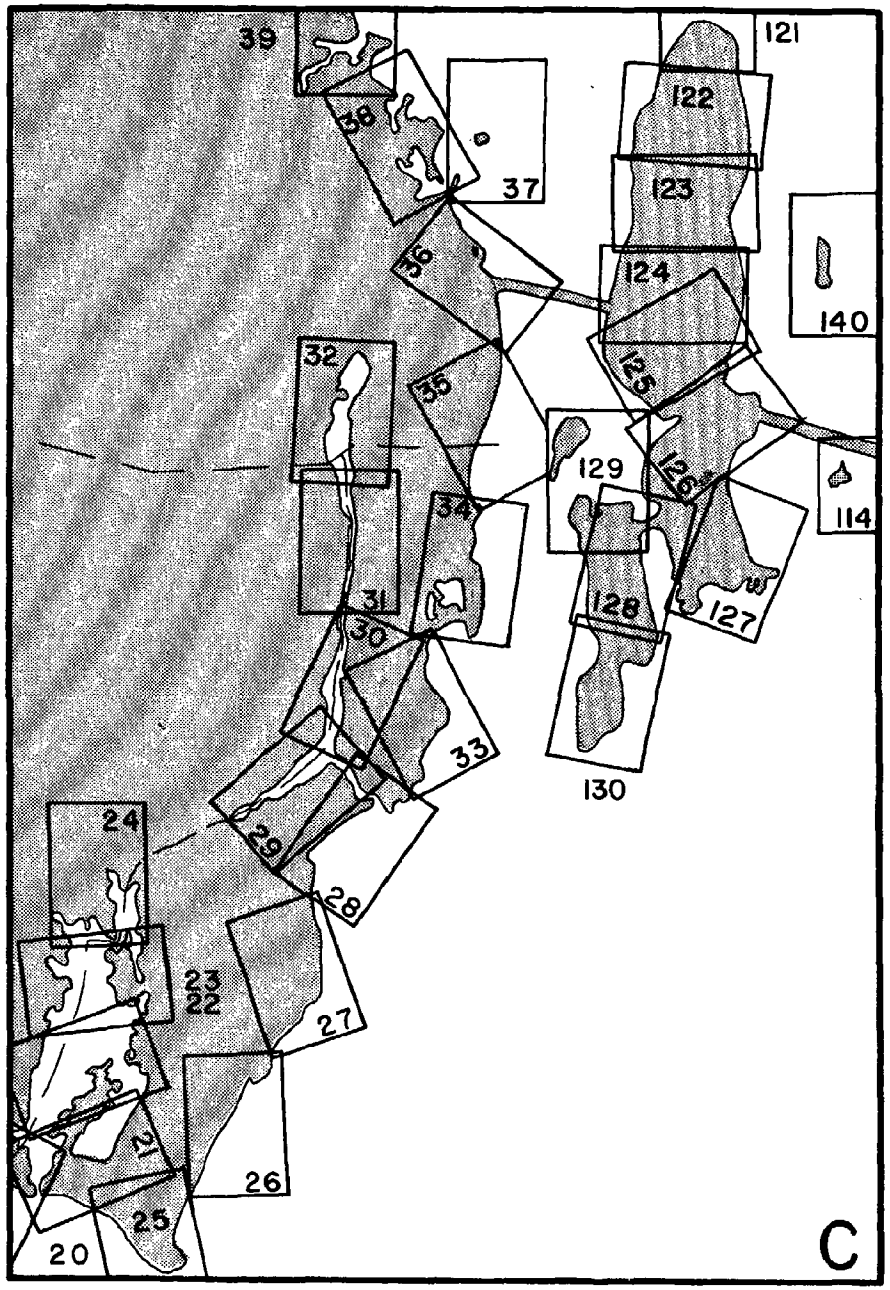
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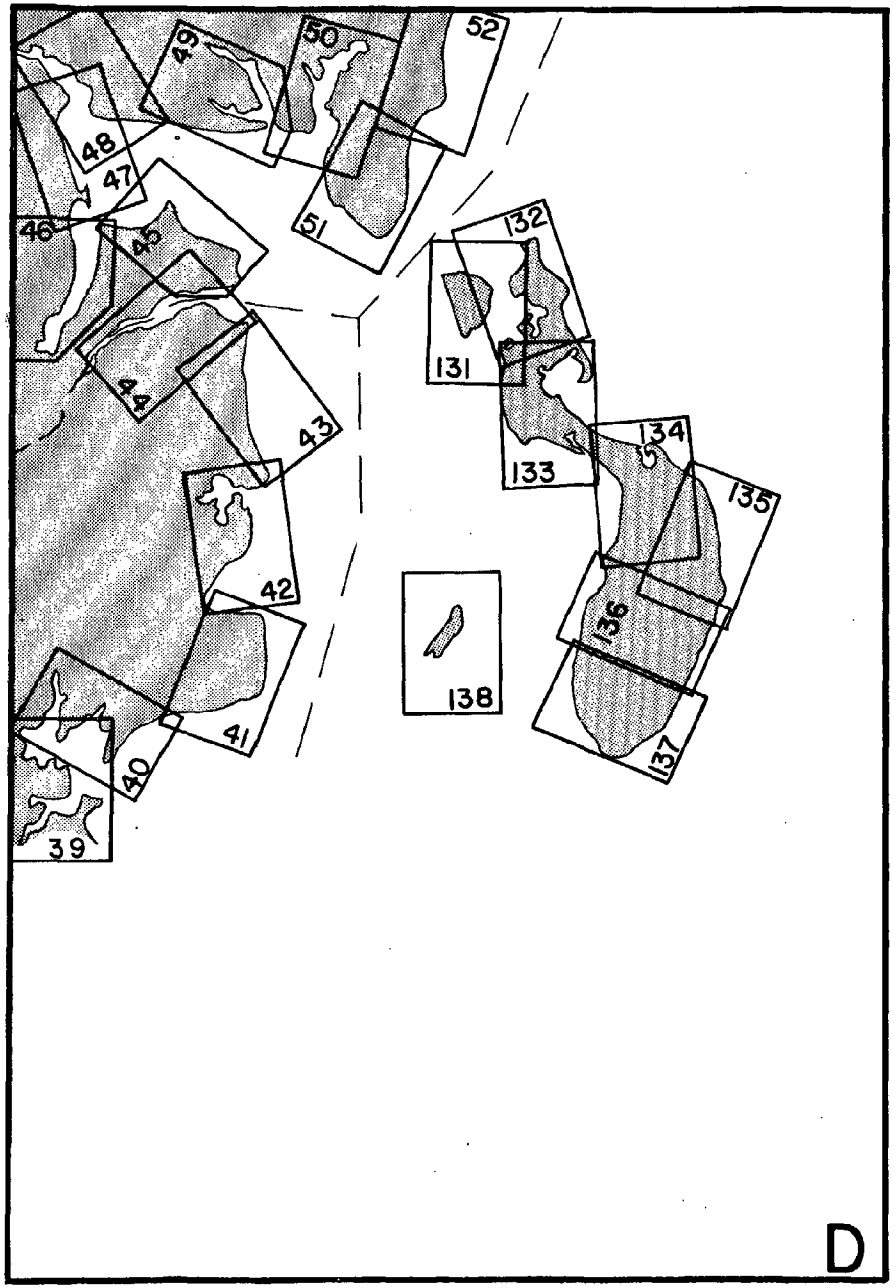
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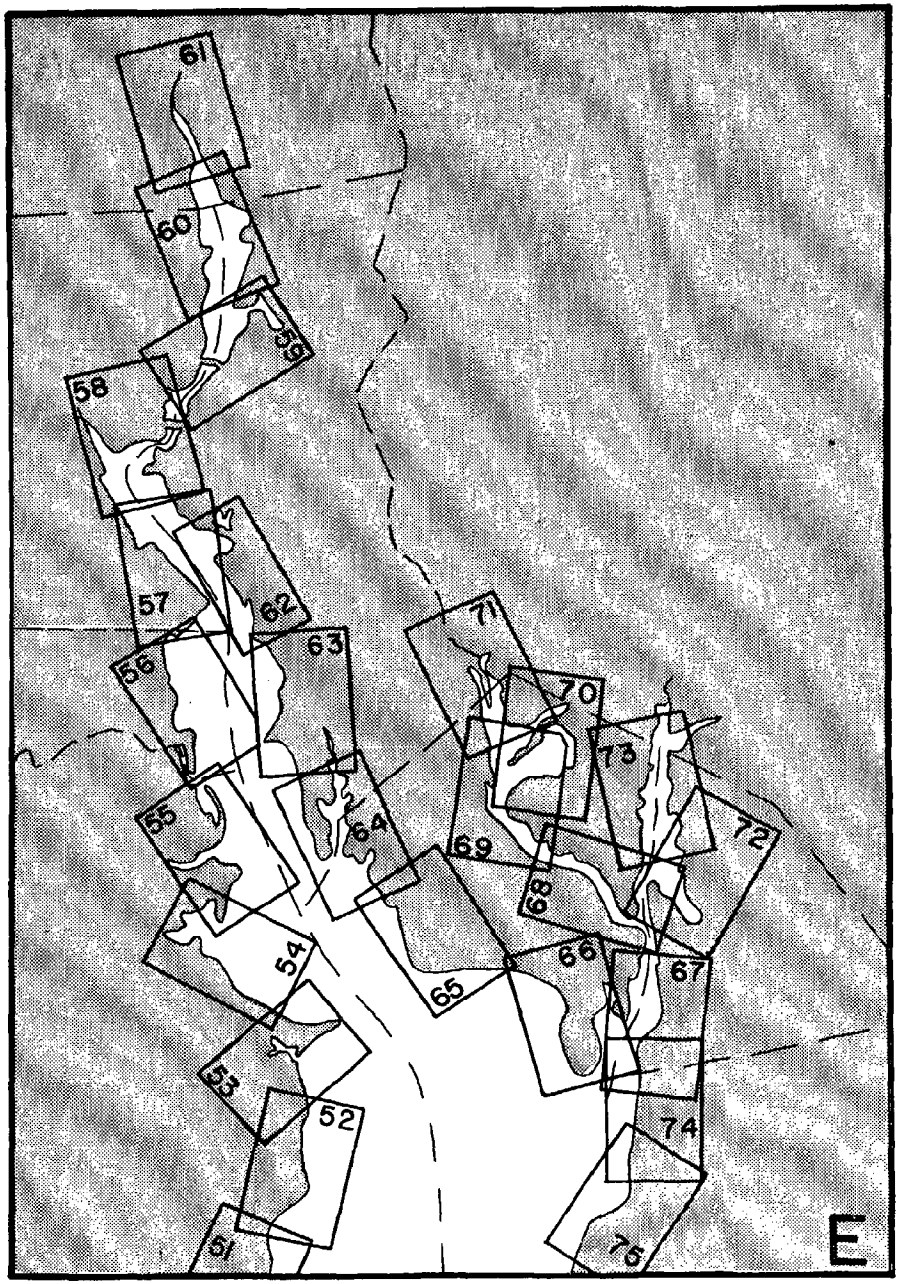
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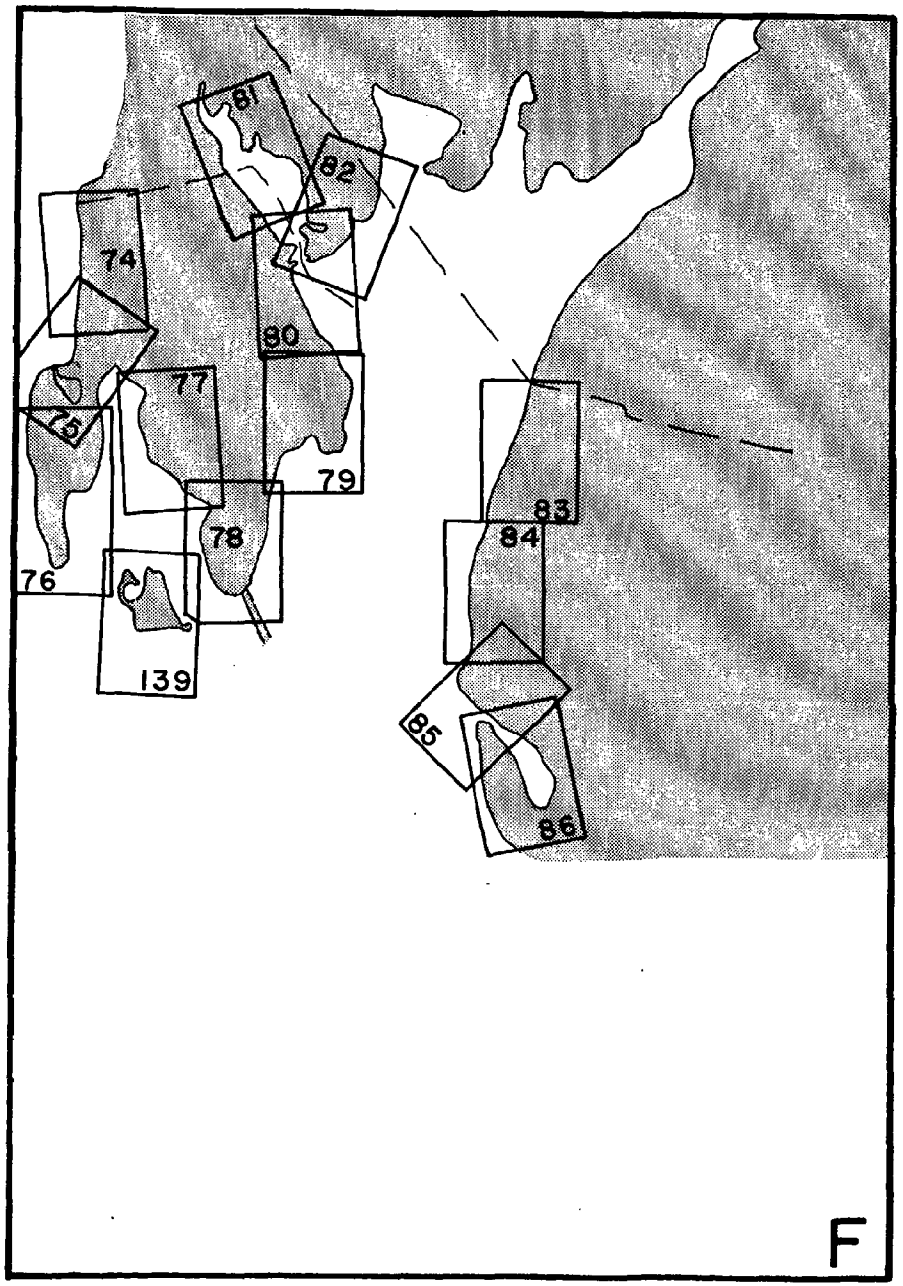
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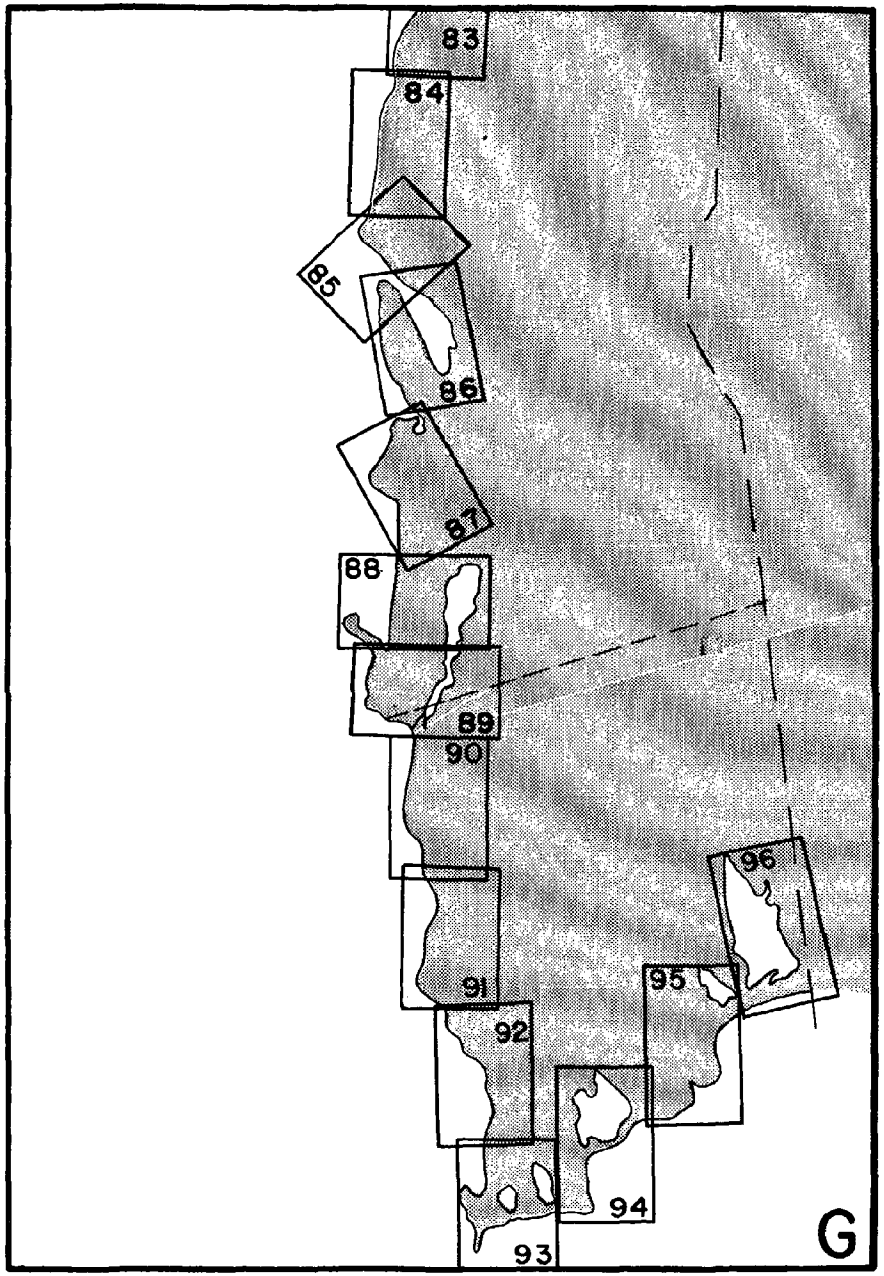
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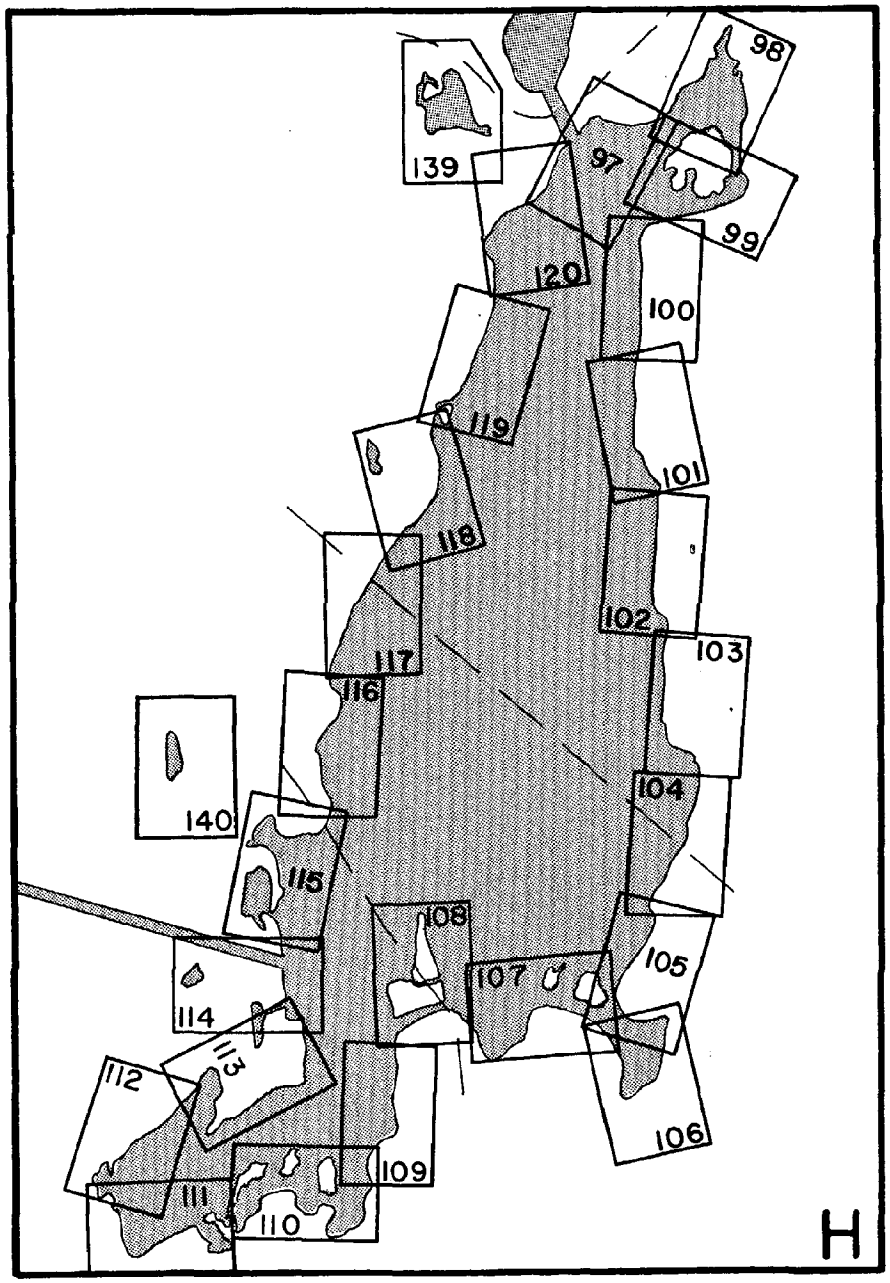
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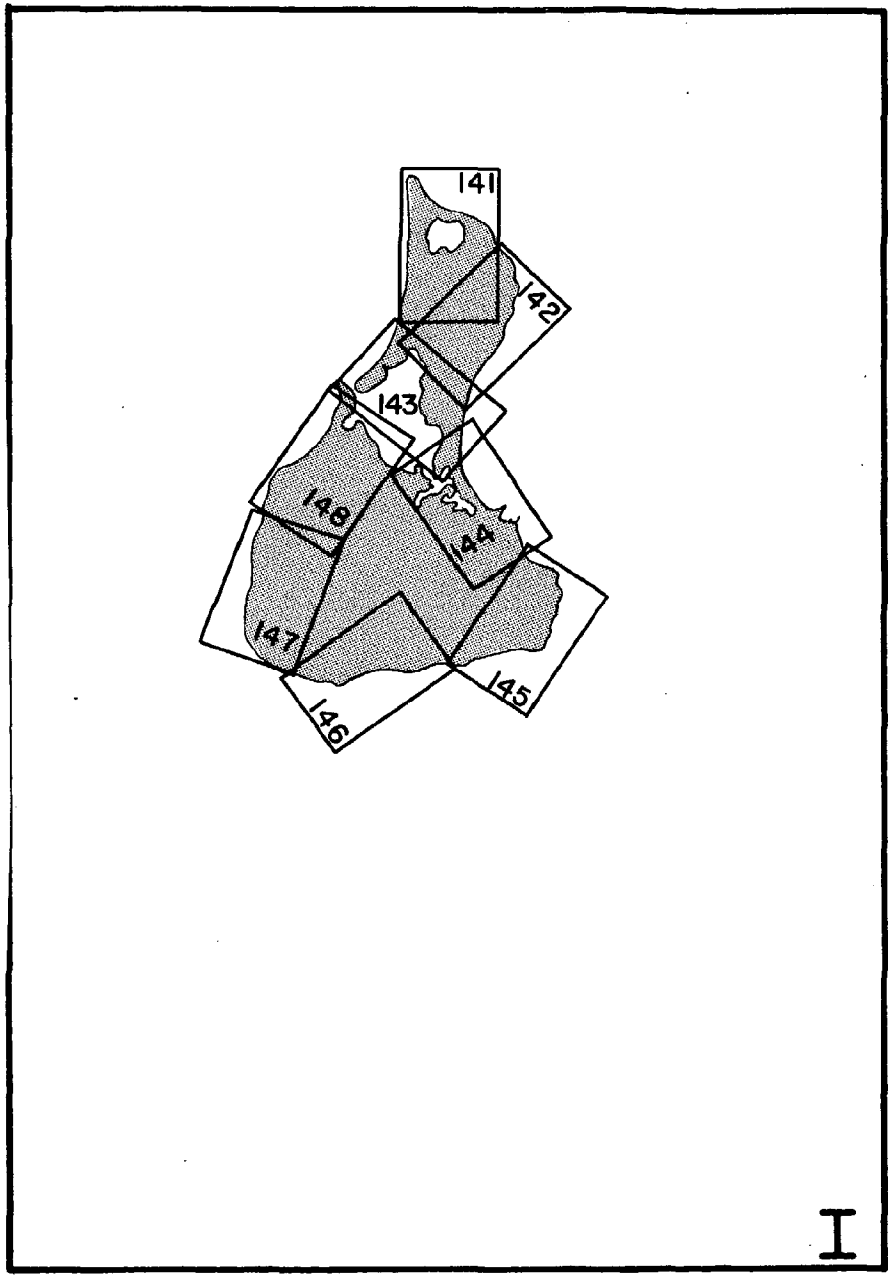
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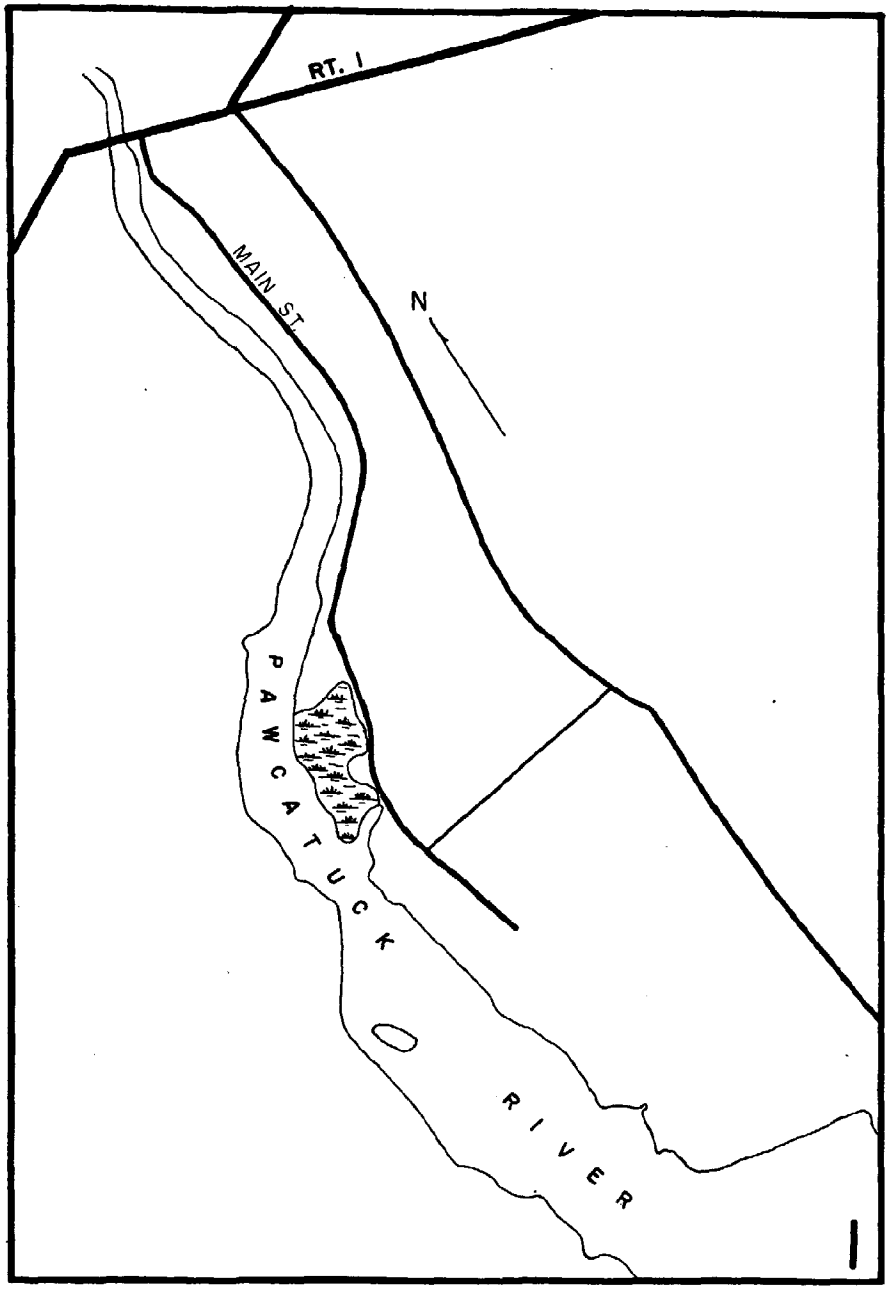
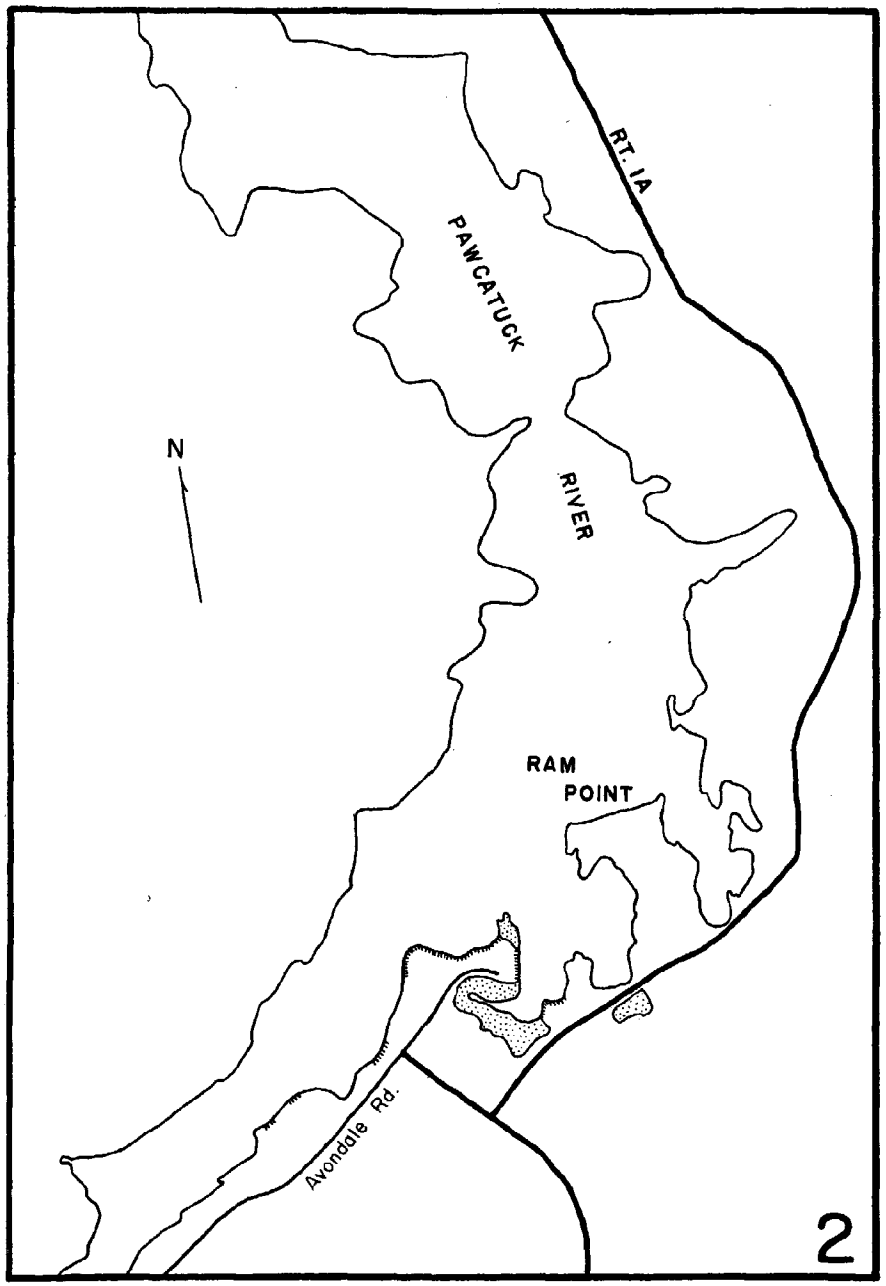
Inventory Maps

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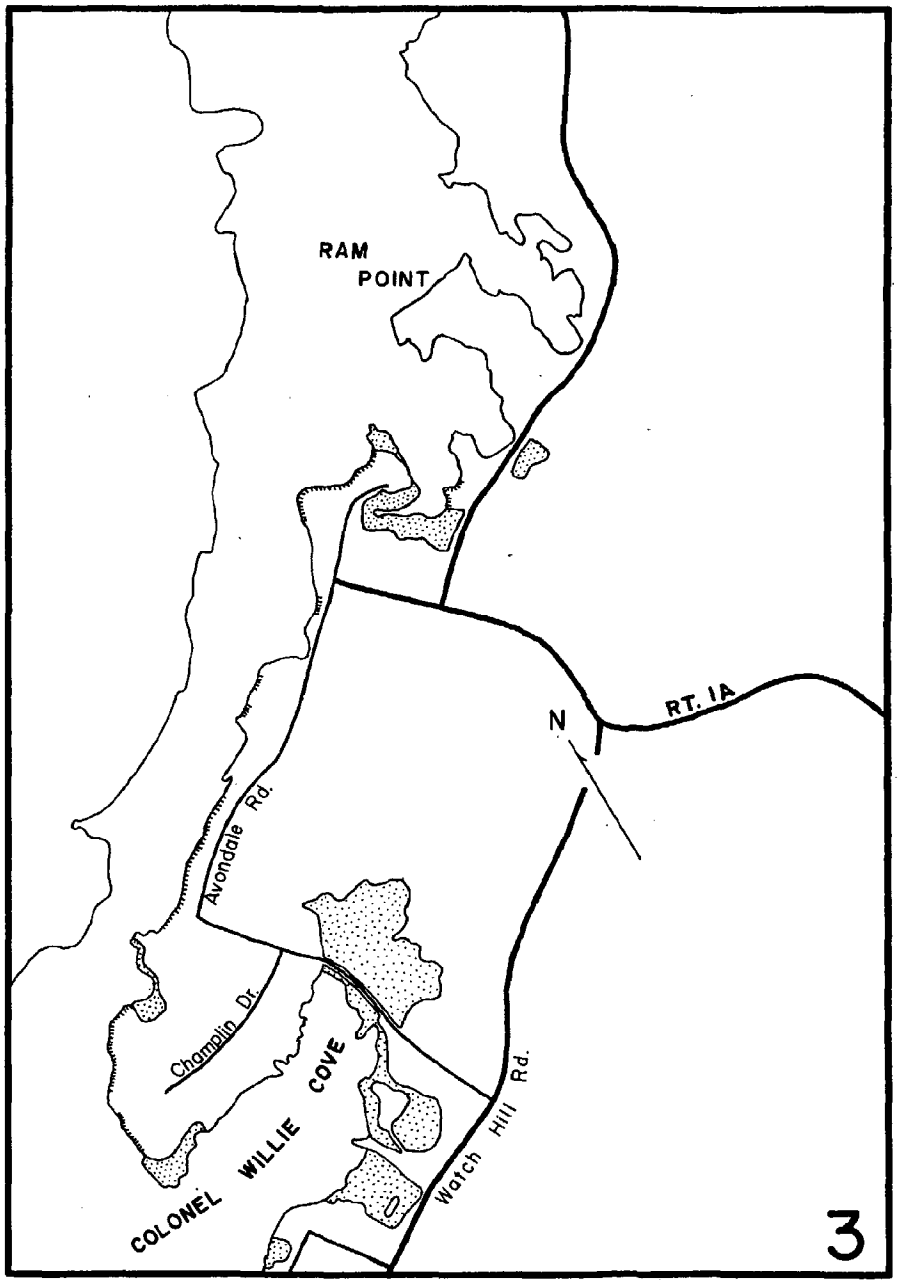
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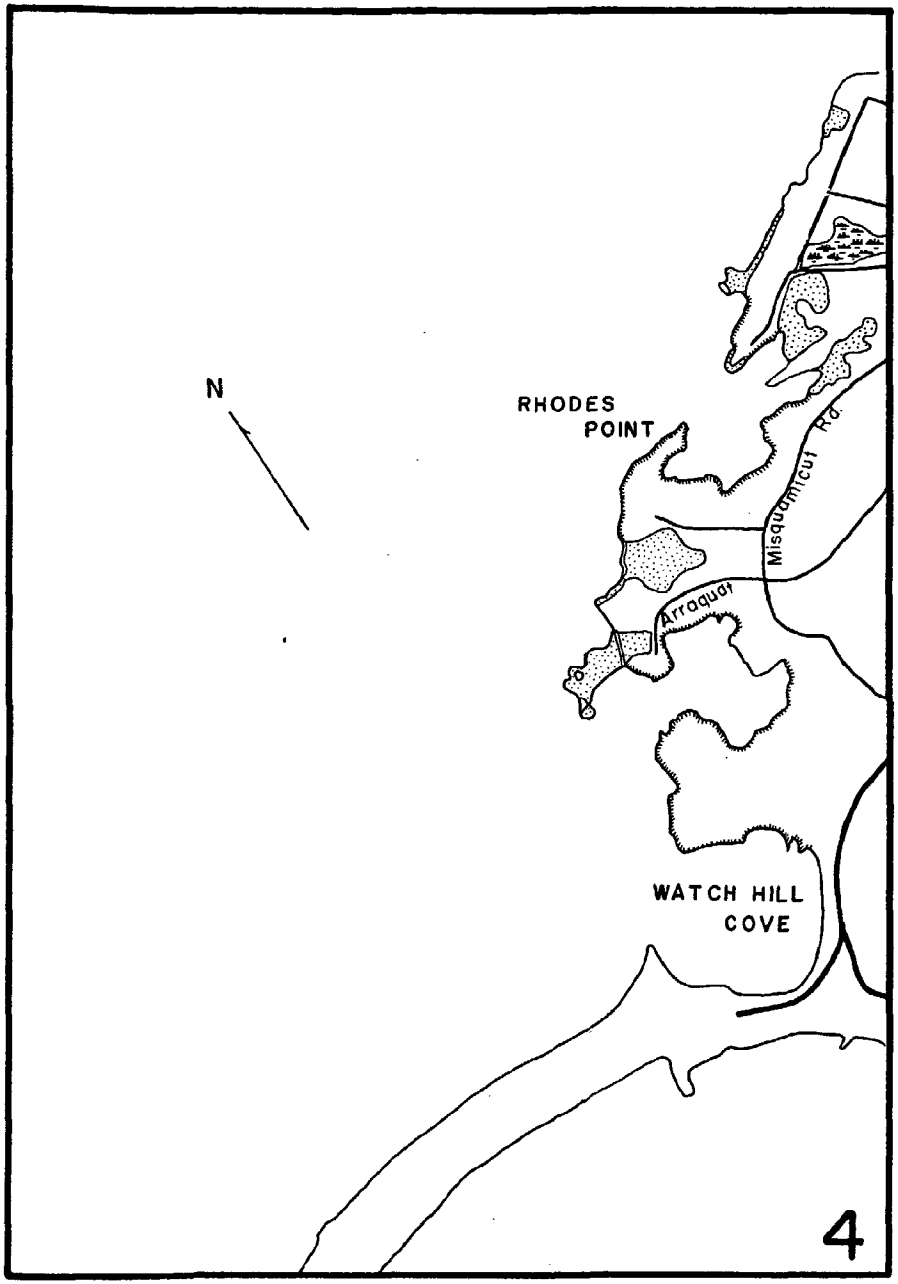
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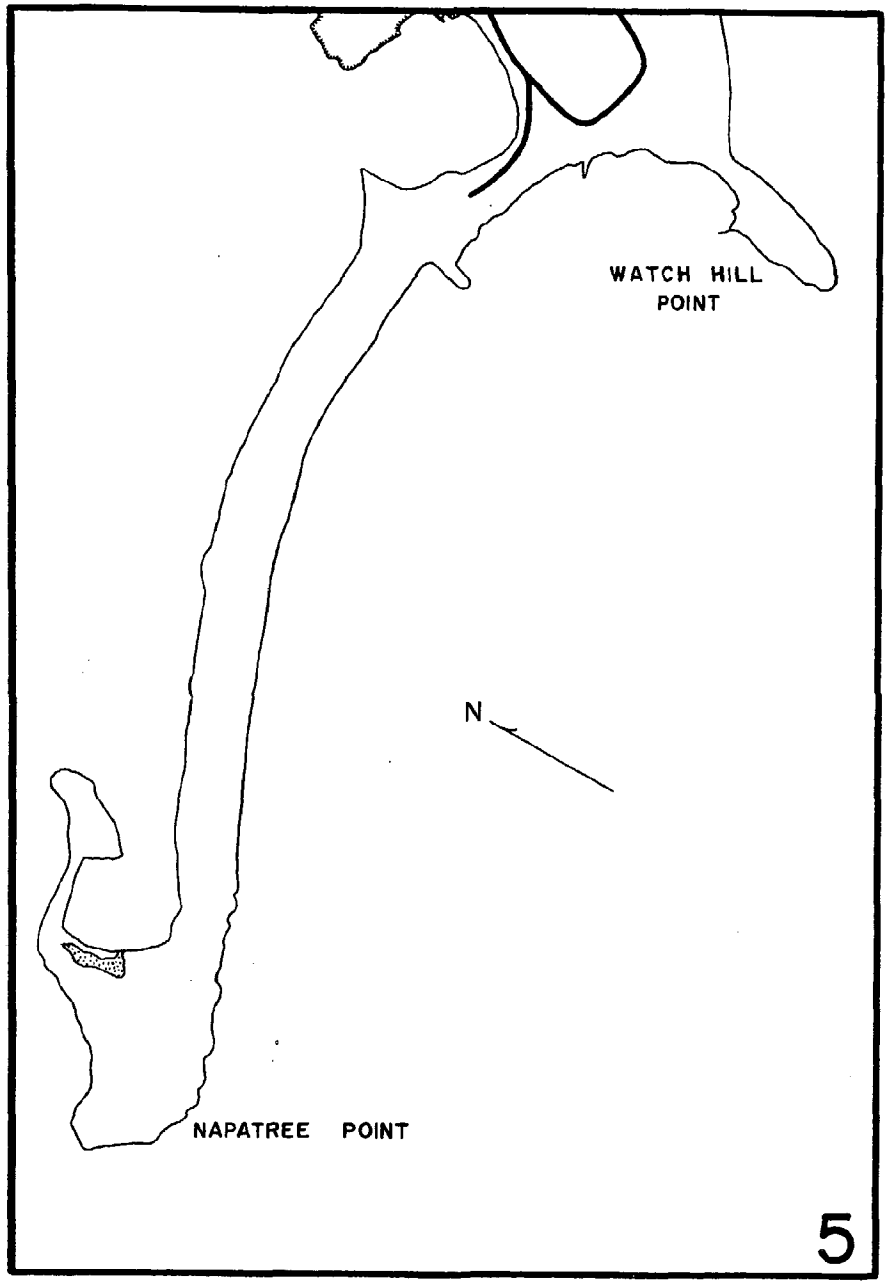
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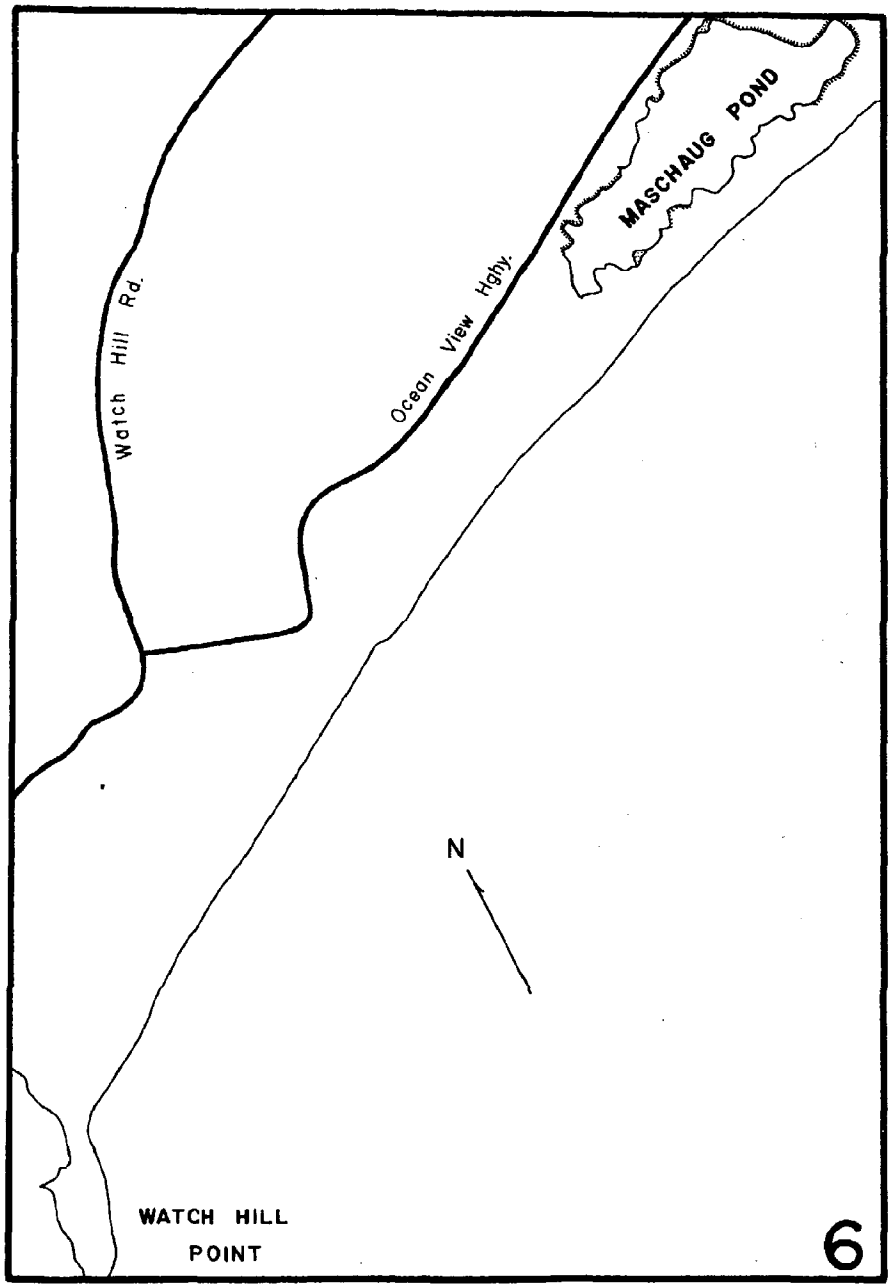
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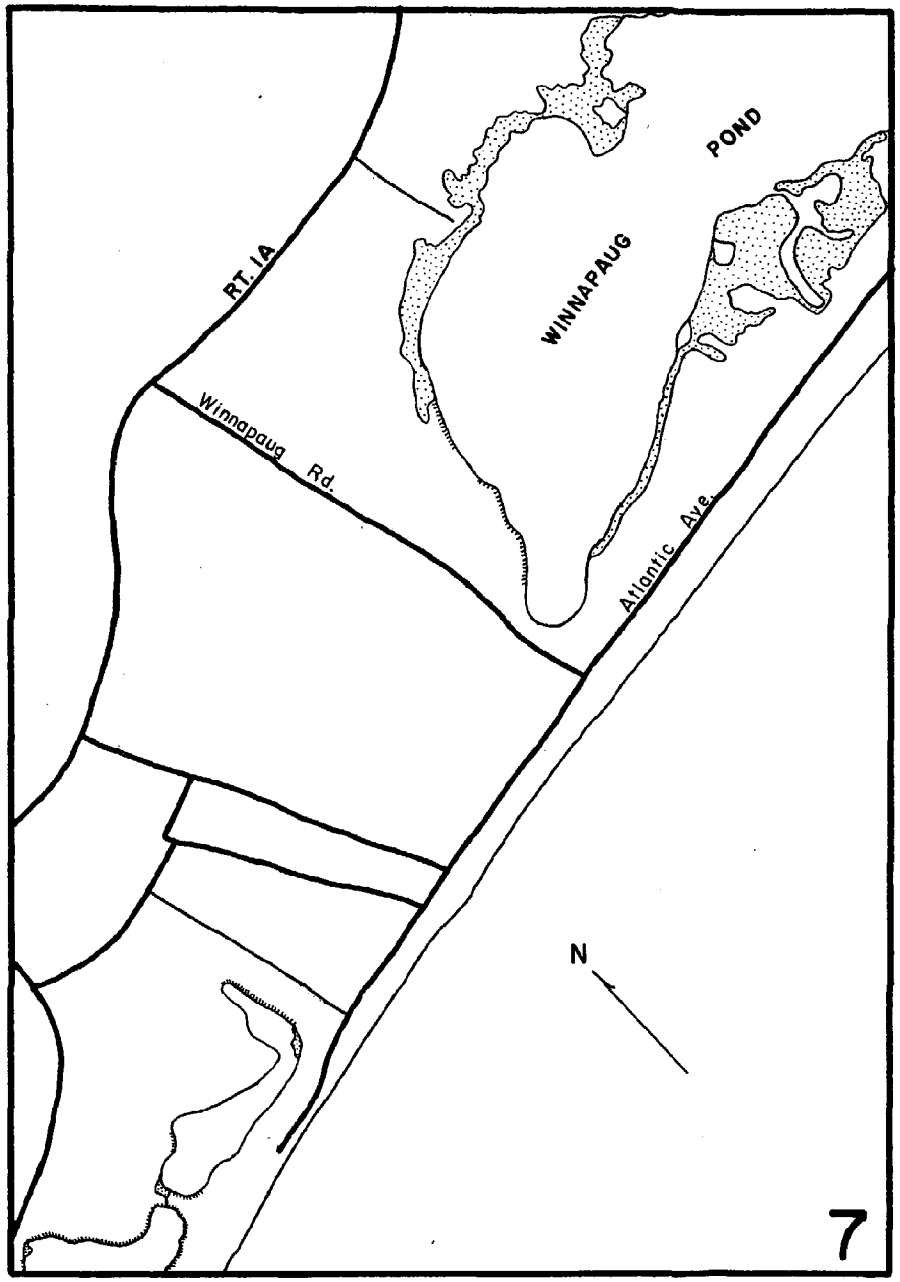
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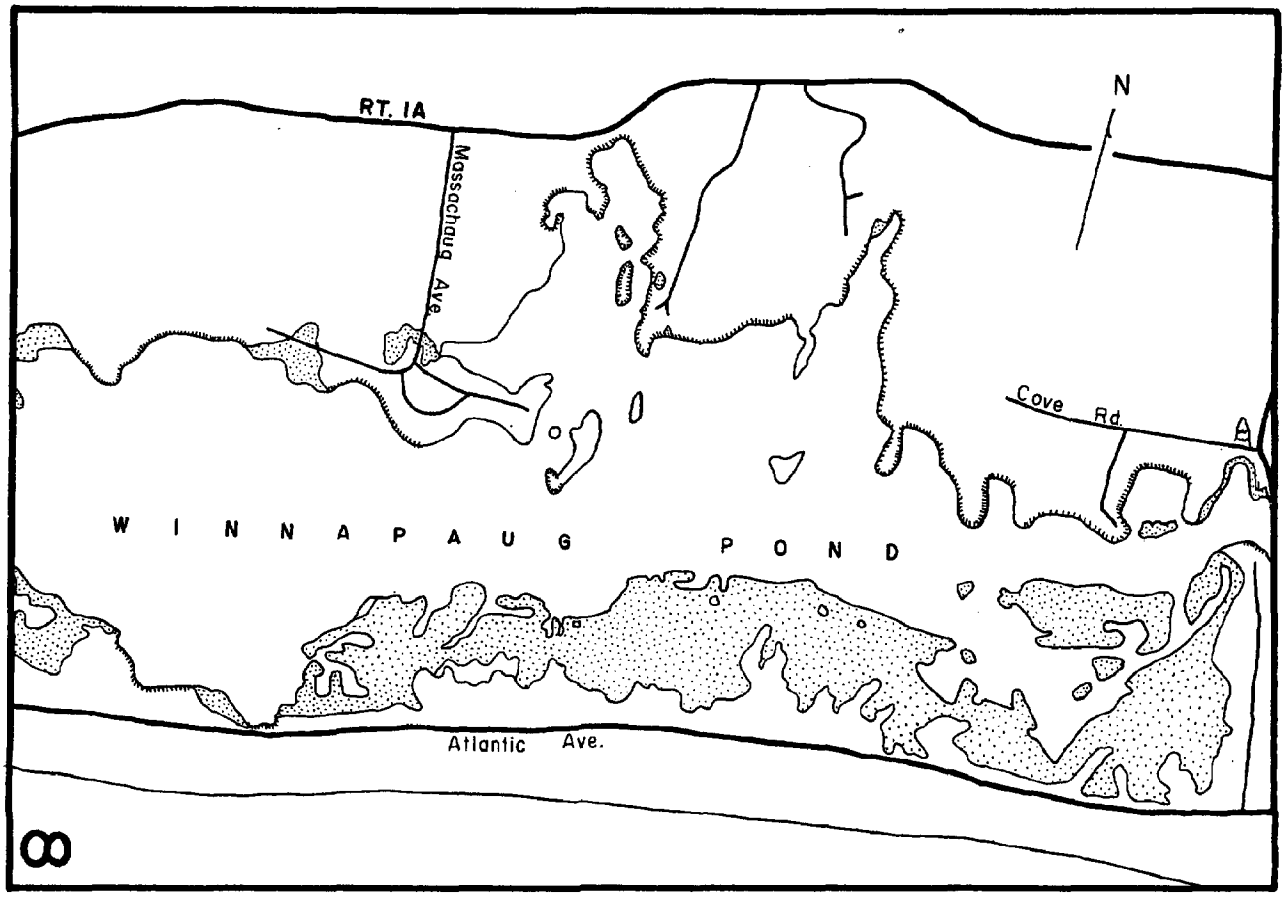
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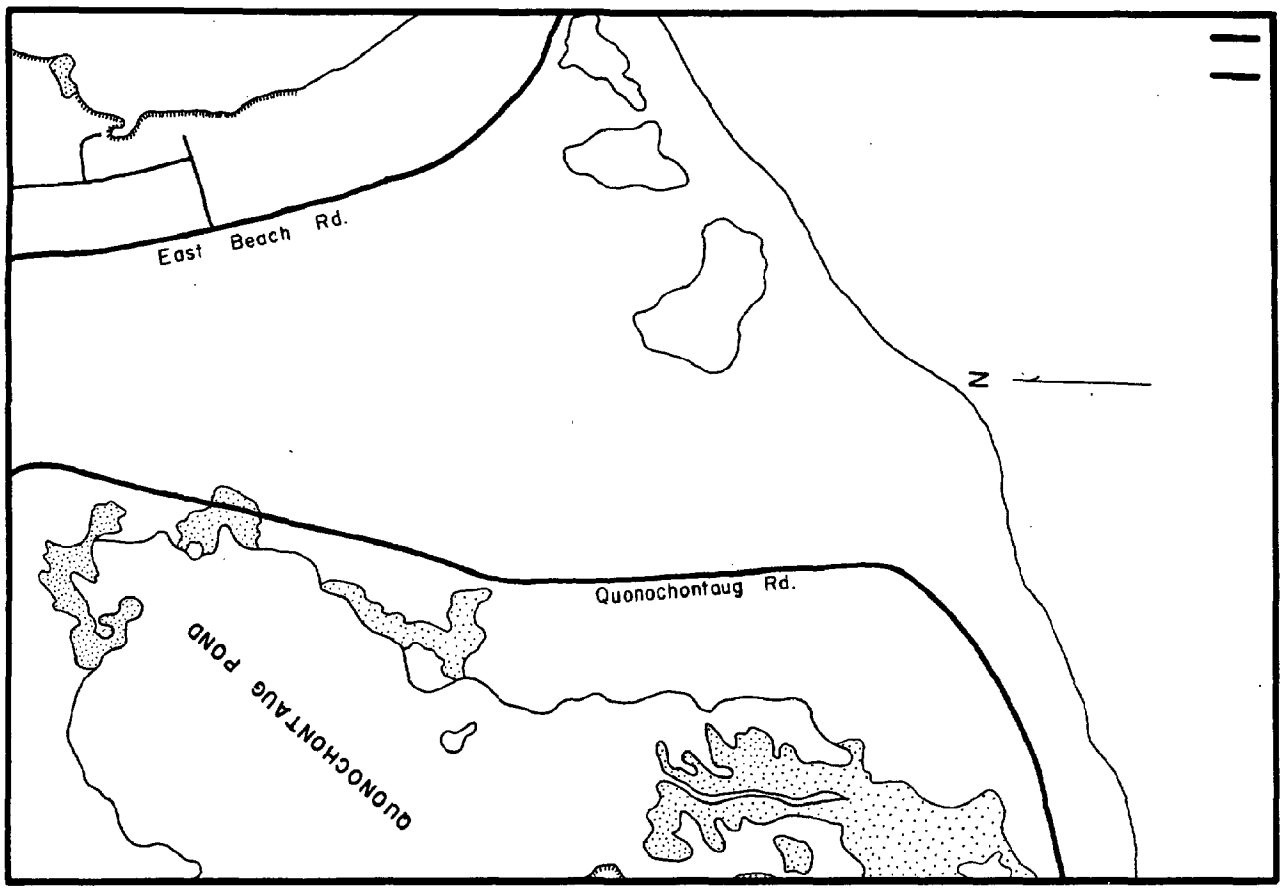
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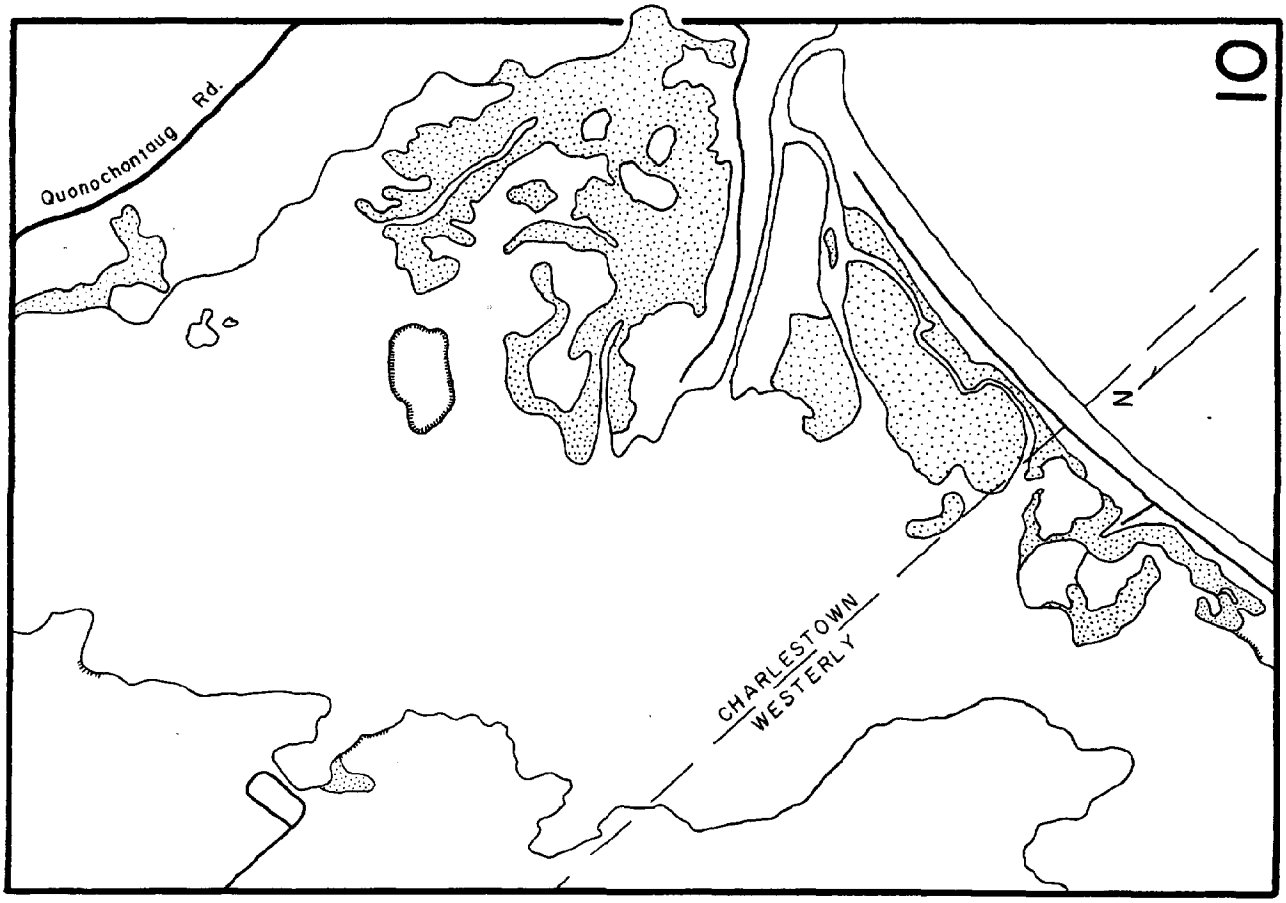
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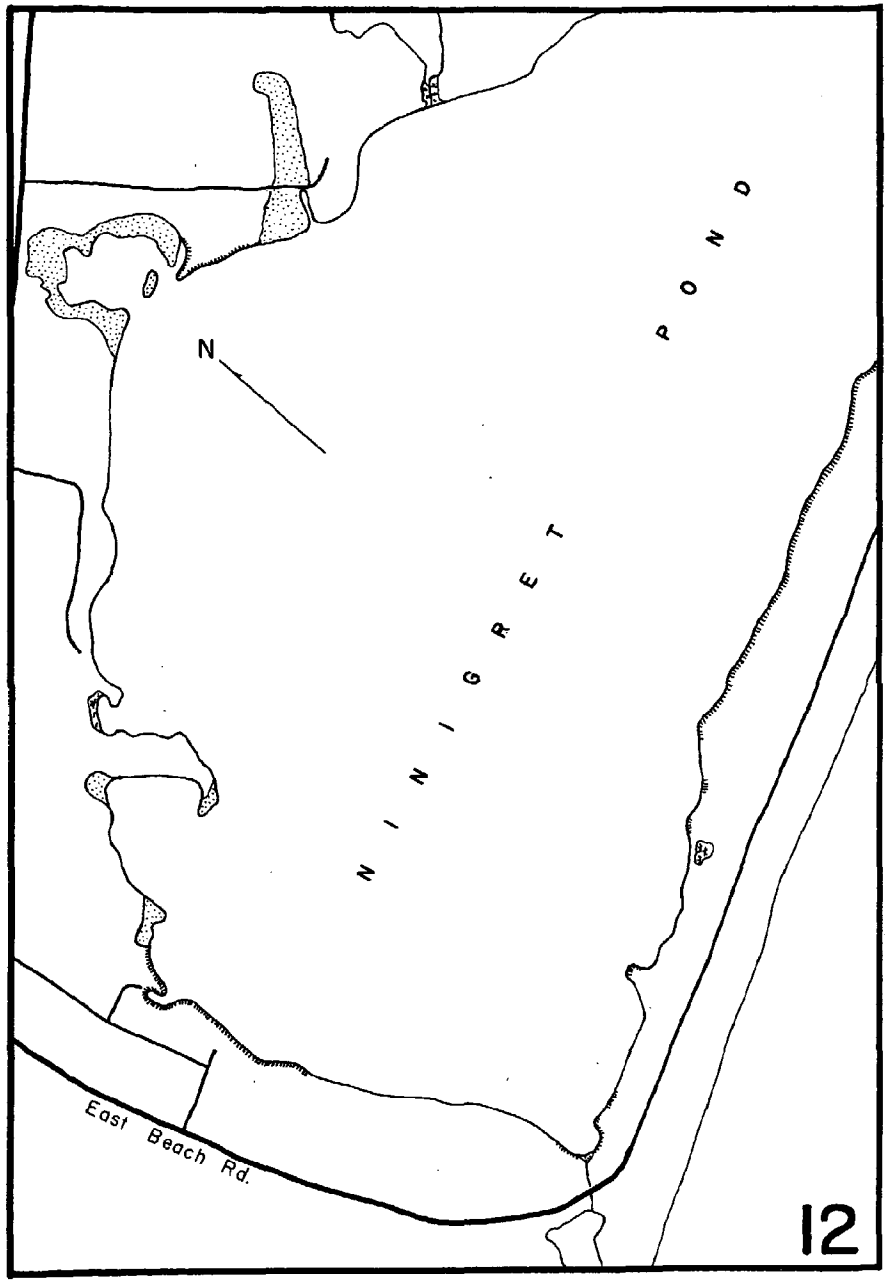
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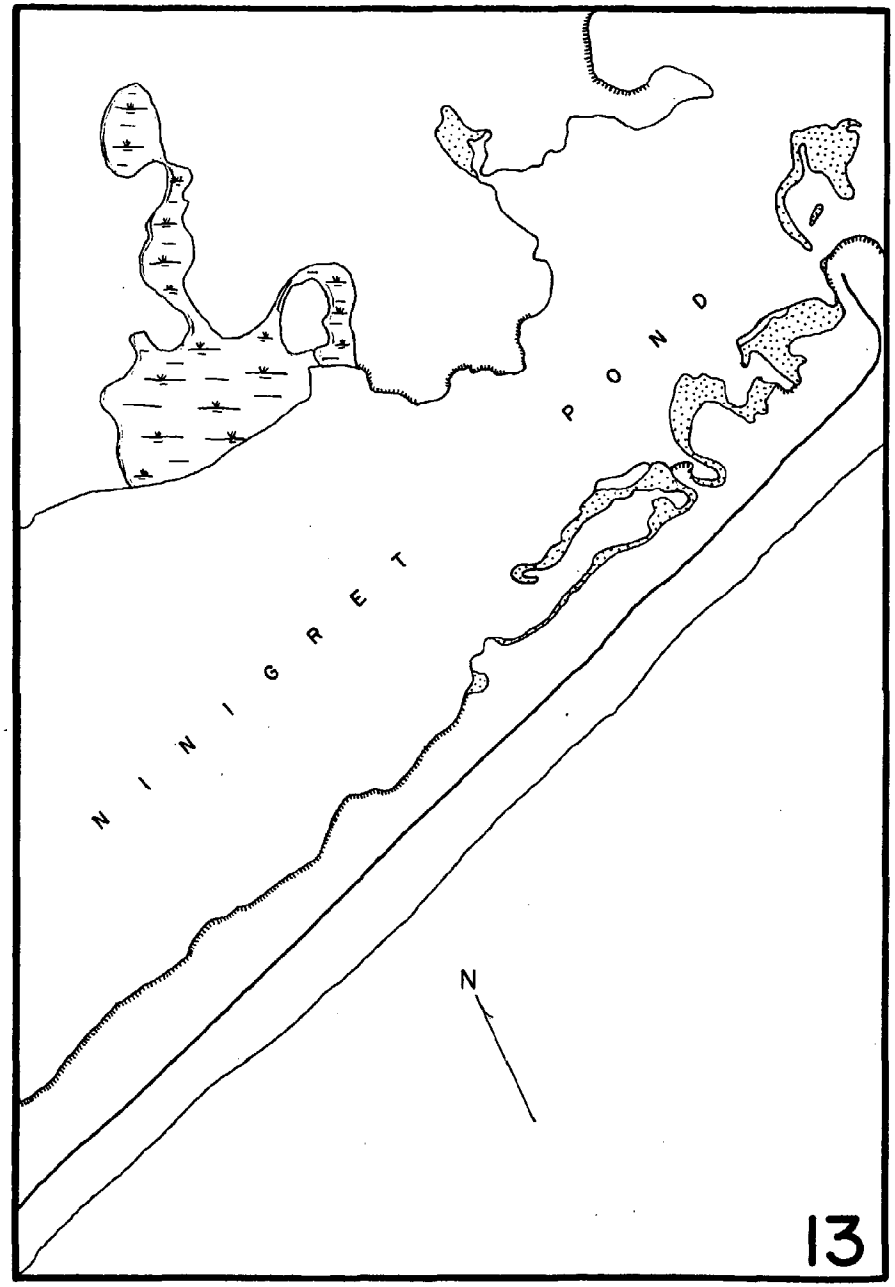
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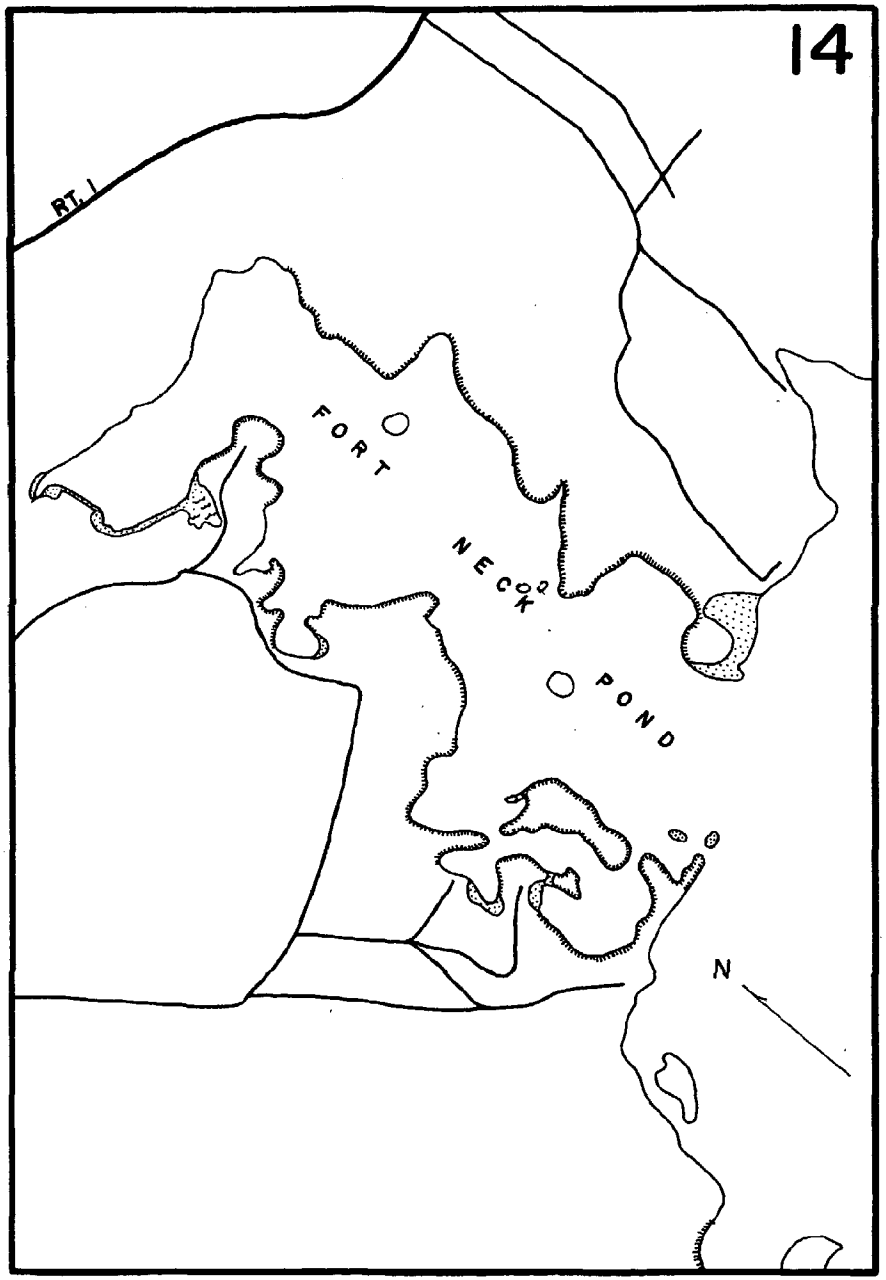
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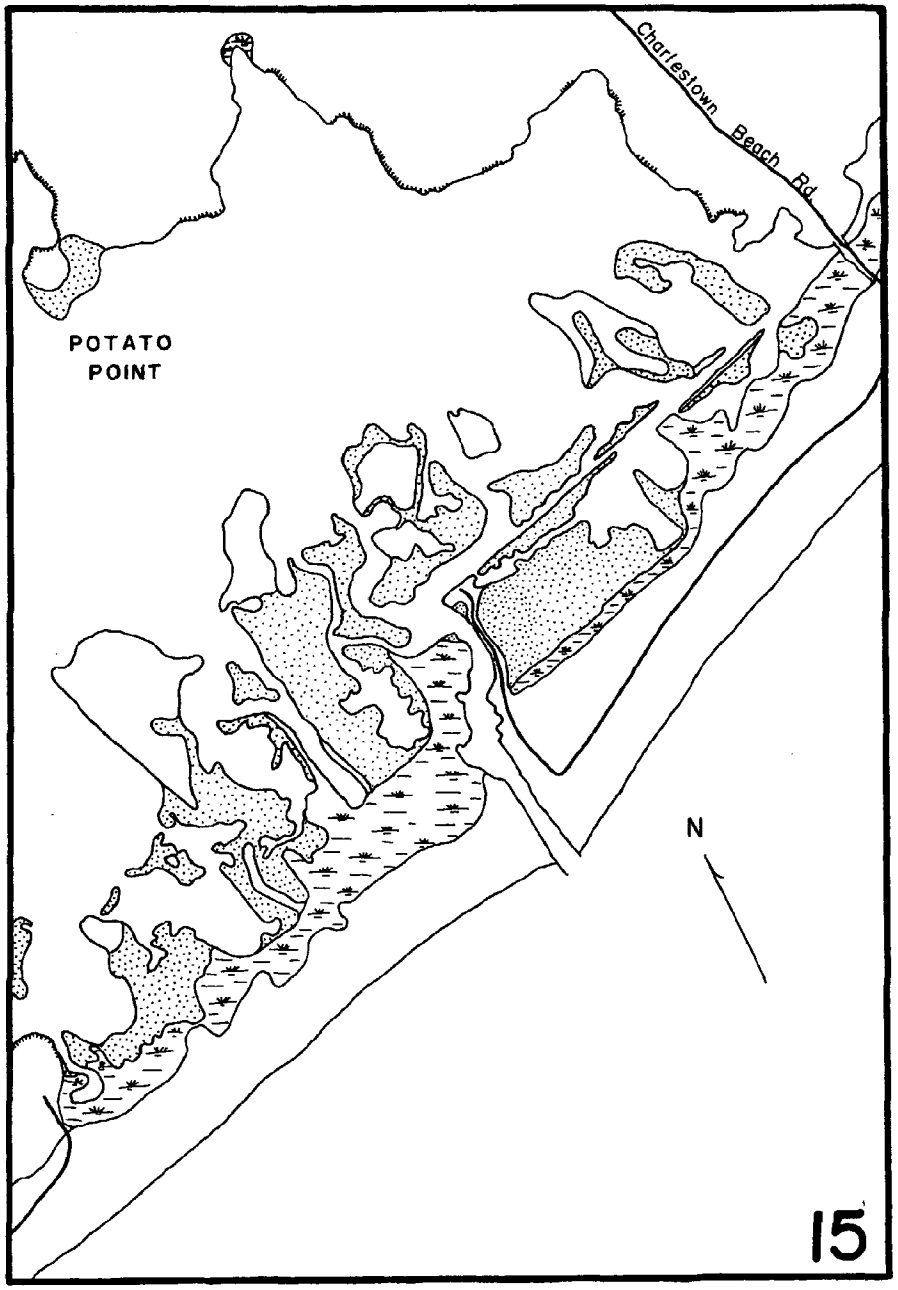
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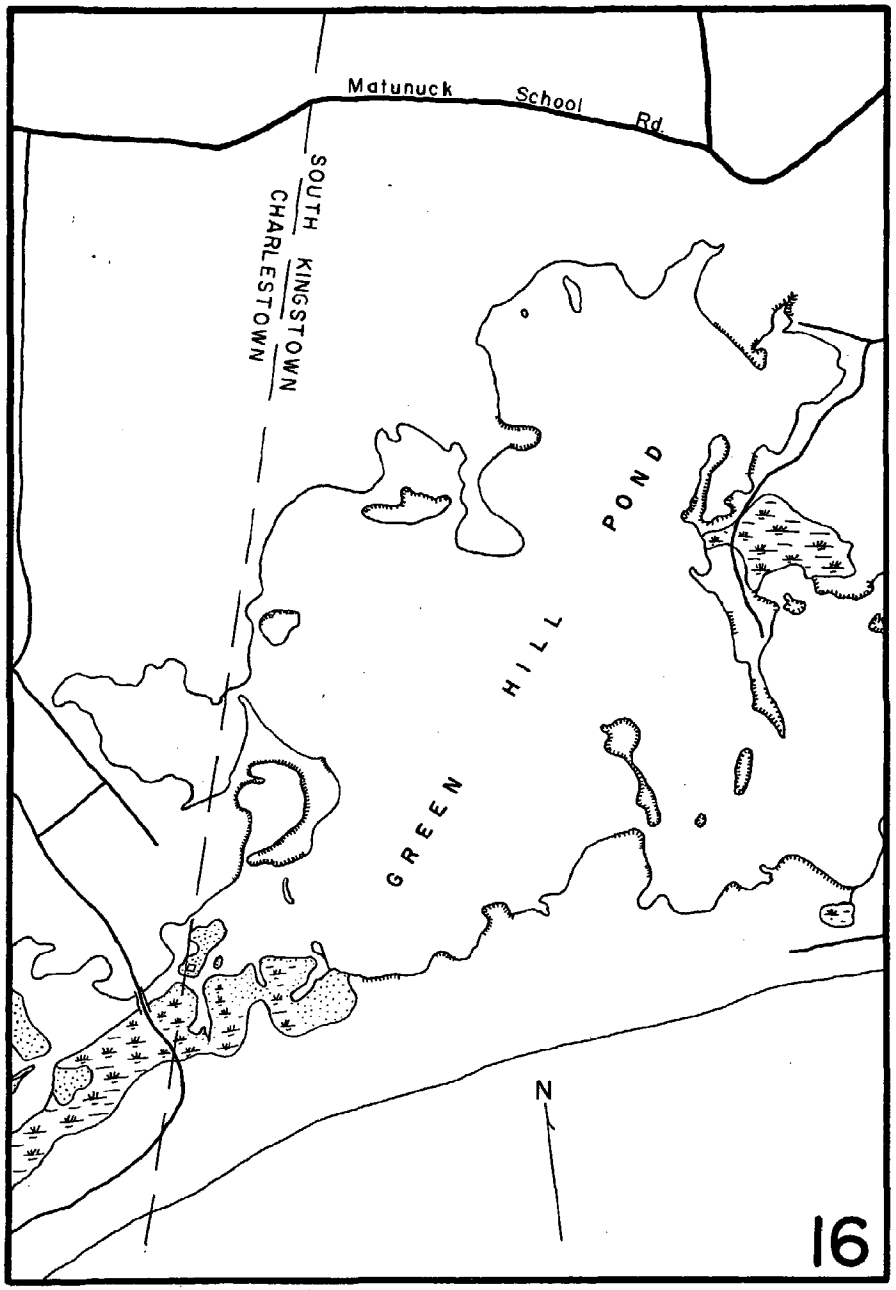
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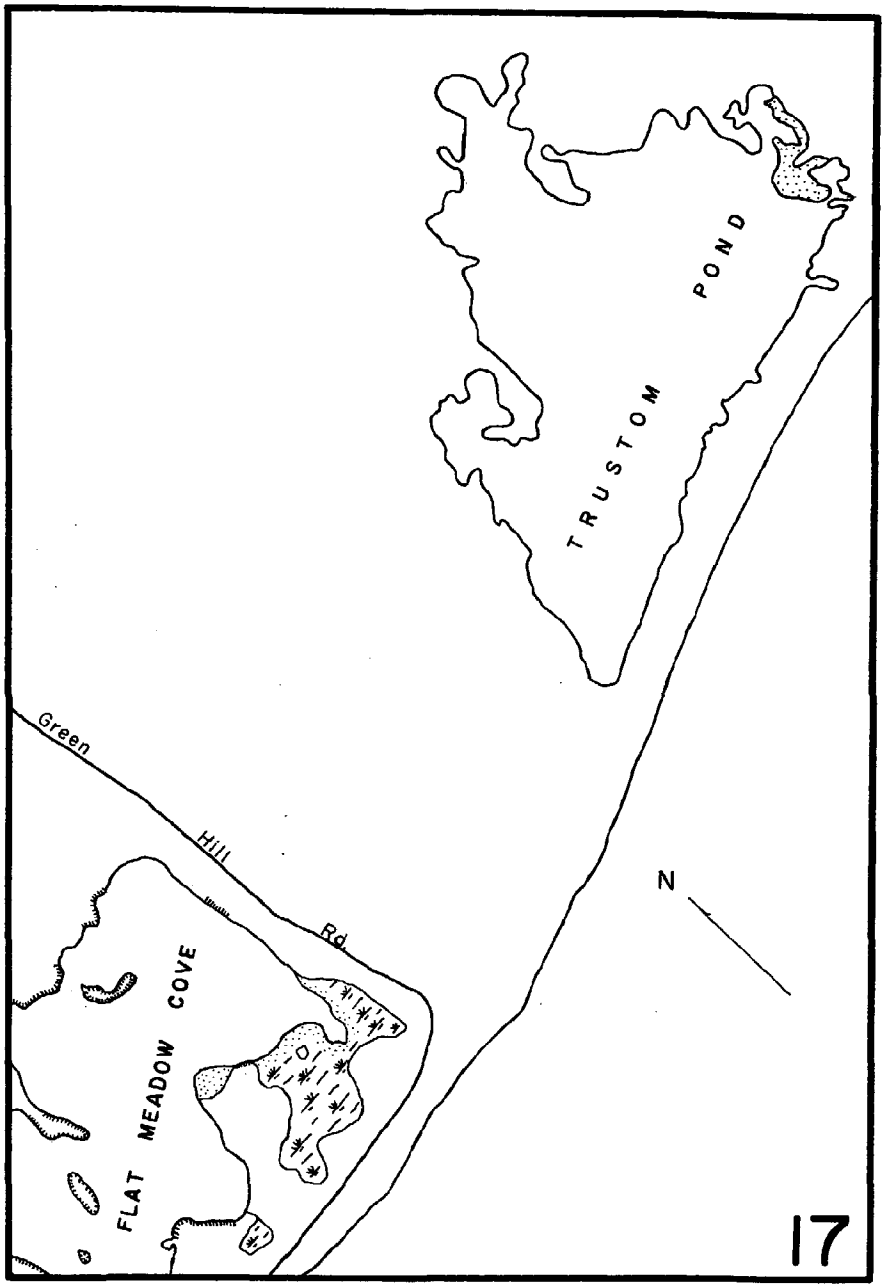
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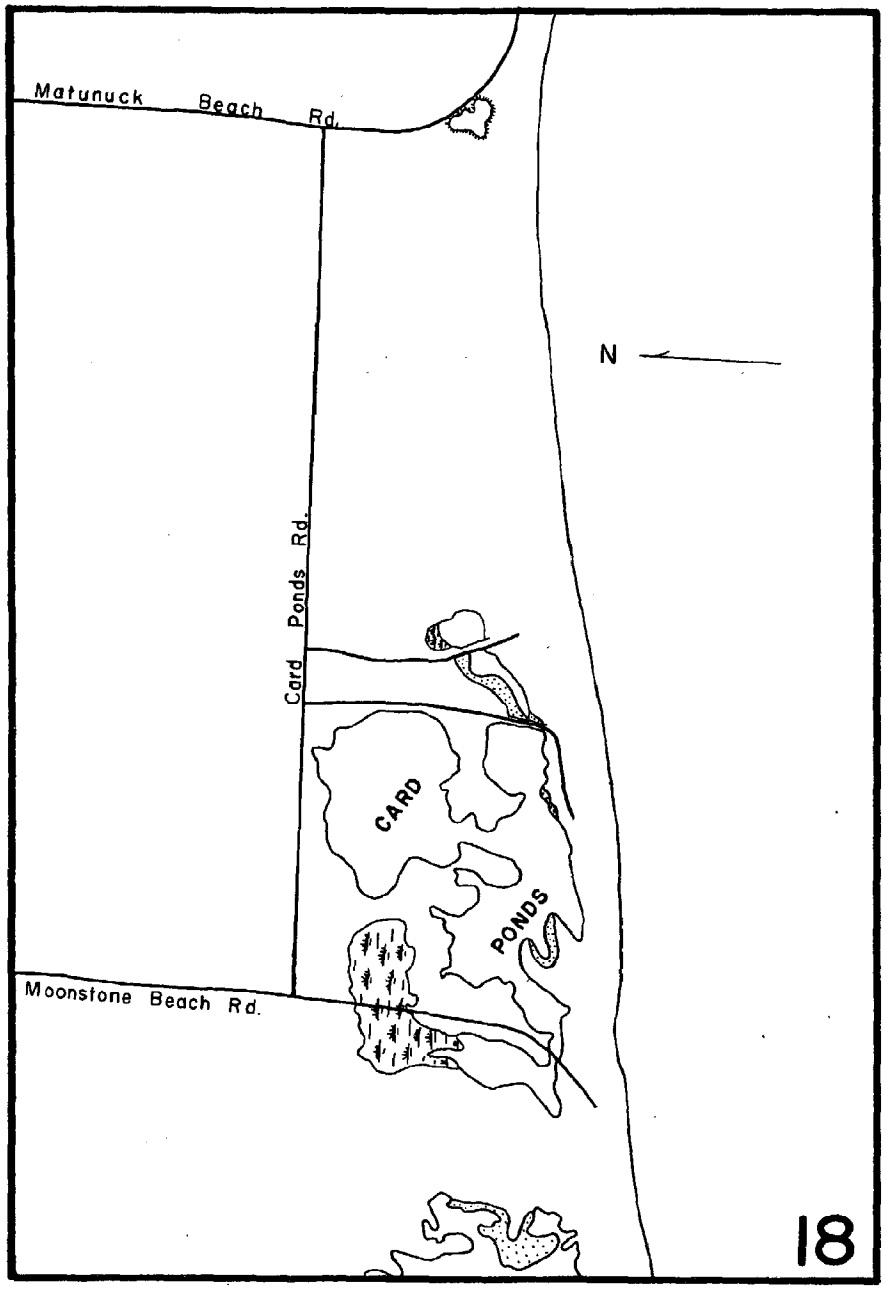
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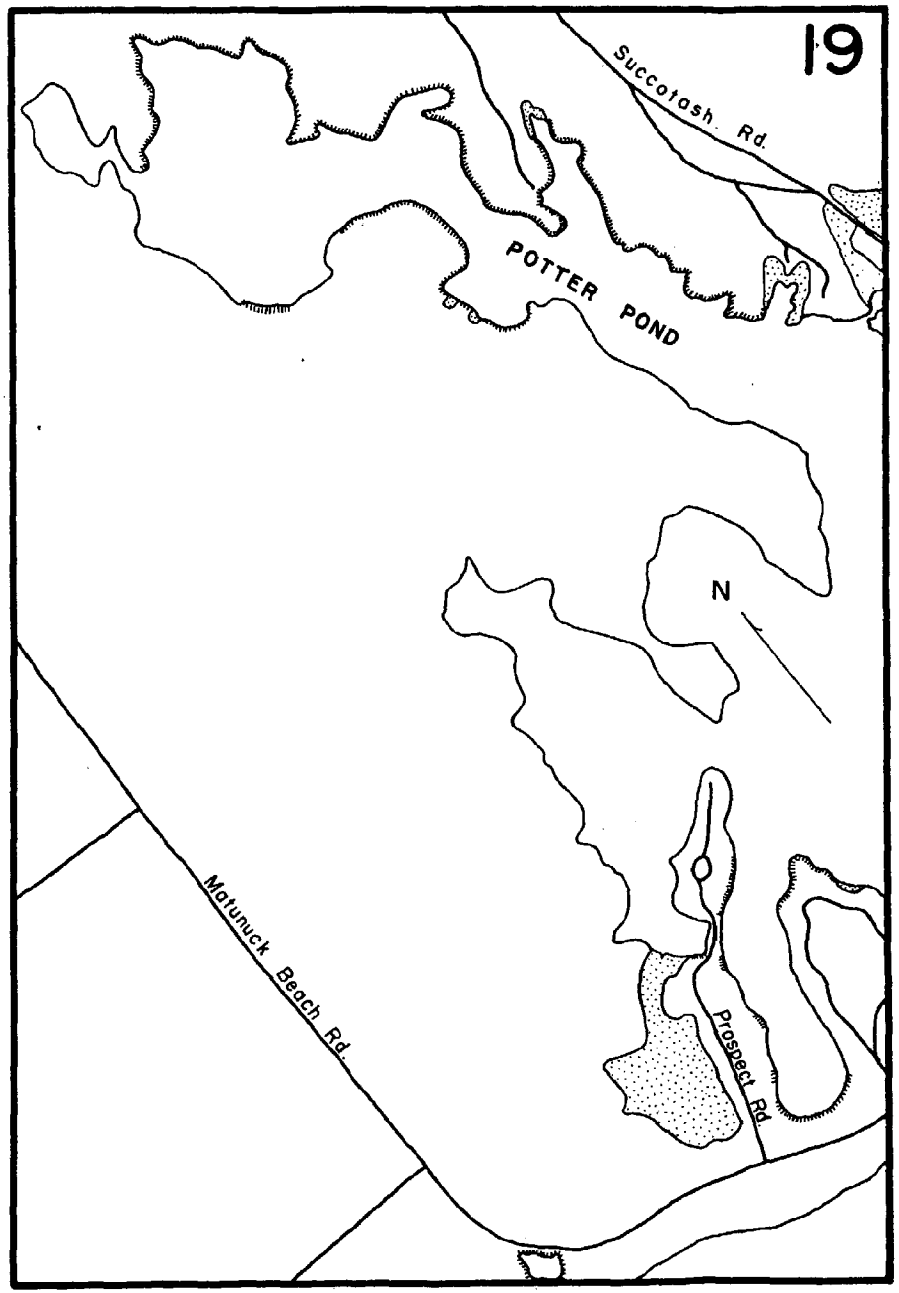
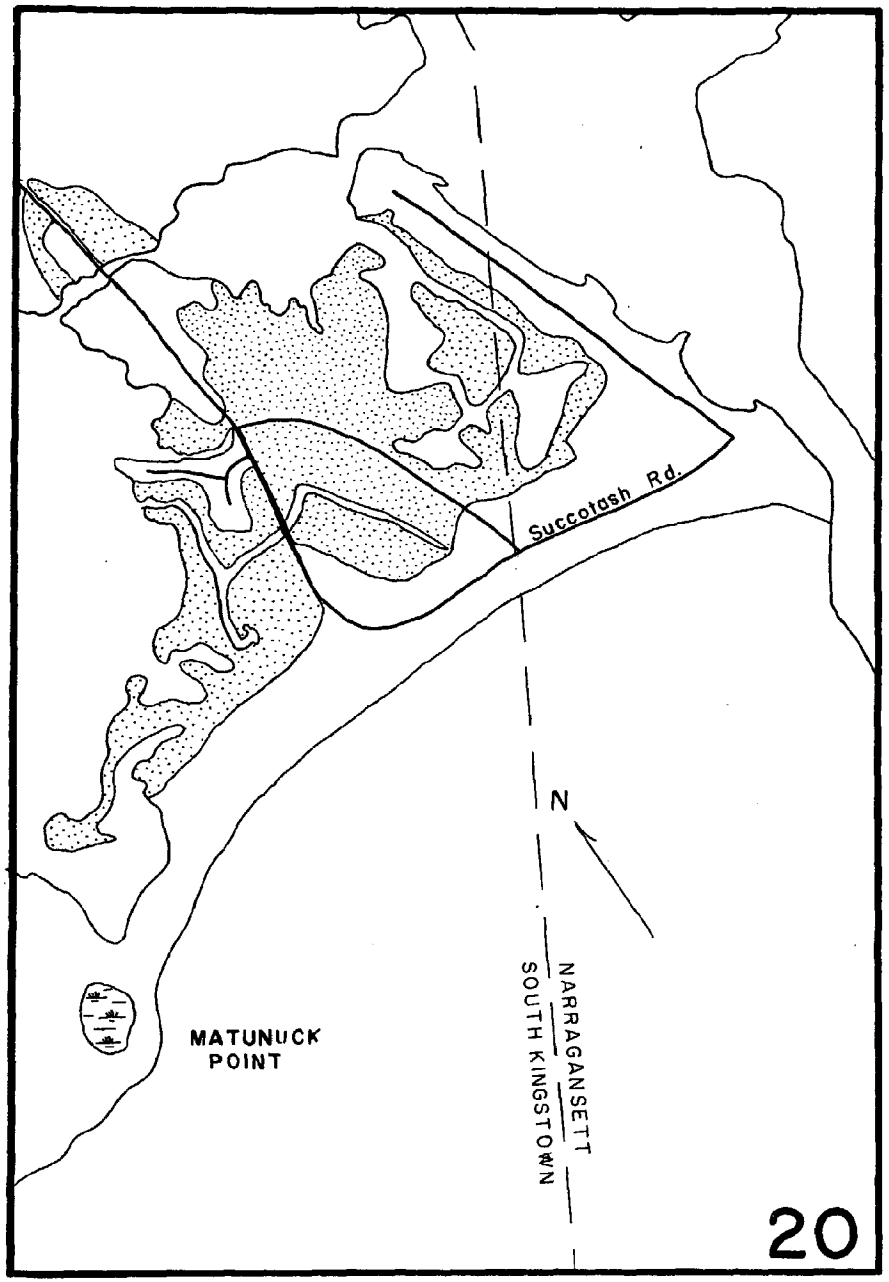
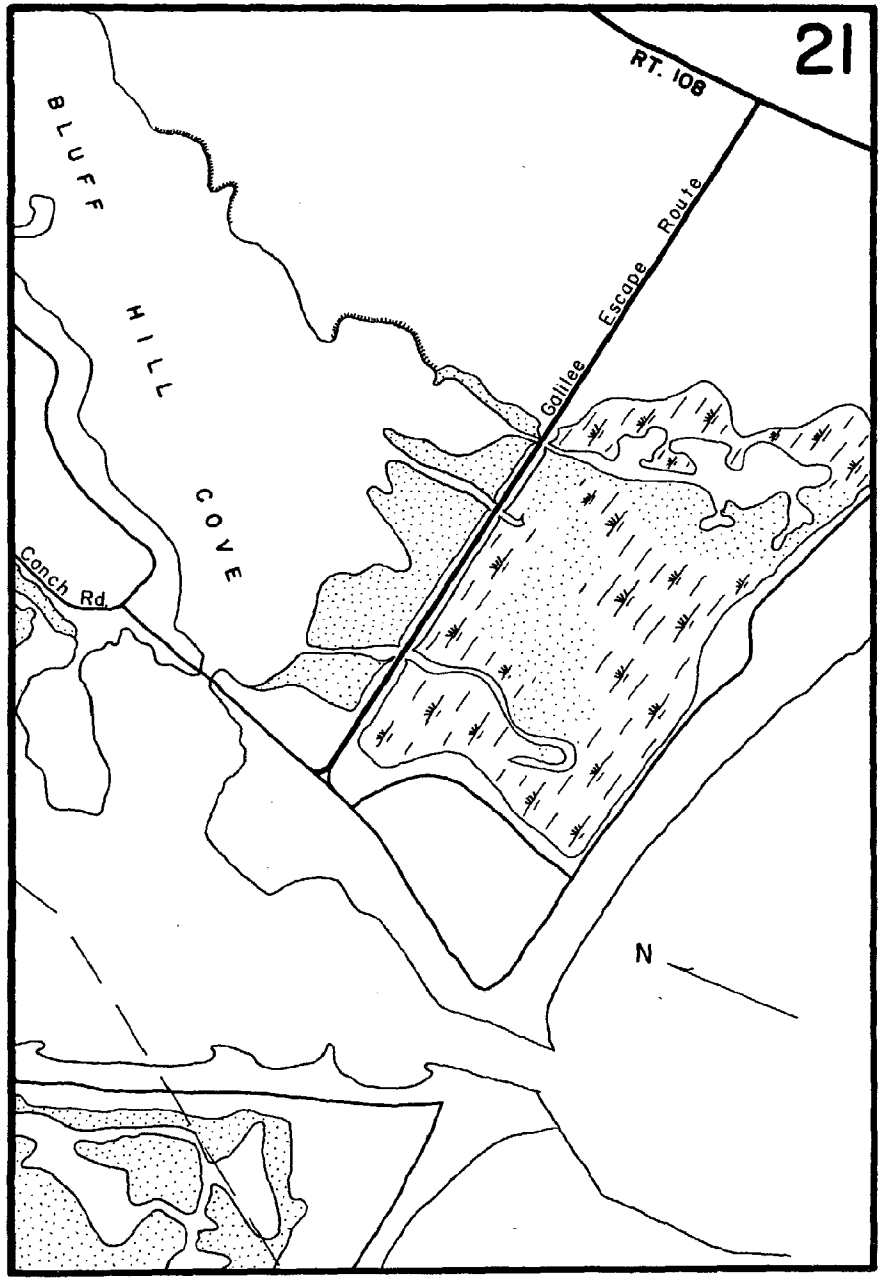
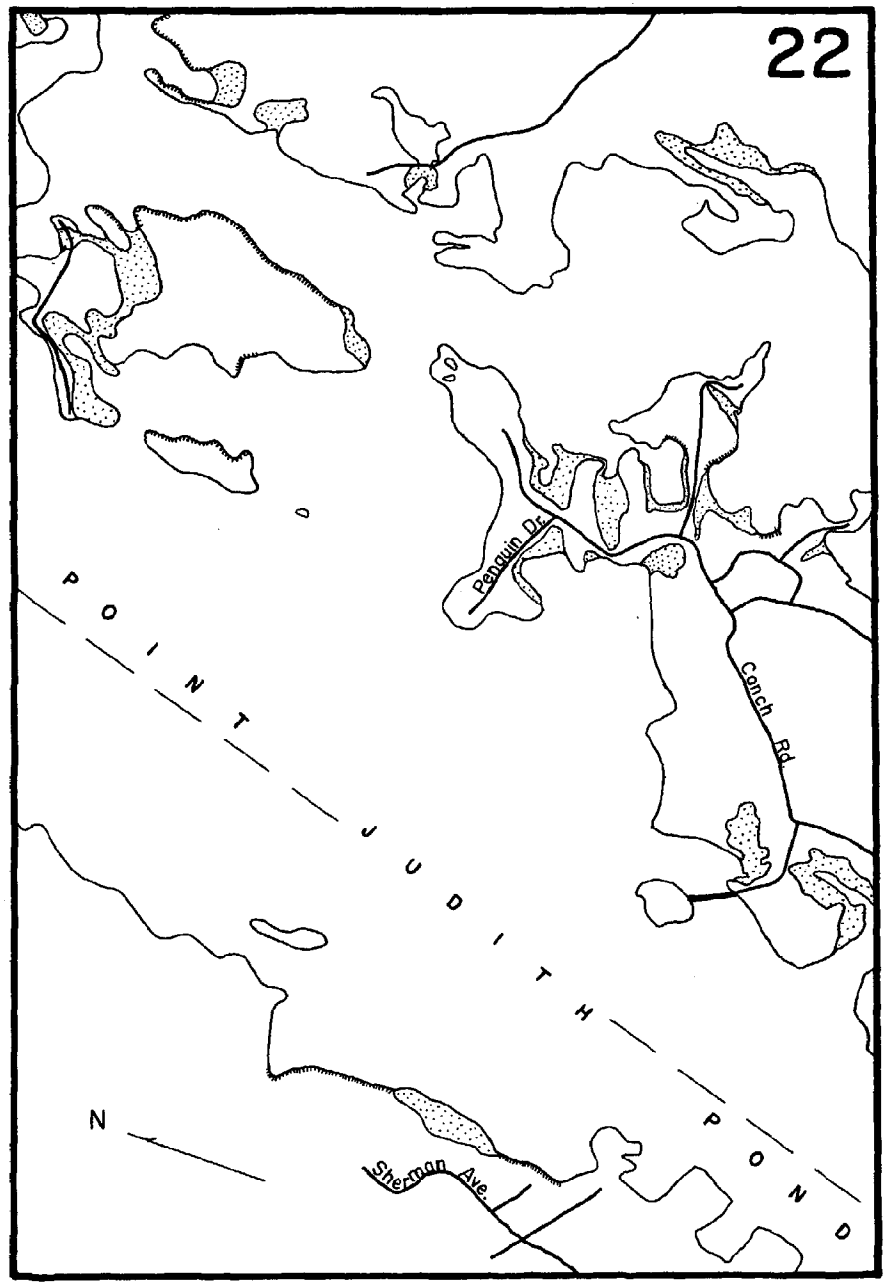
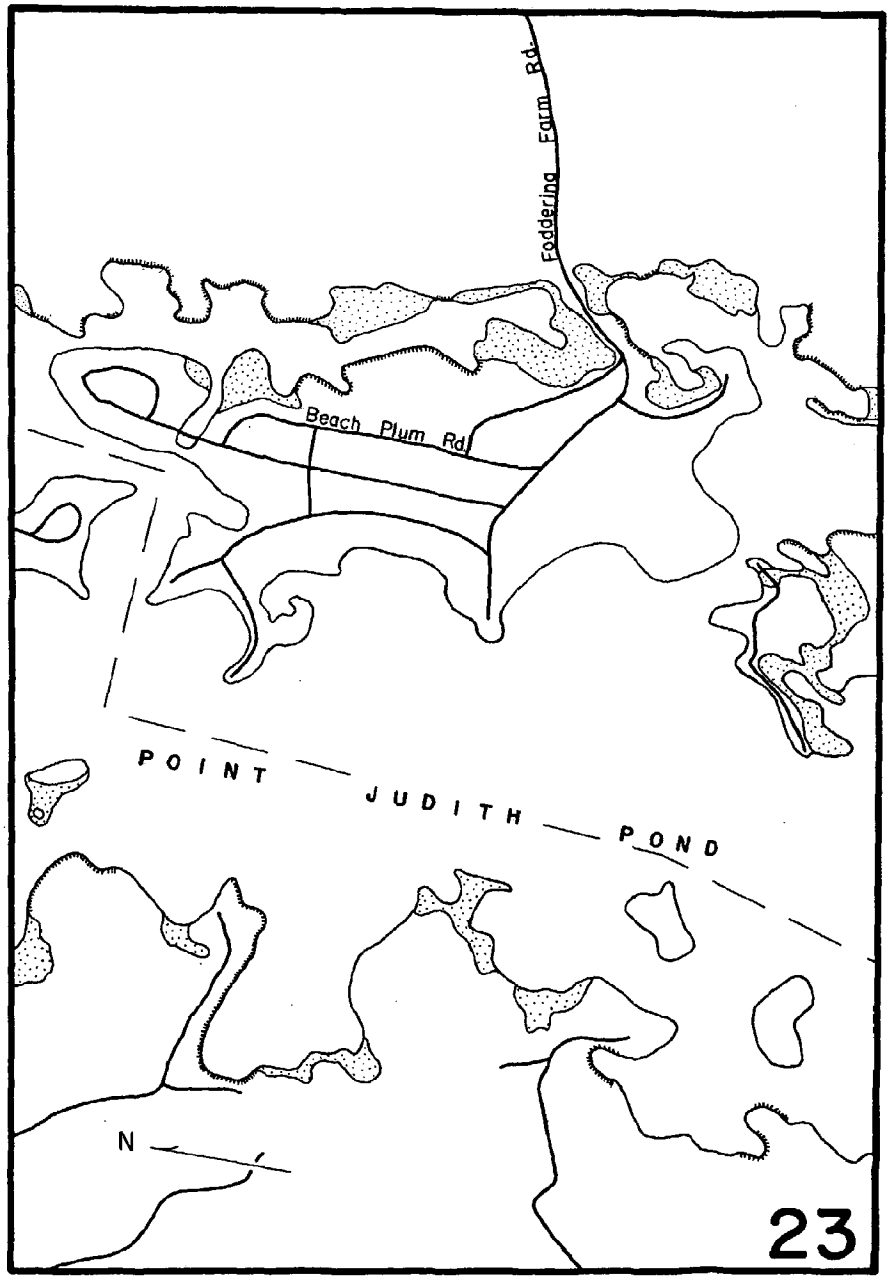
Moonstone Beach Rd.
18

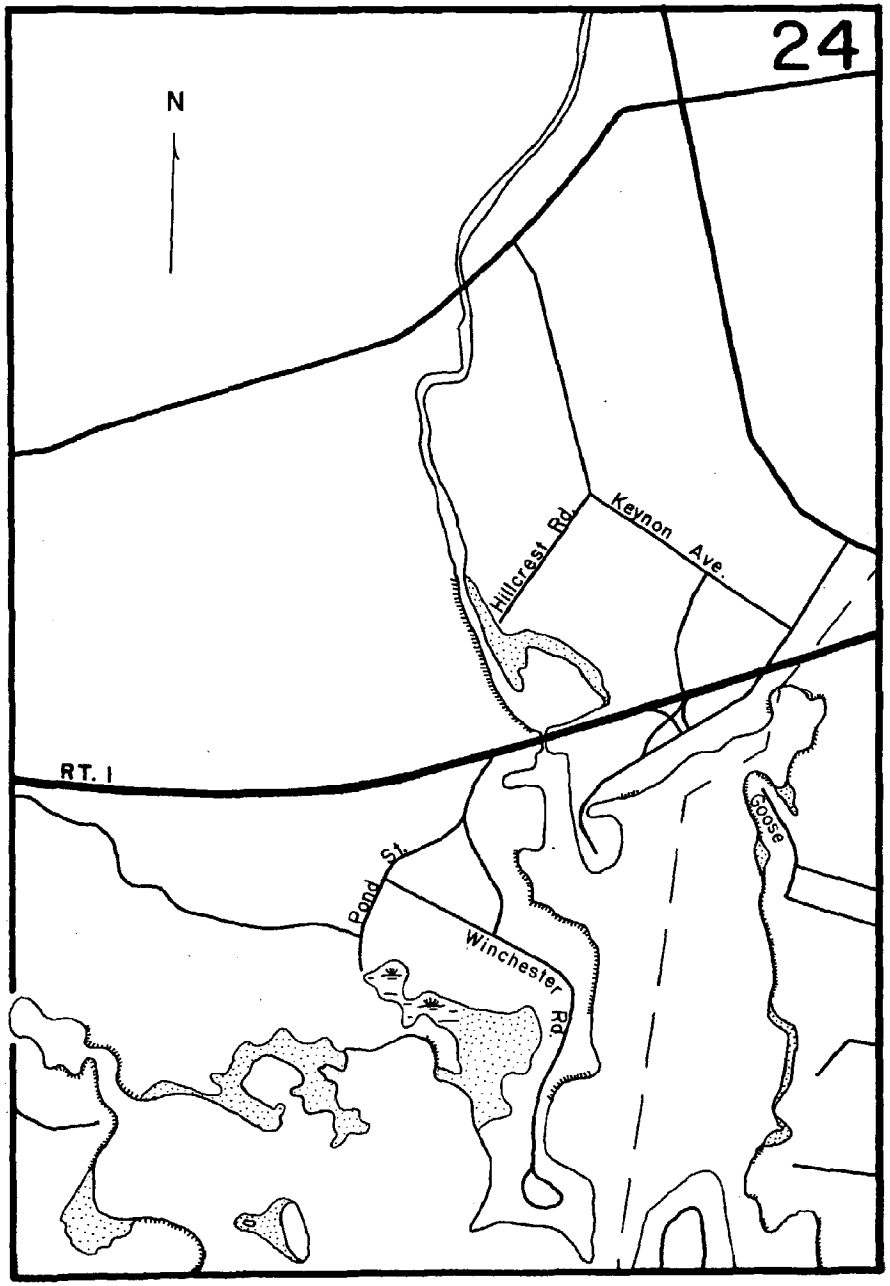

19
Succotash Rd.
POTTER POND
N
Matunuck Beach Rd.
Prospect Rd.

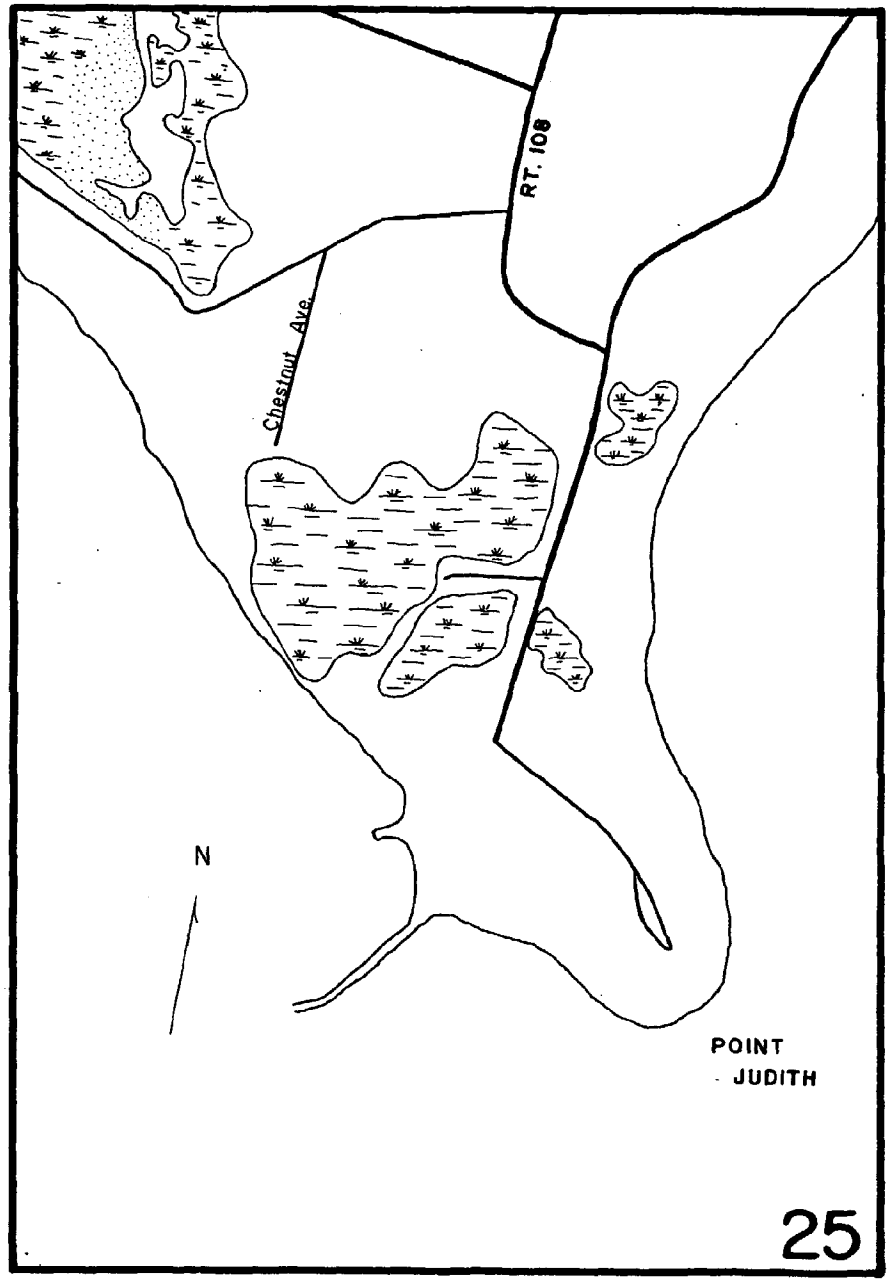

Succotash Rd.
N
NARRAGANSETT
SOUTH KINGSTOWN
MATUNUCK
POINT
20

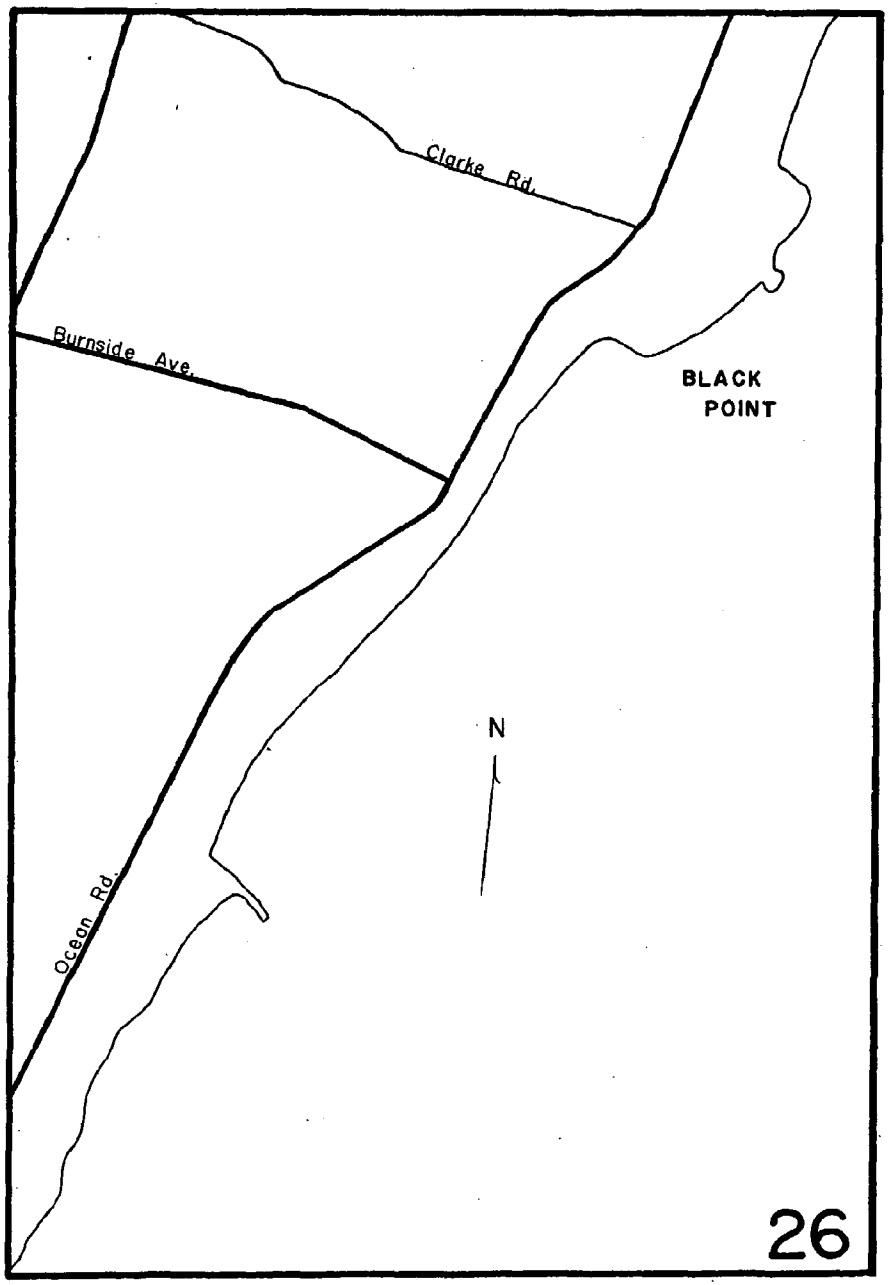

21
RT. 108
BLUFF
HILL
COVE
Escape Route
Galilee
Conch Rd.
N

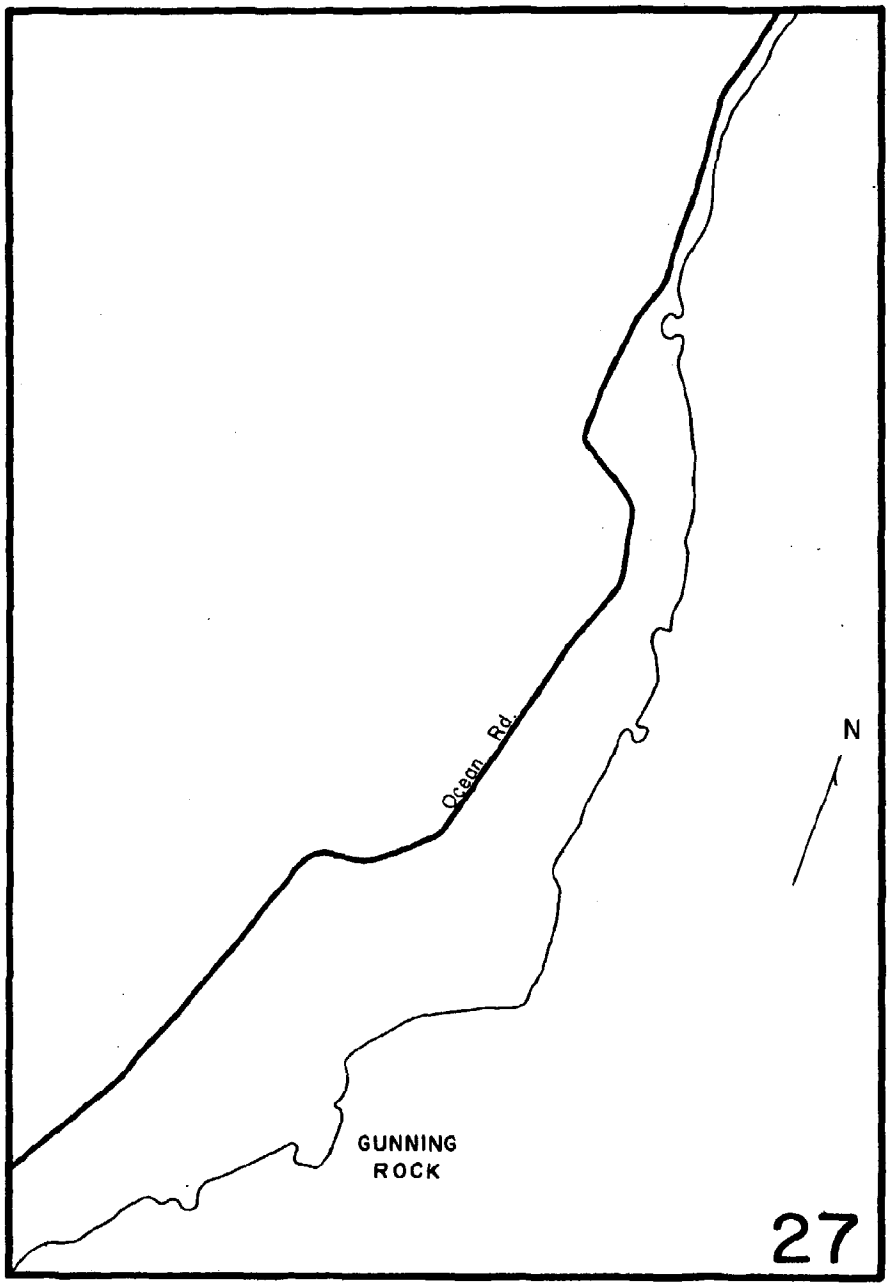

22
Penguin Dr.
Conch Rd.
POINT JUDITH POND
N
Sherman Ave.

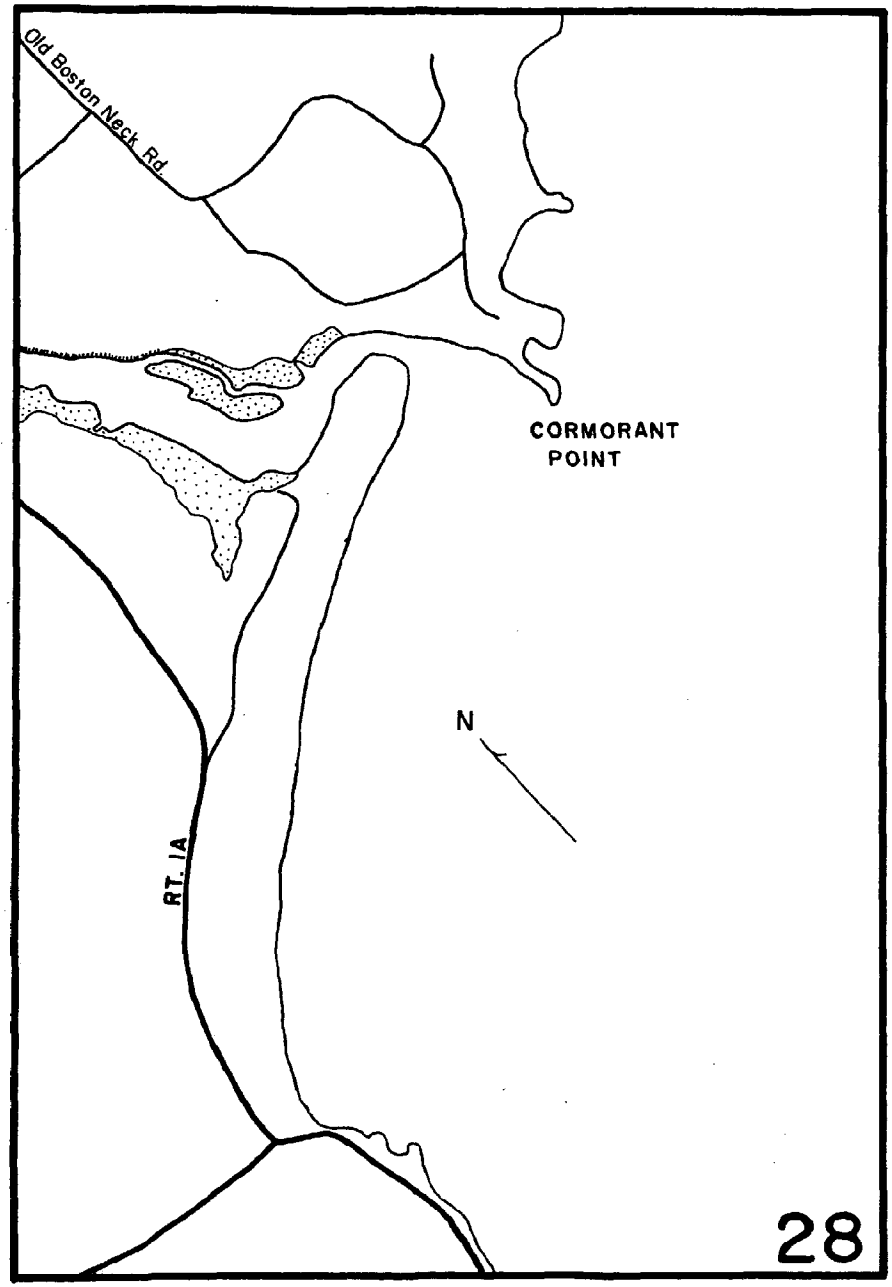

Foddering Farm Rd.
Beach Plum Rd.
POINT JUDITH POND
N
23

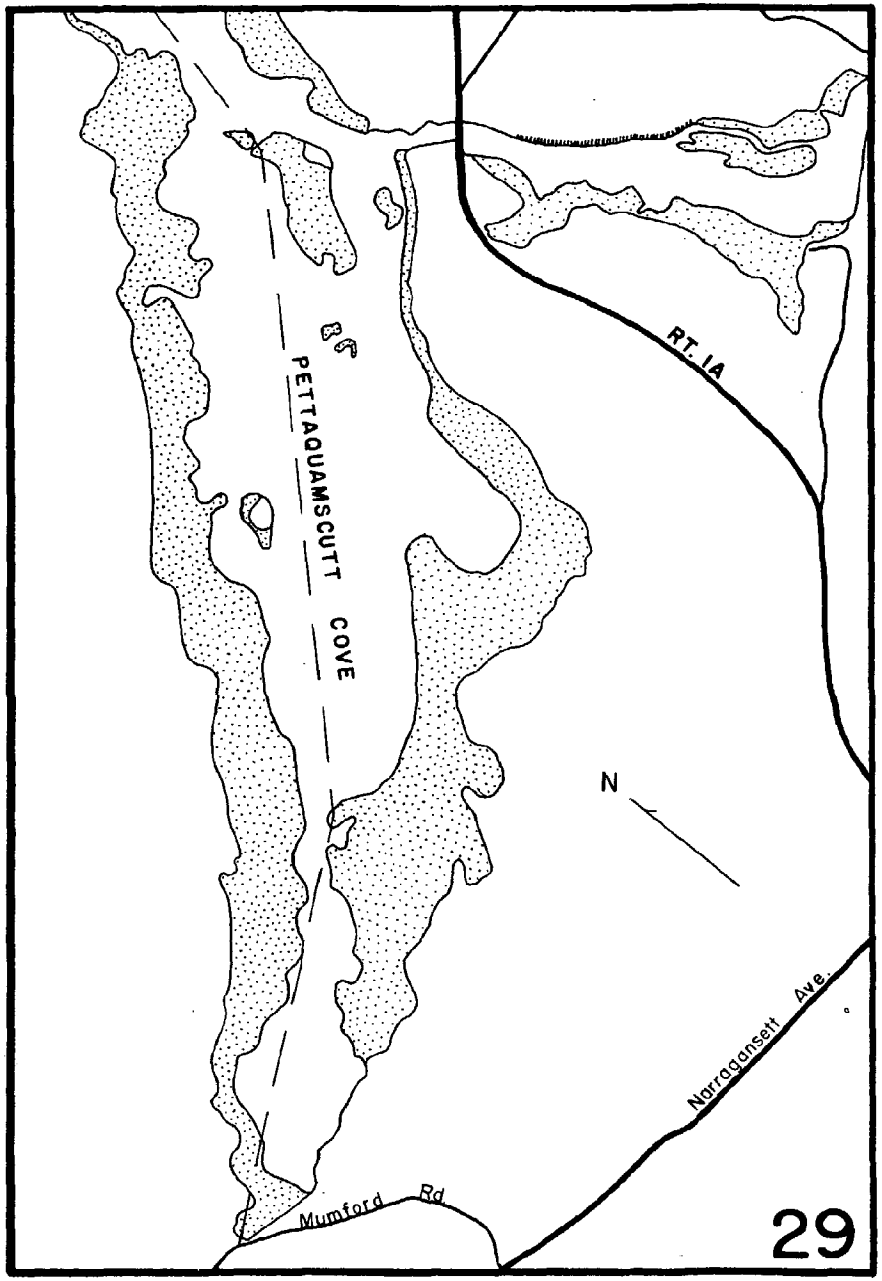

24
N
Hillcrest Rd.
Keynon Ave.
RT. 1
Pond St.
Winchester Rd.
Goose

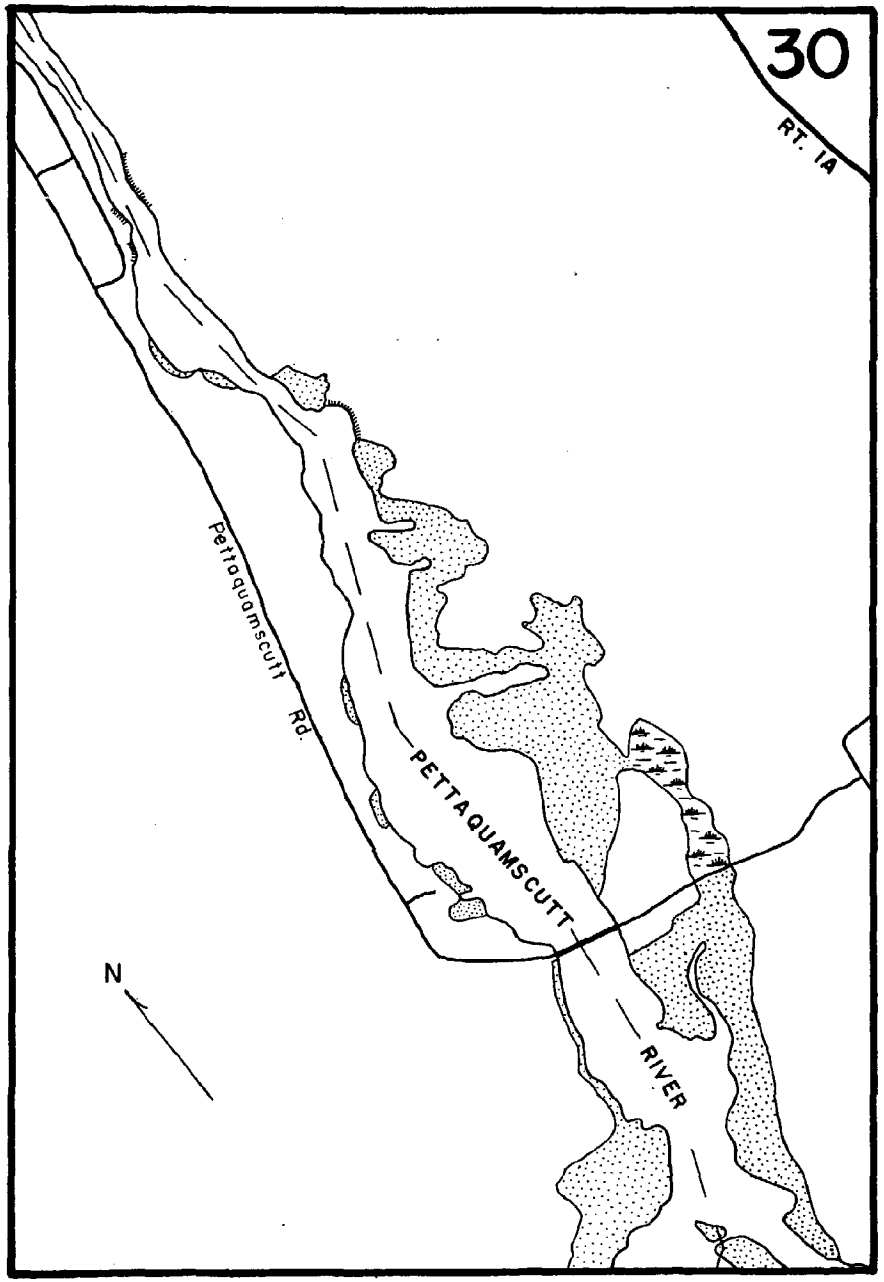

RT. 108
Chestnut Ave.
N
POINT
JUDITH
25

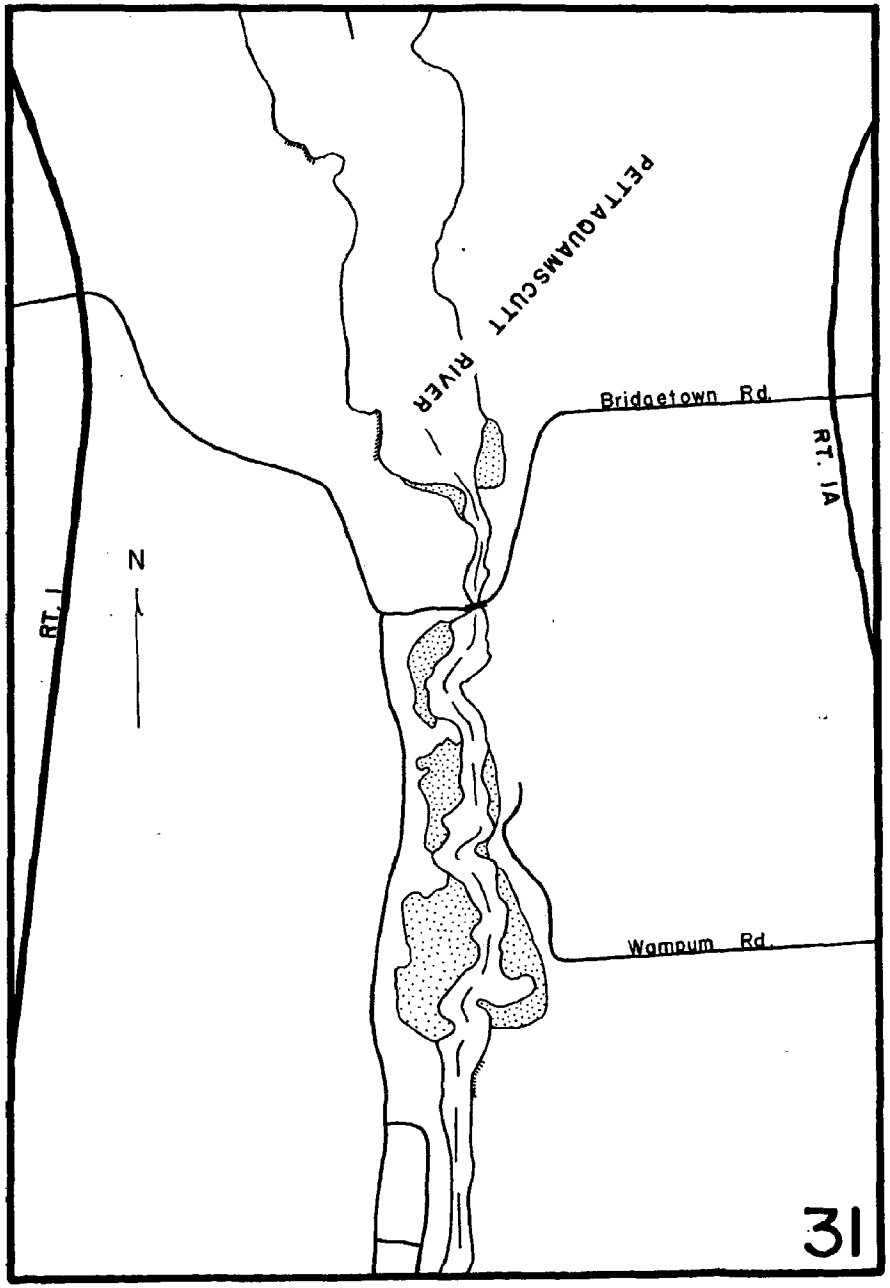

Clarke Rd.
Burnside Ave.
BLACK
POINT
N
Ocean Rd.
26

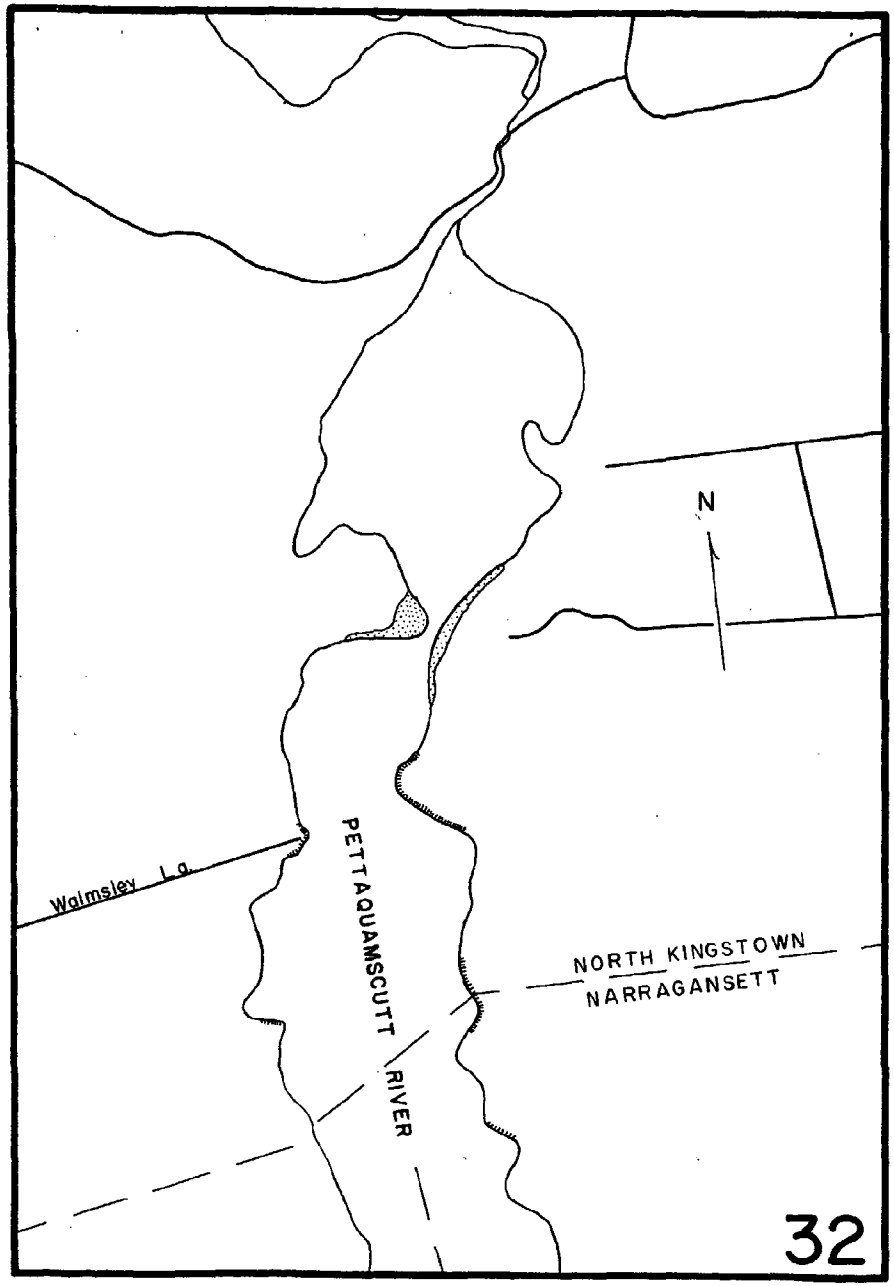

Ocean Rd.
N
GUNNING
ROCK
27

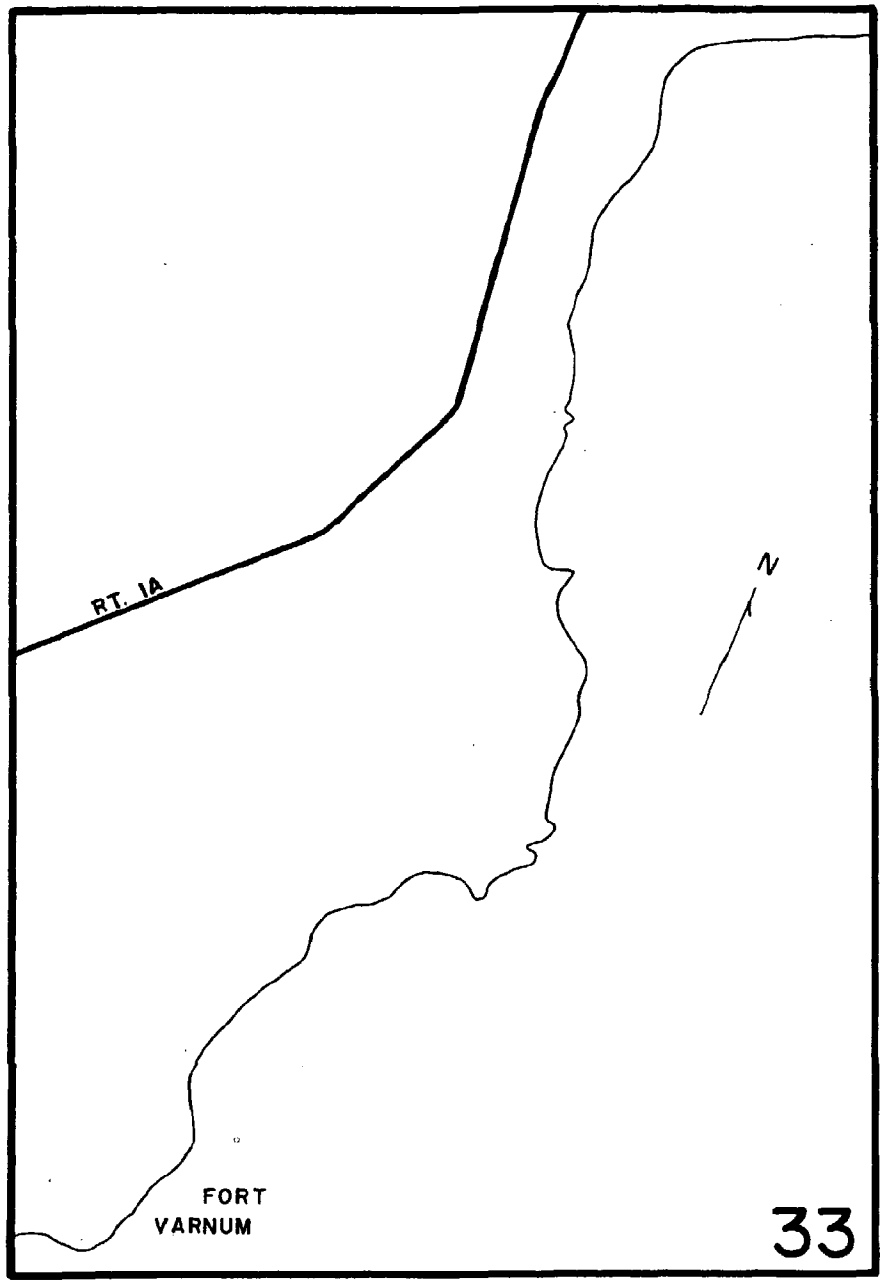

Old Boston Neck Rd
CORMORANT POINT
N
RT. 1A
28

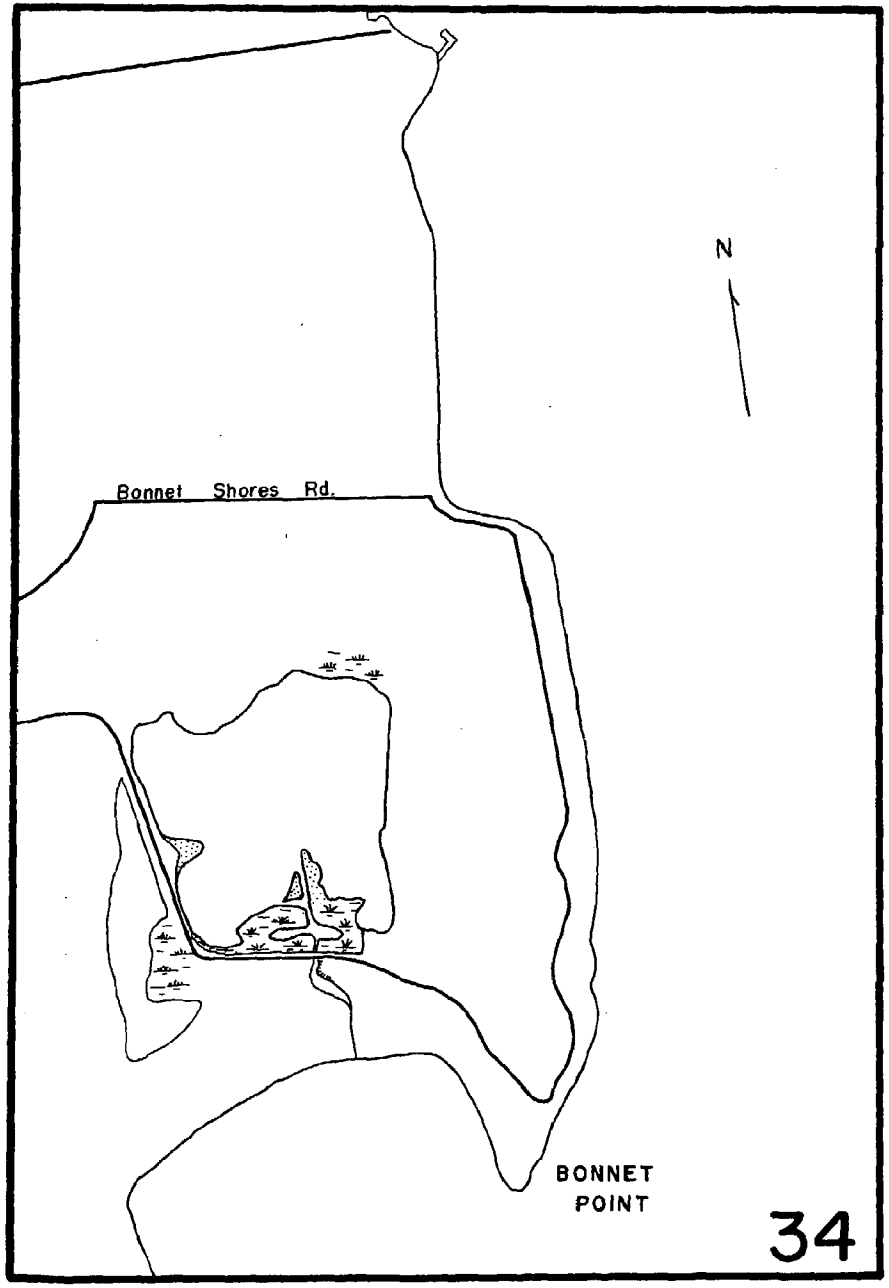

PETTAQUAMSCUTT COVE
RT. 1A
N
Narragansett Ave.
Mumford Rd
29

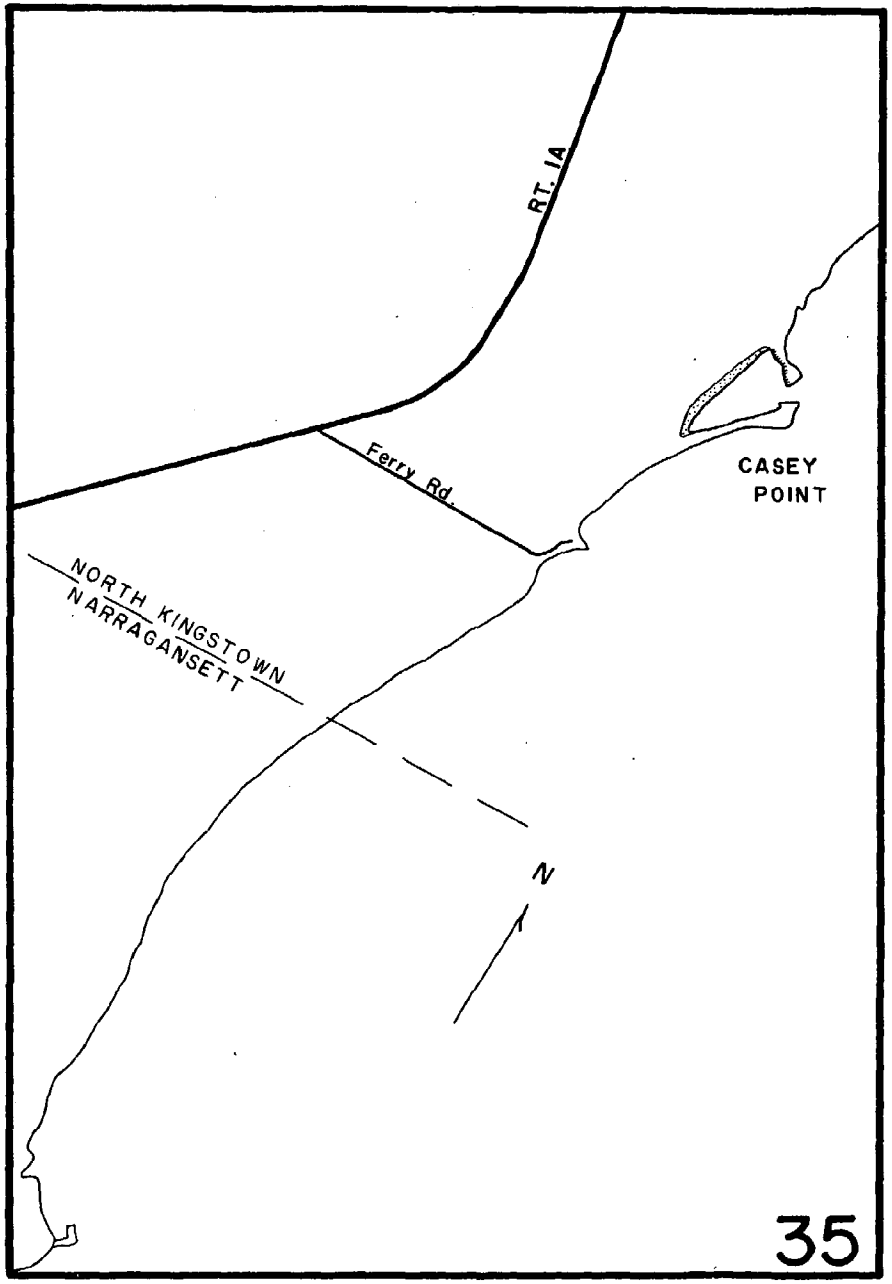

30
RT. 1A
Pettaquamscutt Rd.
PETTAQUAMSCUTT
RIVER
N

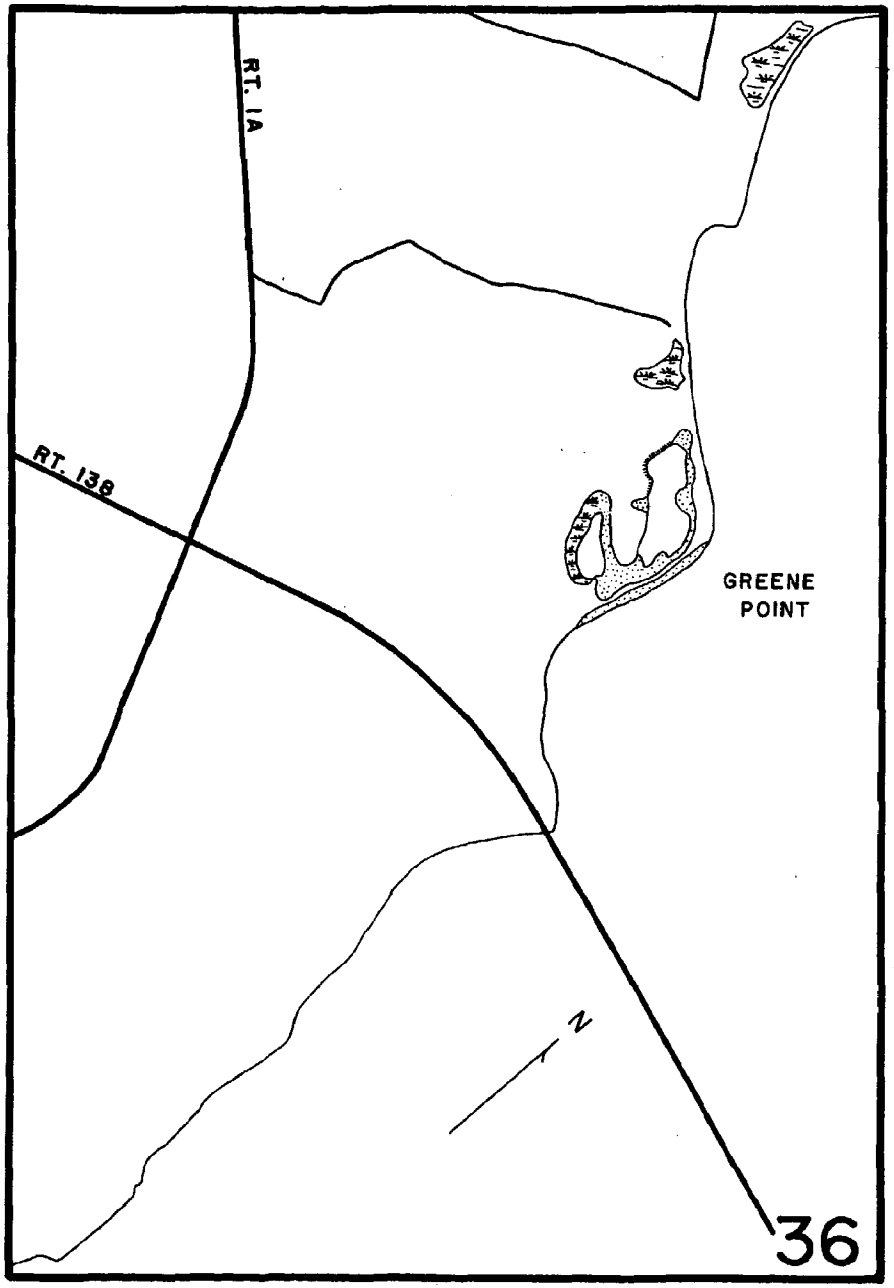

PETTAQUAMSCUTT RIVER
Bridgetown Rd.
RT. 1A
RT. 1
N
Wampum Rd.
31

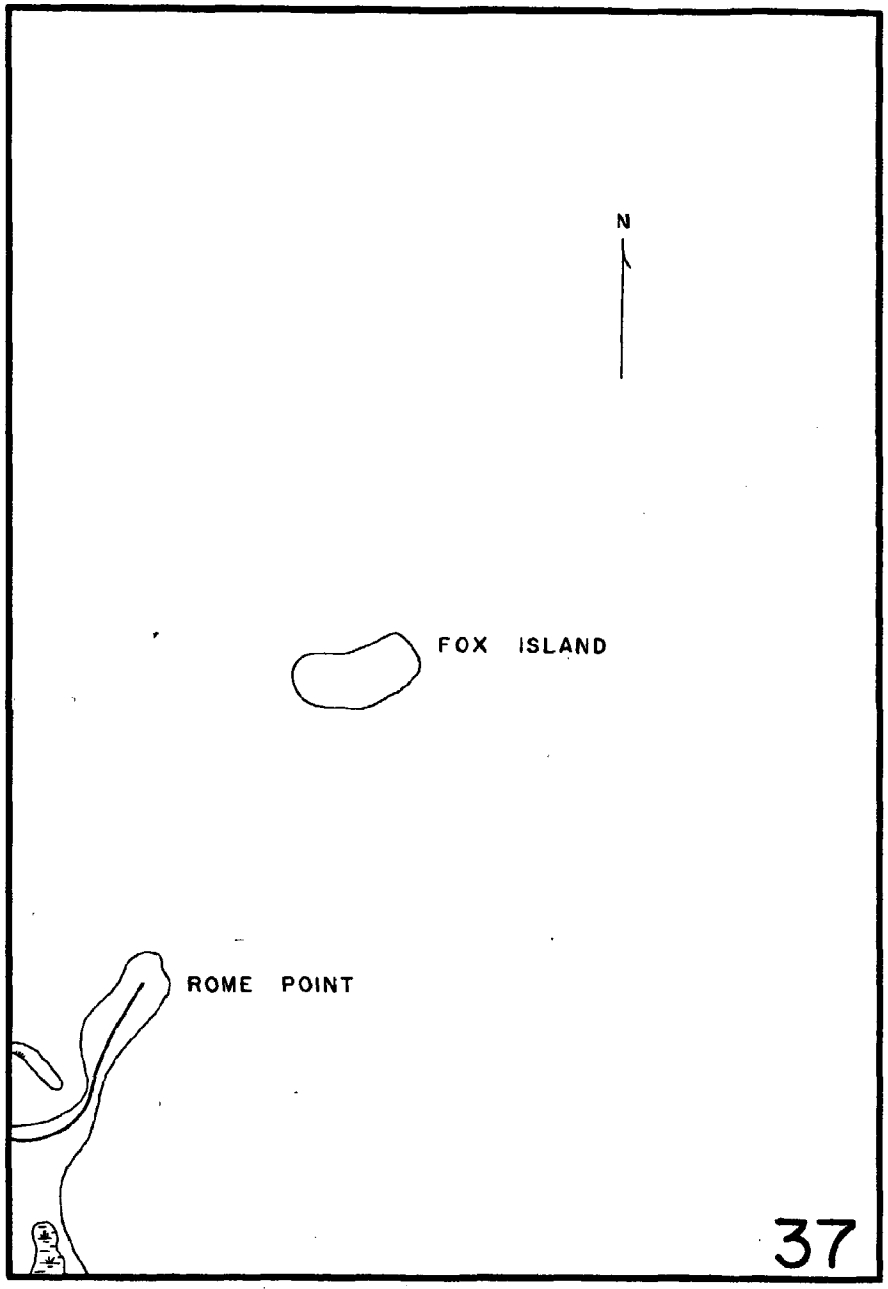

N
Walmsley La.
PETTAQUAMSCUTT RIVER
NORTH KINGSTOWN
NARRAGANSETT
32

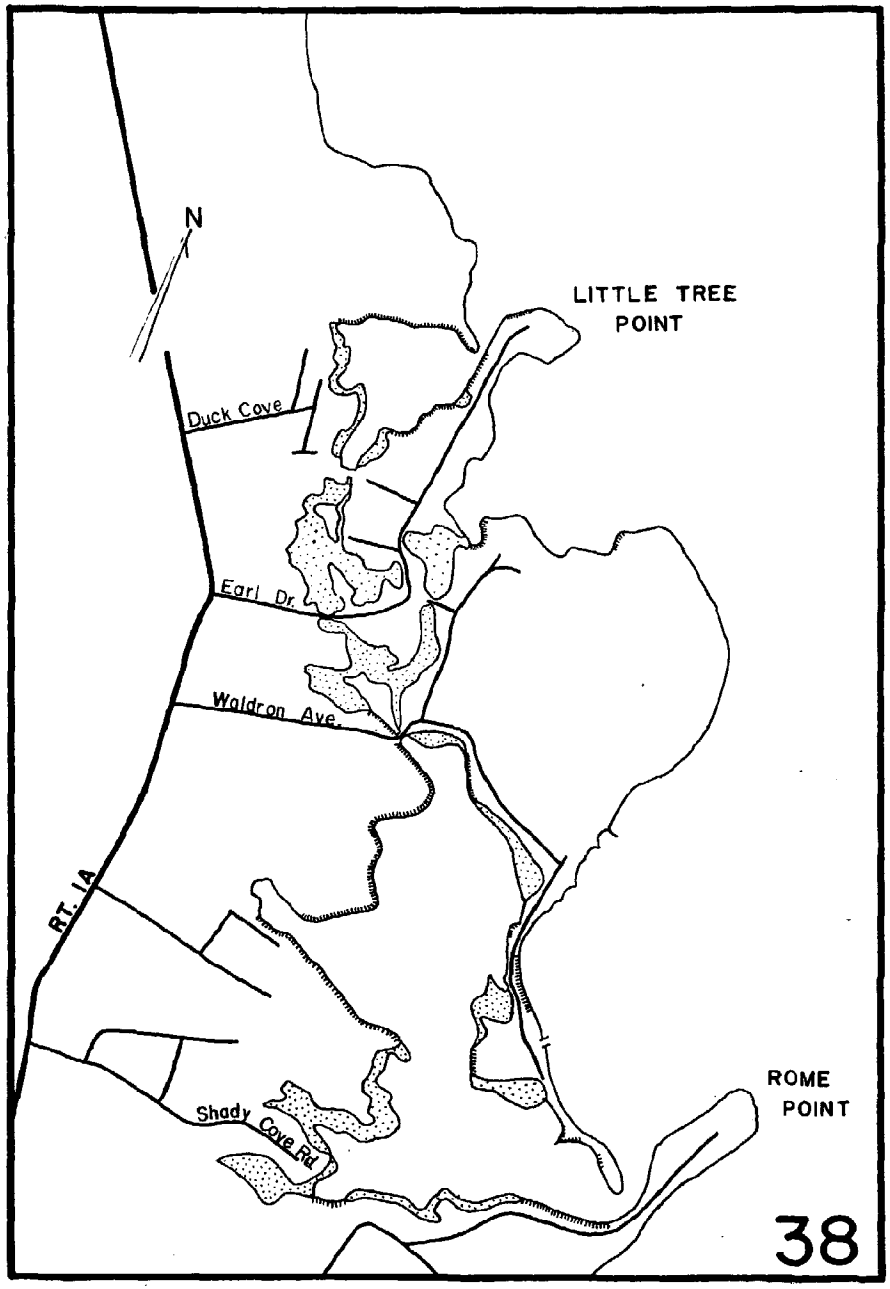

RT. 1A
N
FORT
VARNUM
33

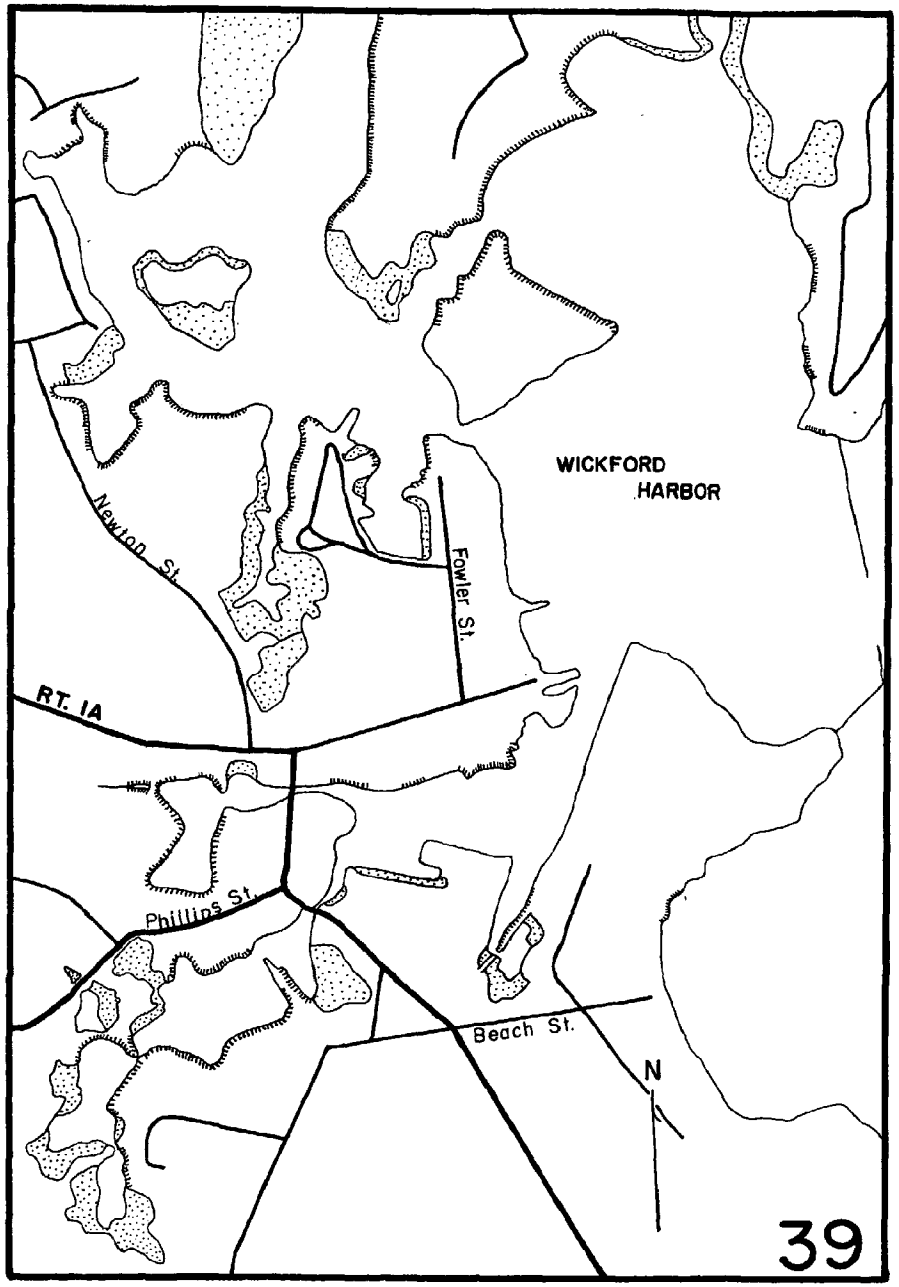

N
Bonnet Shores Rd.
BONNET
POINT
34

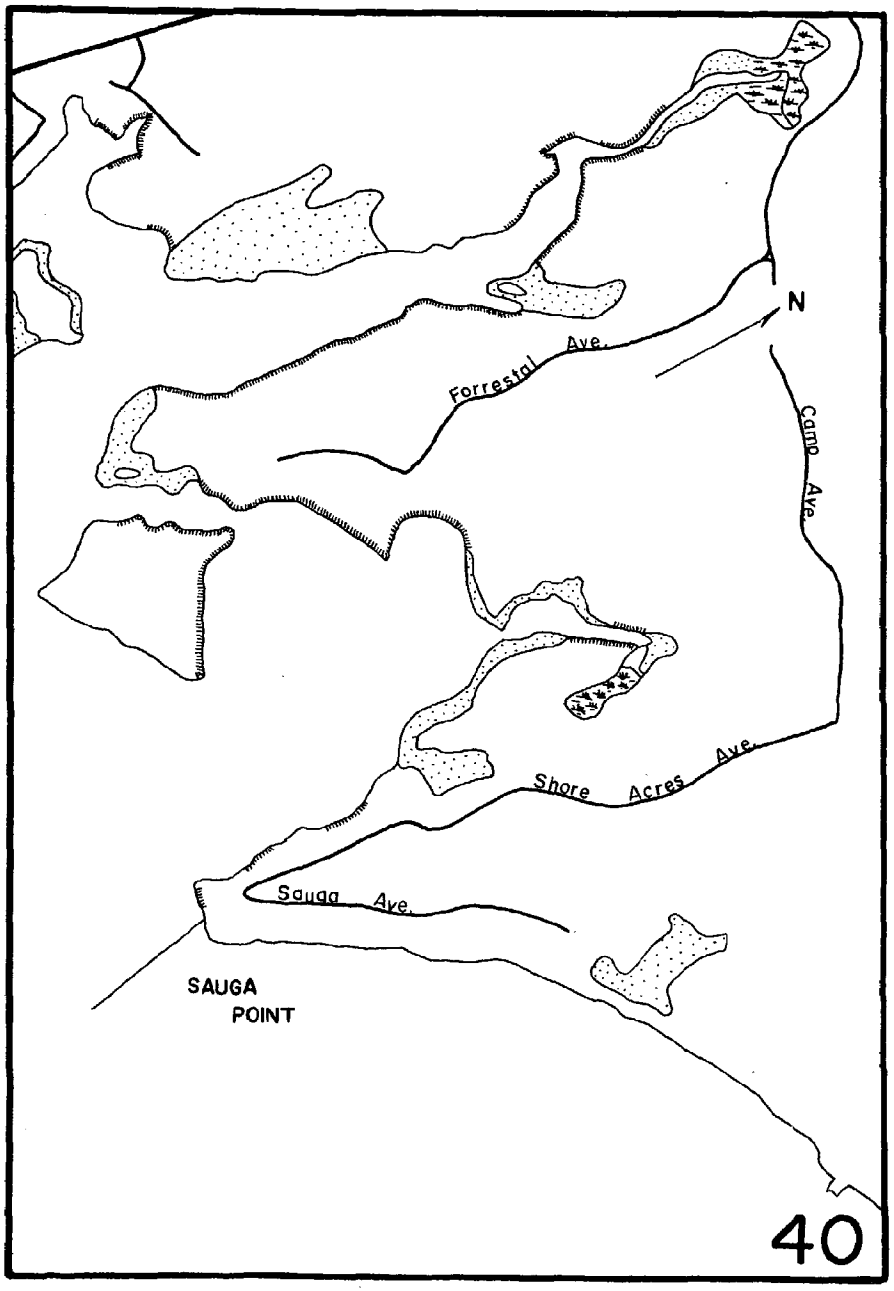

RT. 1A
Ferry Rd.
CASEY
POINT
NORTH KINGSTOWN
NARRAGANSETT
N
35

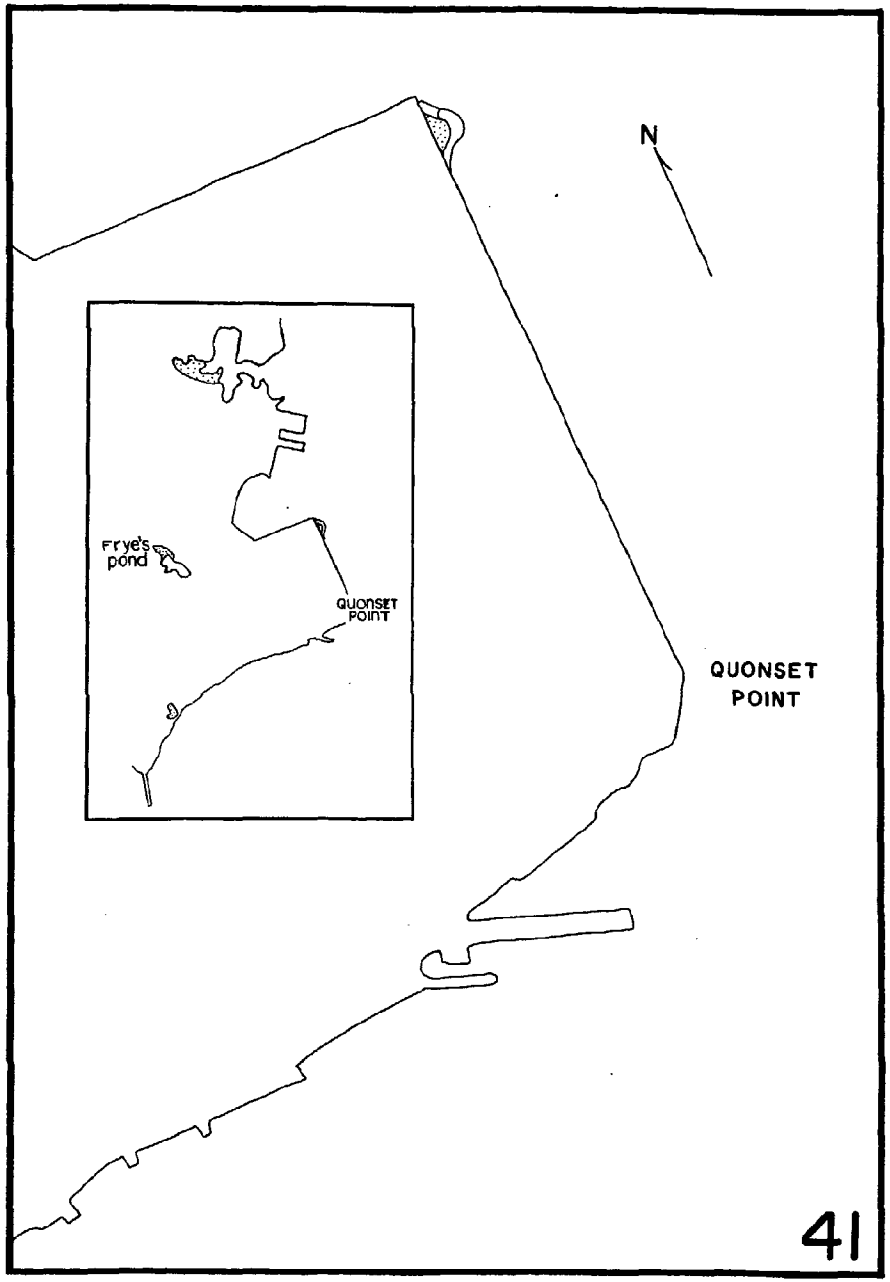

RT. 1A
RT. 138
GREENE POINT
N
36

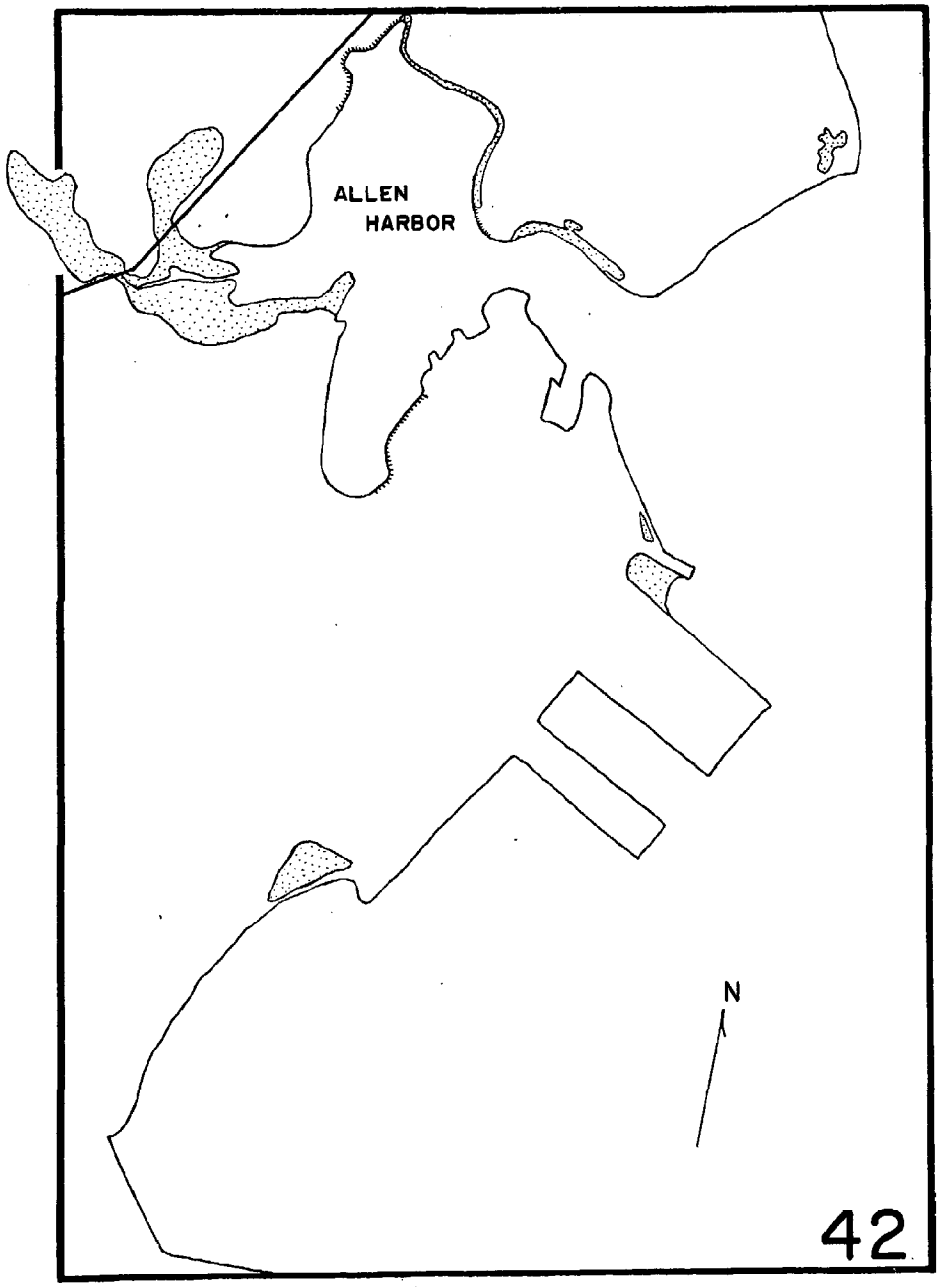

N
FOX ISLAND
ROME POINT
37

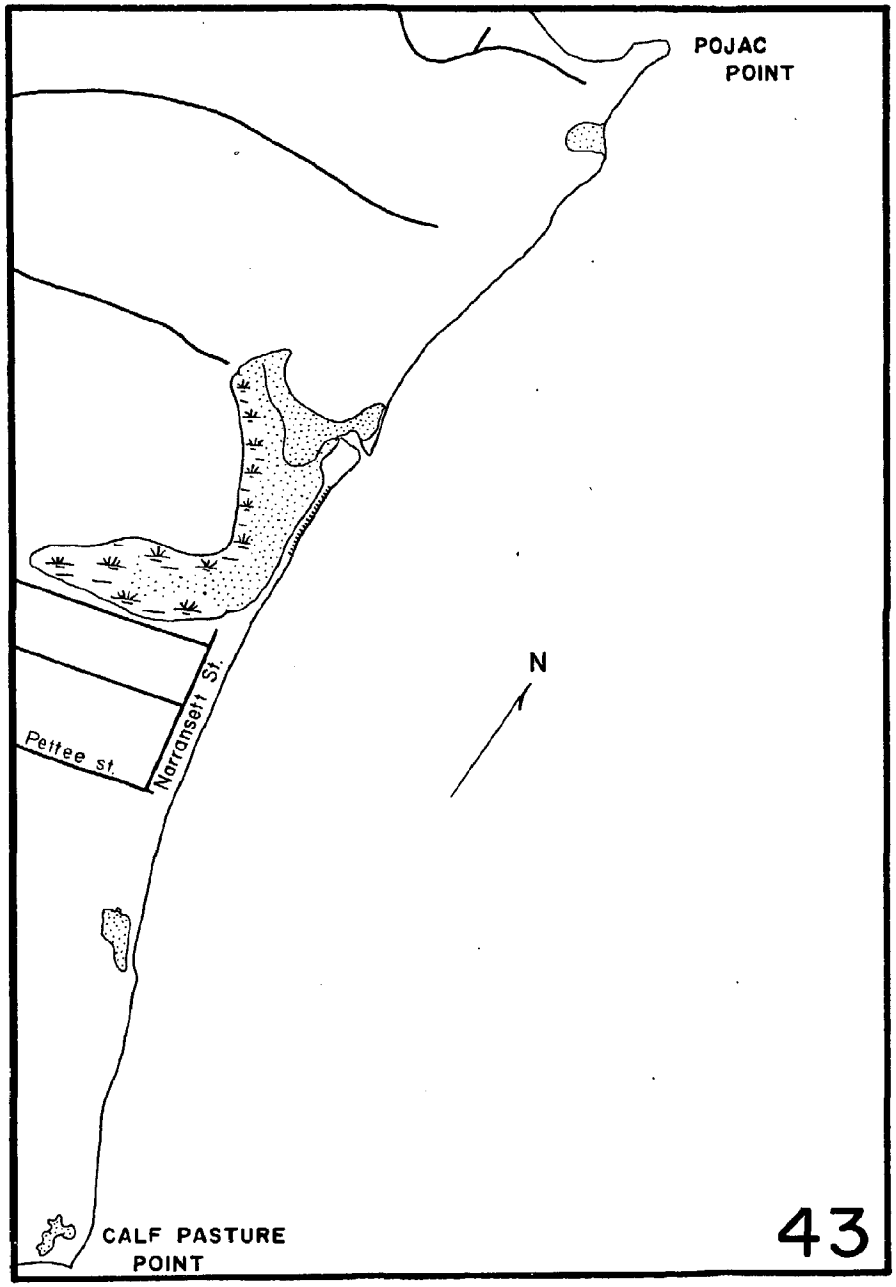

N
LITTLE TREE
POINT
Duck Cove
Earl Dr.
Waldron Ave.
RT. 1A
Shady Cove Rd.
ROME
POINT
38

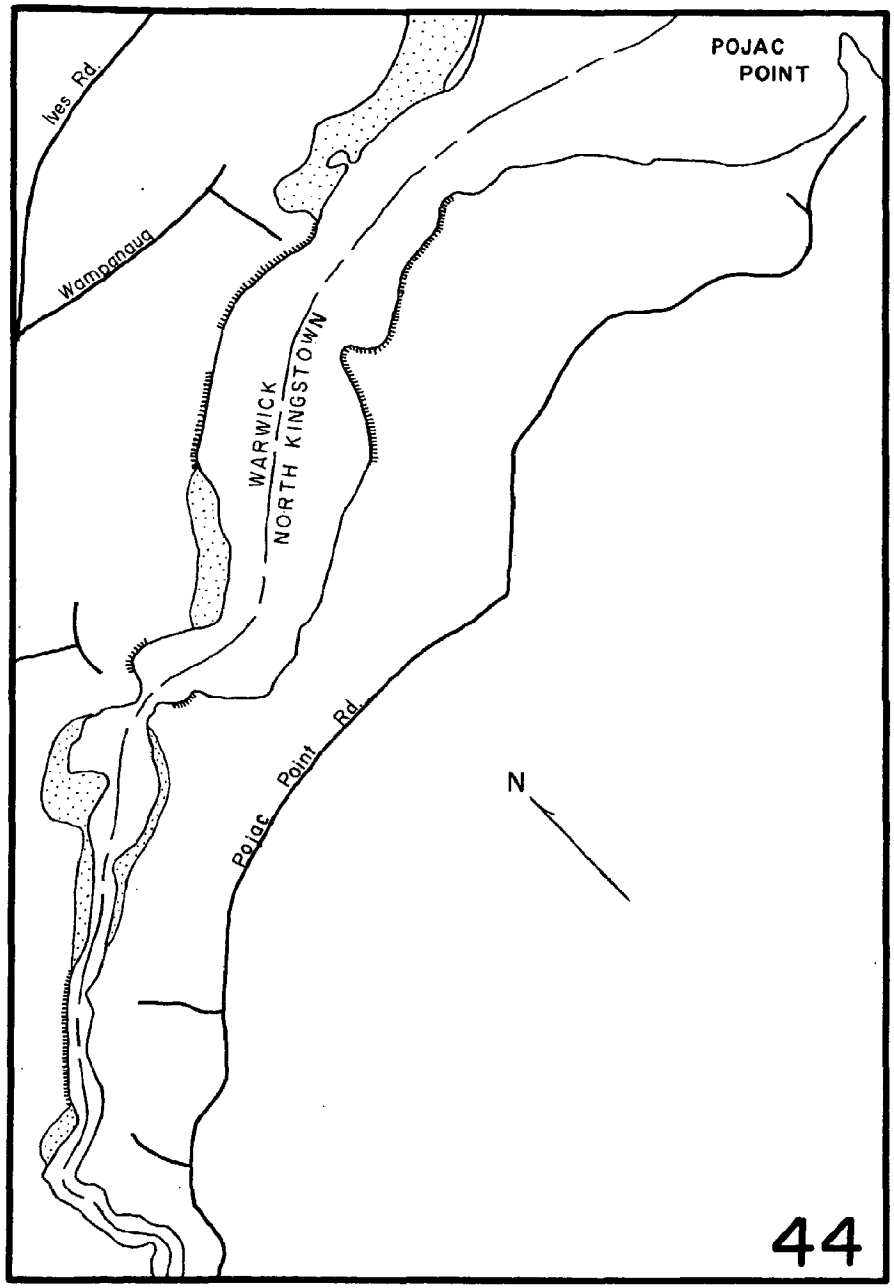

WICKFORD
HARBOR
Newton St.
Fowler St.
RT. 1A
Phillips St.
Beach St.
N
39

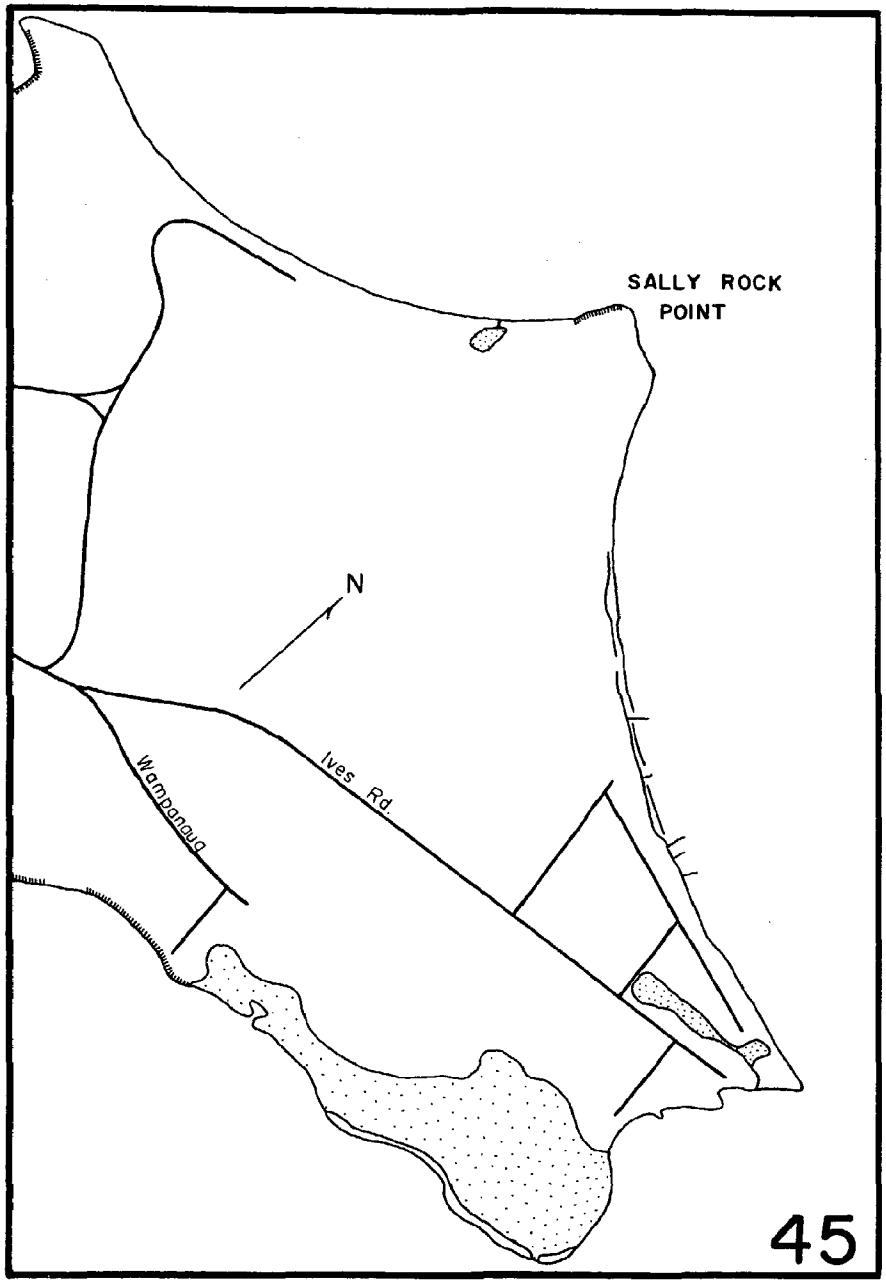

N
Forrestal Ave.
Camp Ave.
Shore Acres Ave.
Sauga Ave.
SAUGA POINT
40

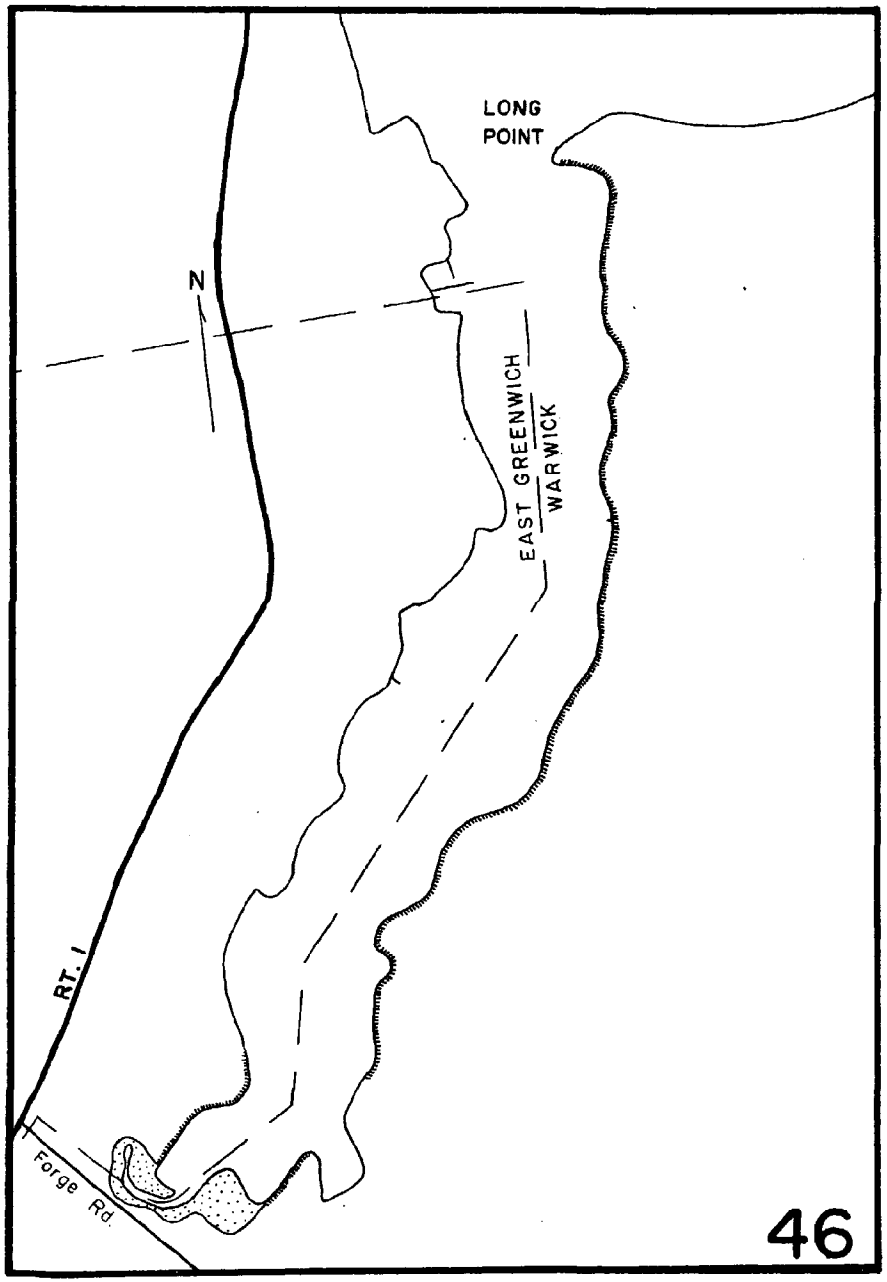

N
Frye's pond
QUONSET POINT
QUONSET POINT
41

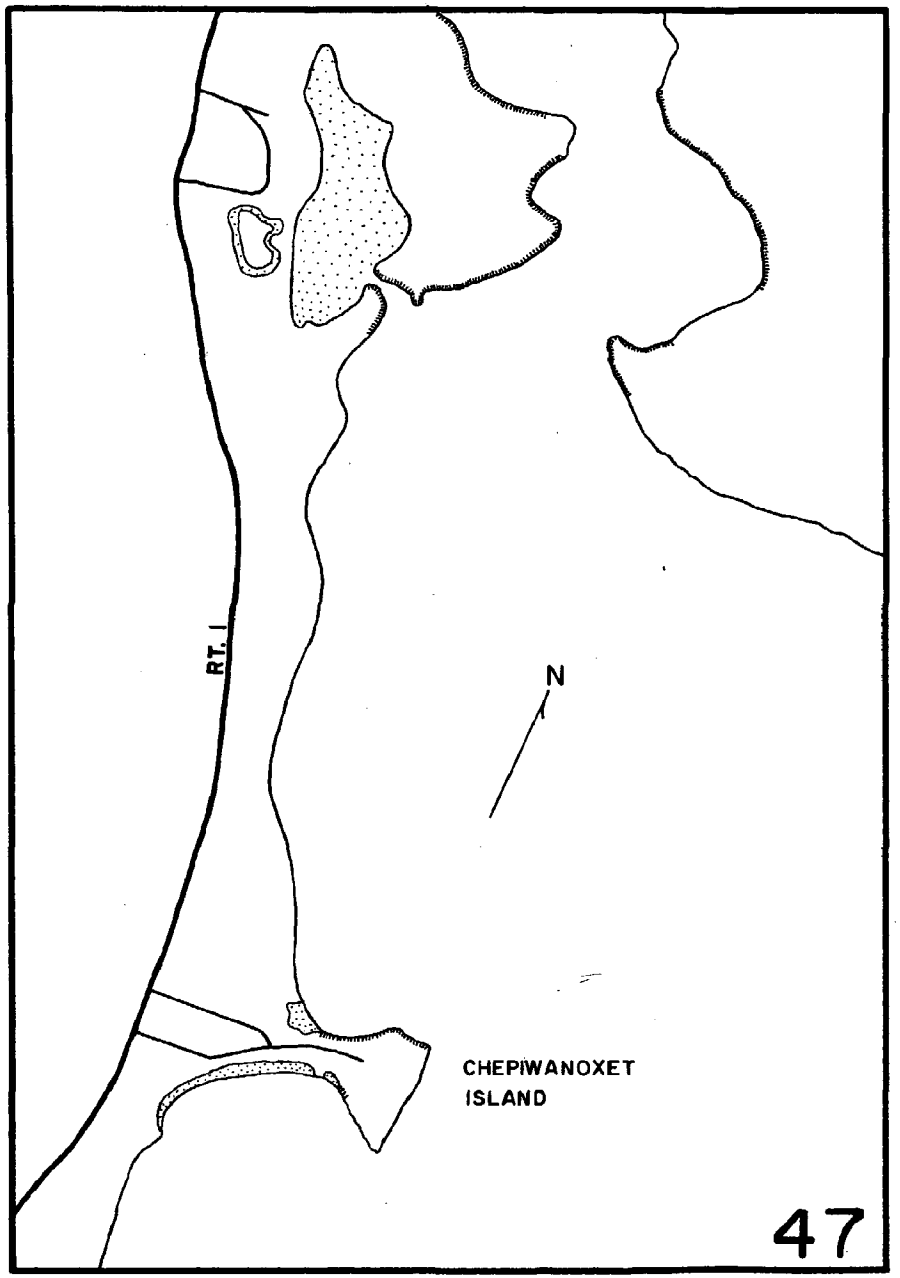

ALLEN
HARBOR
N
42


POJAC
POINT
Narragansett St.
Pettee st.
N
CALF PASTURE
POINT
43


POJAC
POINT
Ives Rd.
Wampanaug
WARWICK
NORTH KINGSTOWN
Pojac Point Rd.
N
44

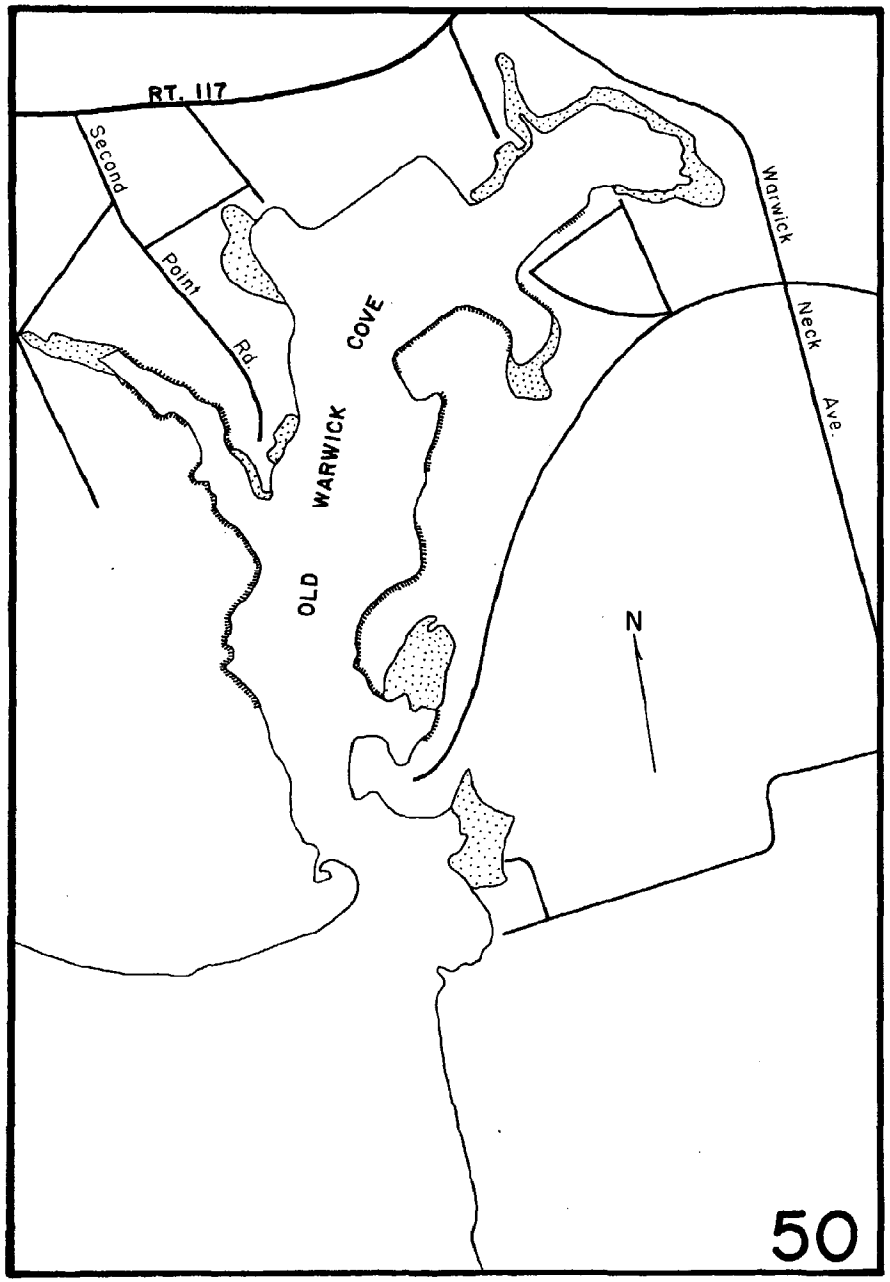

SALLY ROCK
POINT
N
Wampanaug
Ives Rd.
45


LONG
POINT
N
EAST GREENWICH
WARWICK
RT. 1
Forge Rd.
46

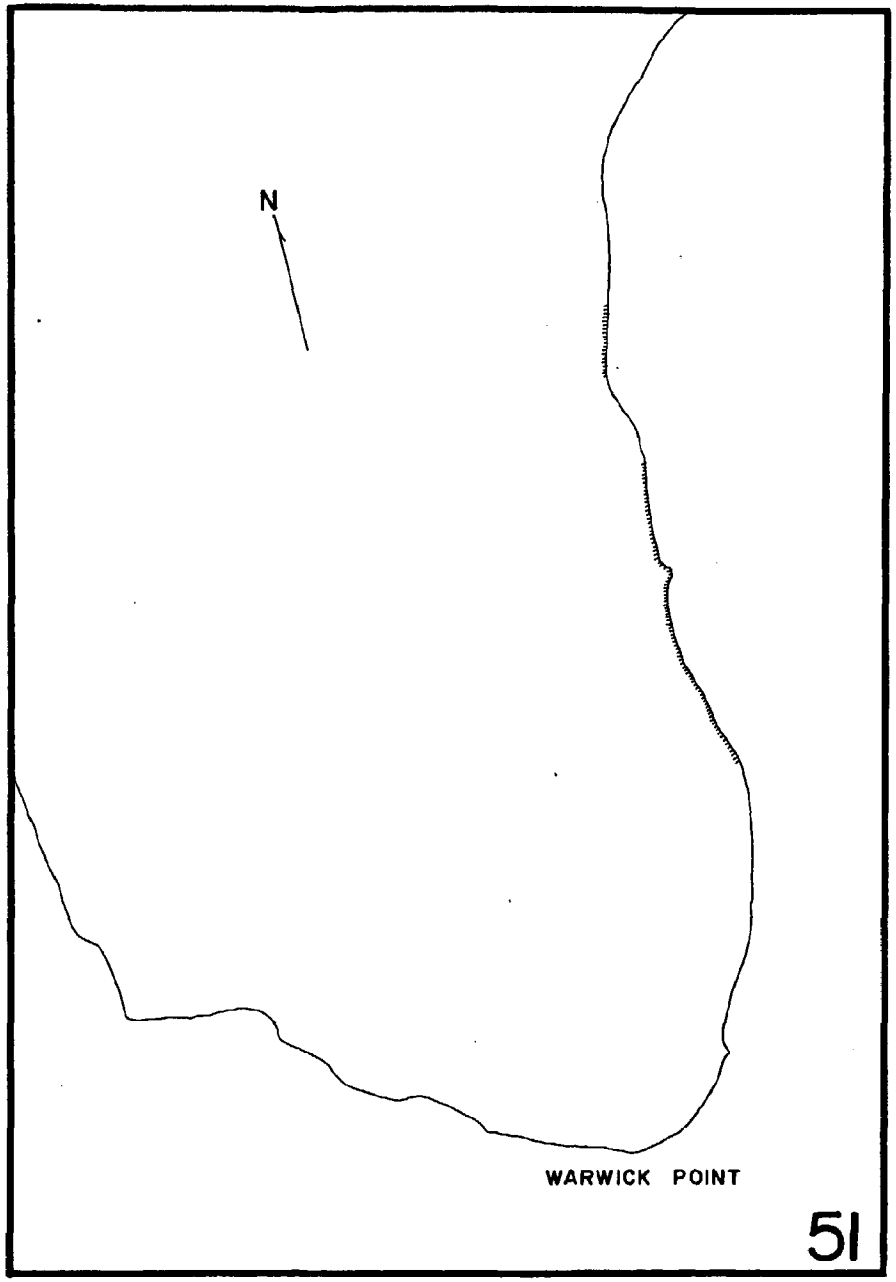

RT. 1
N
CHEPIWANOXET
ISLAND
47

48
RT. 117
APPONAUG COVE
Nausauket Rd.
N

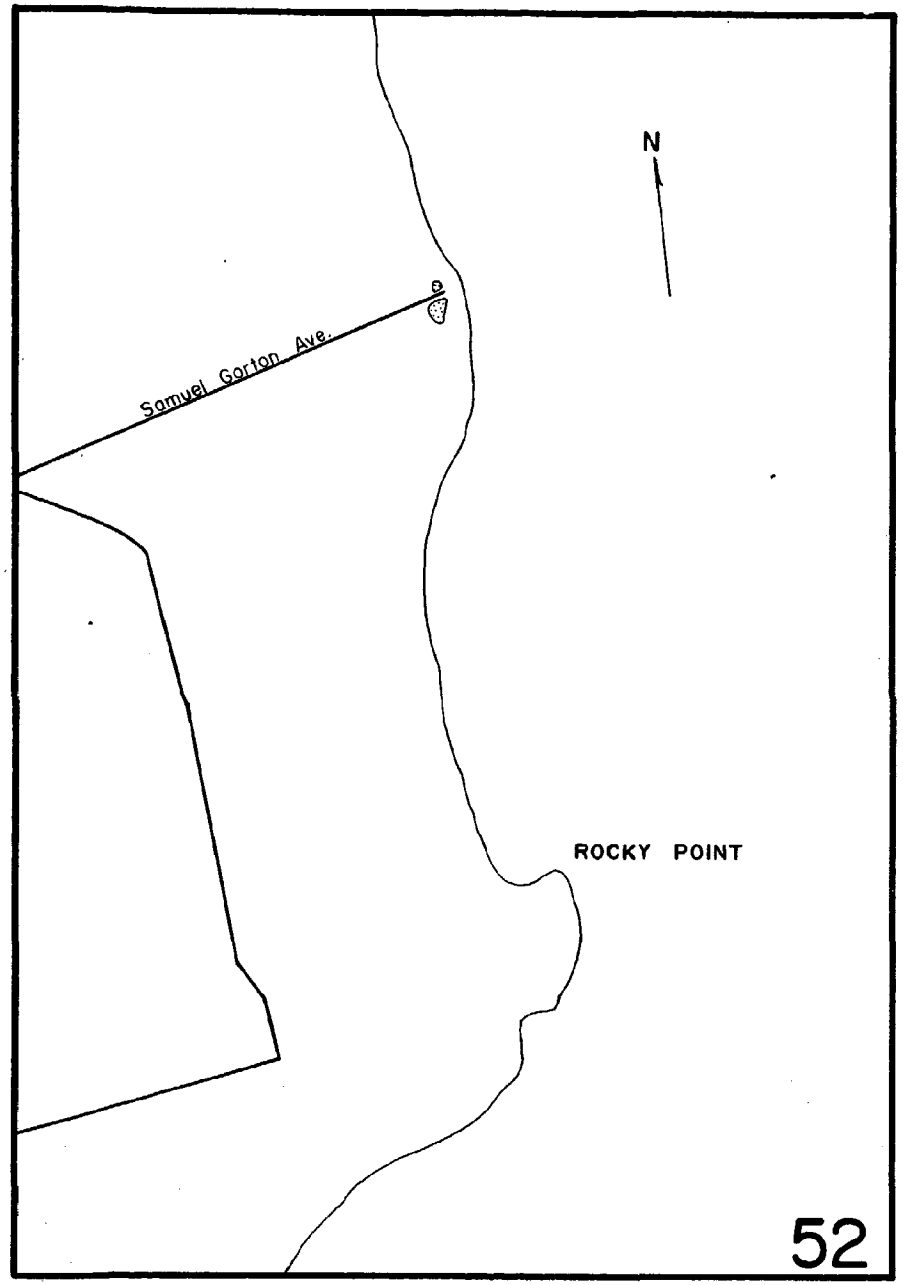
Buttonwoods Ave.
BUTTONWOODS COVE
N
49

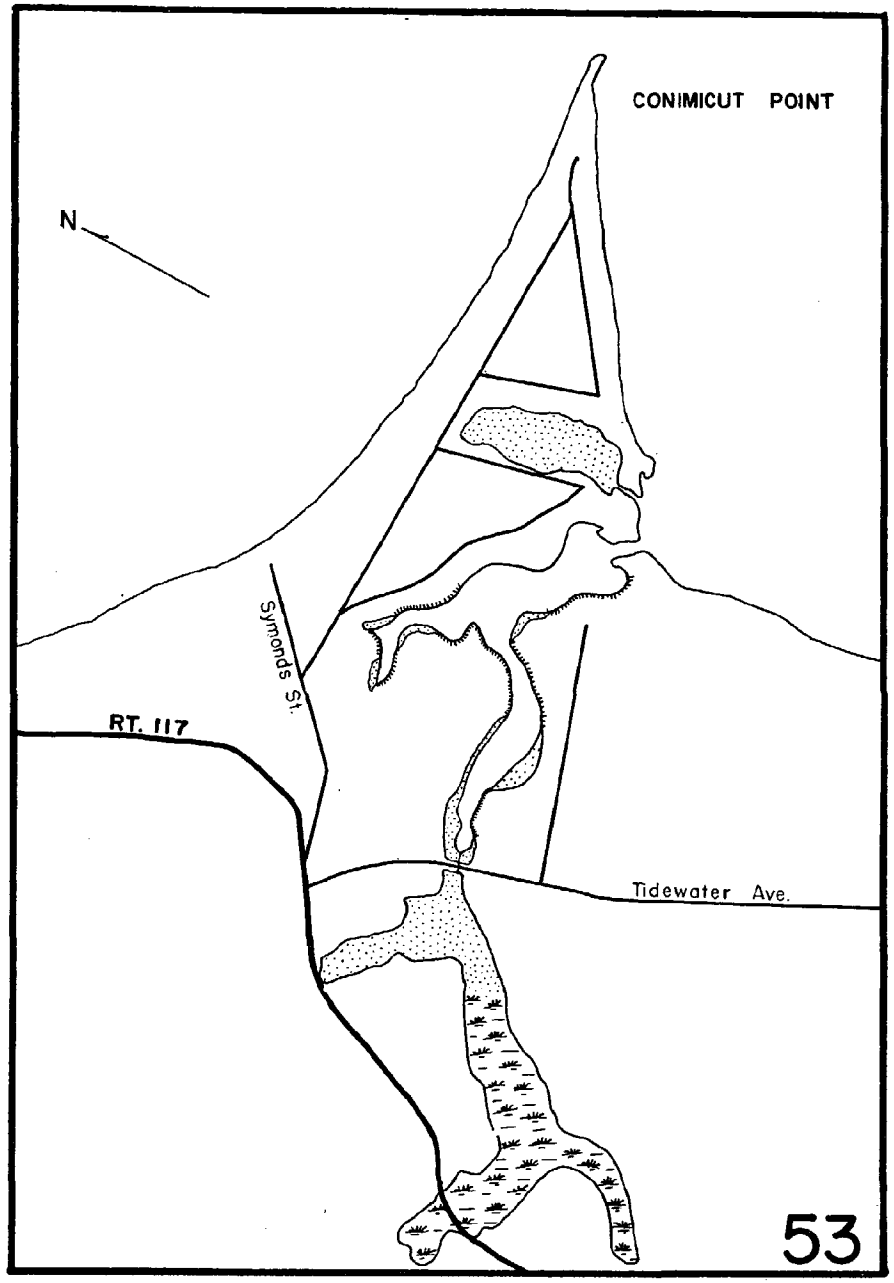

RT. 117
Second
Point
Rd.
OLD
WARWICK
COVE
Warwick
Neck
Ave.
N

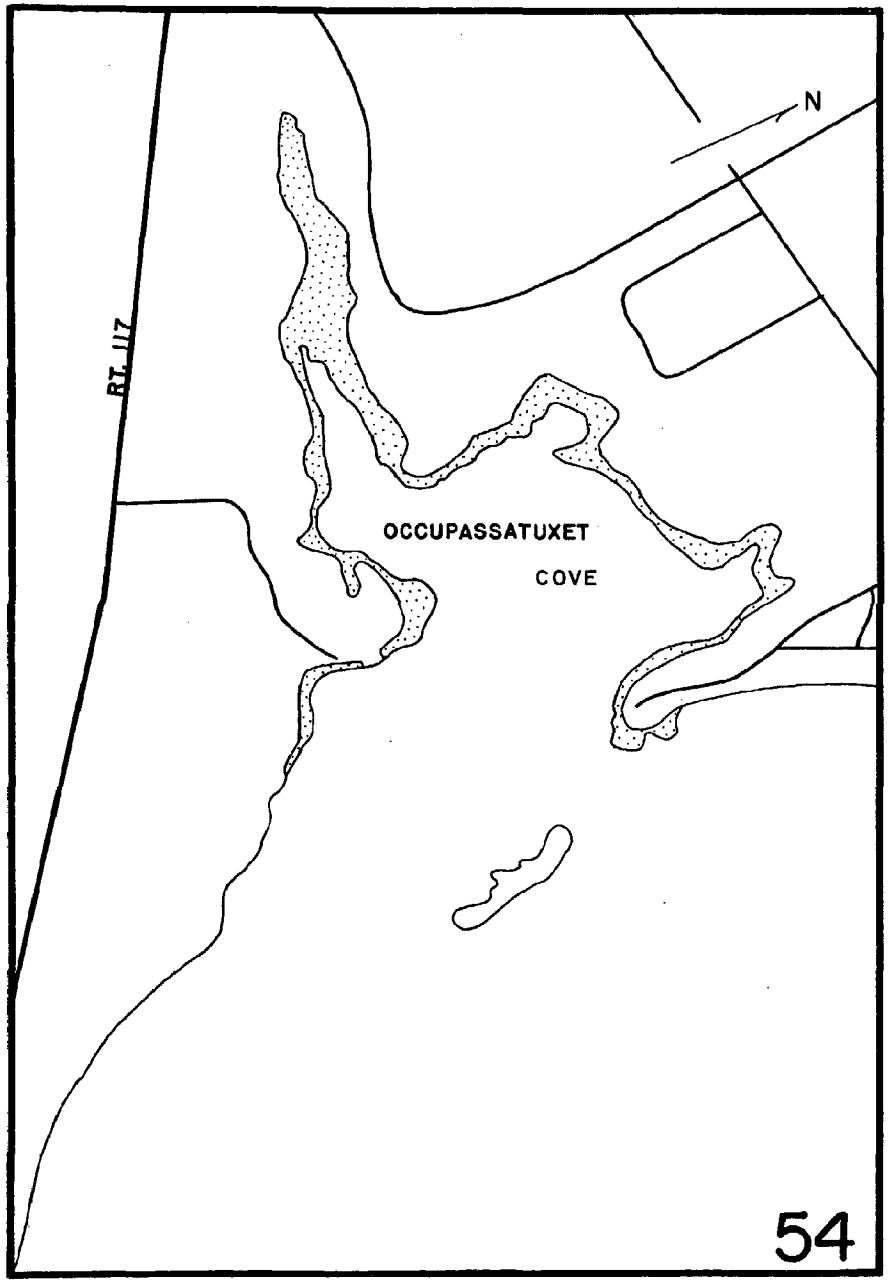
50

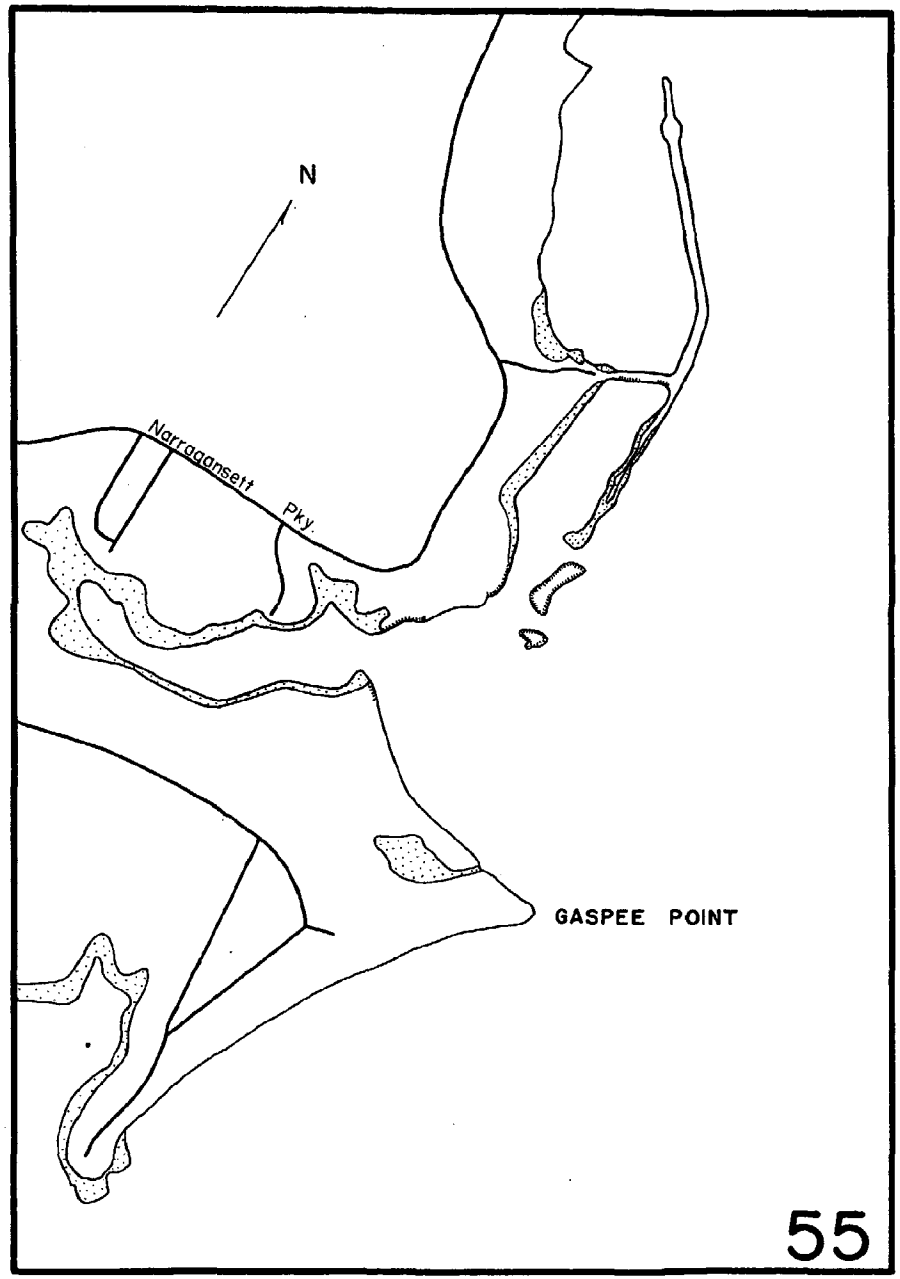

N
WARWICK POINT

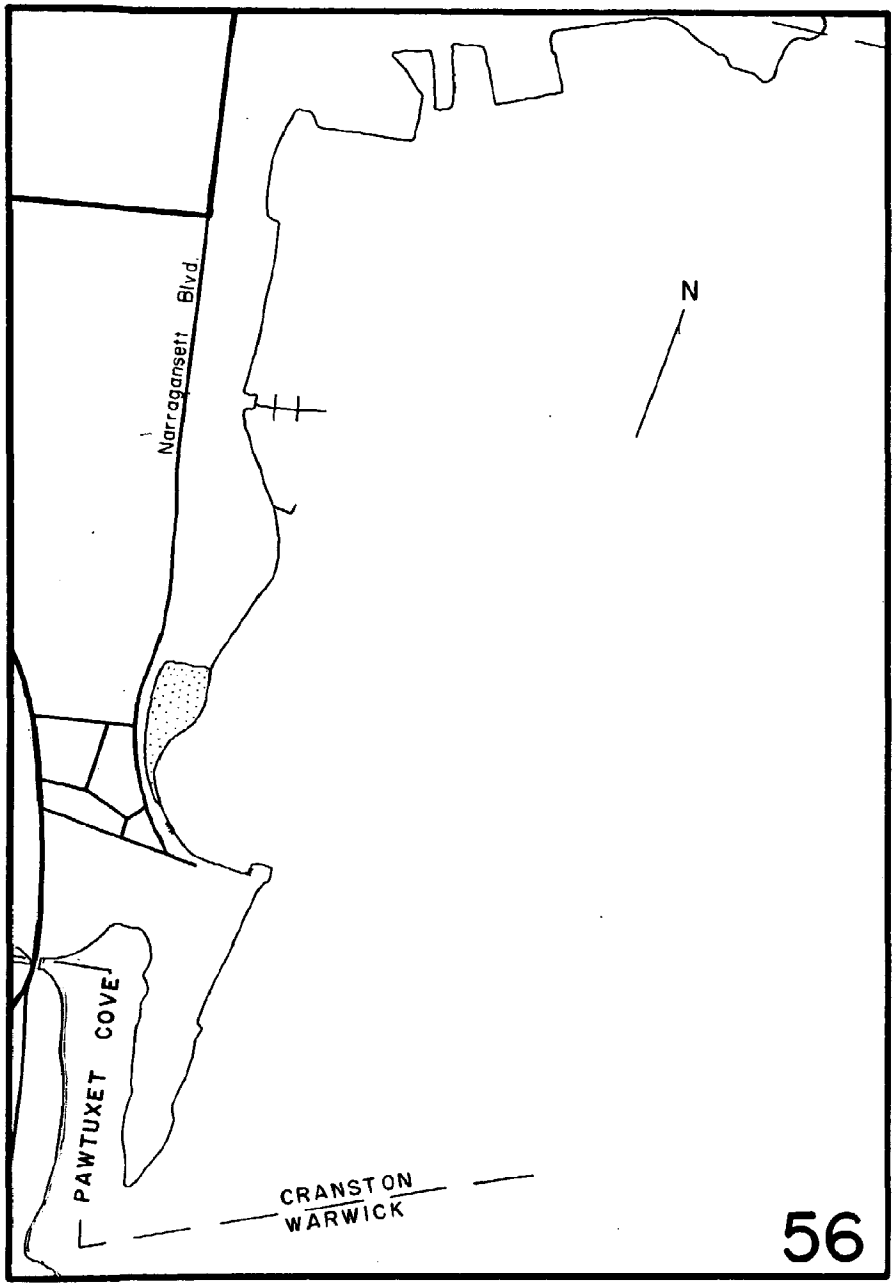
51

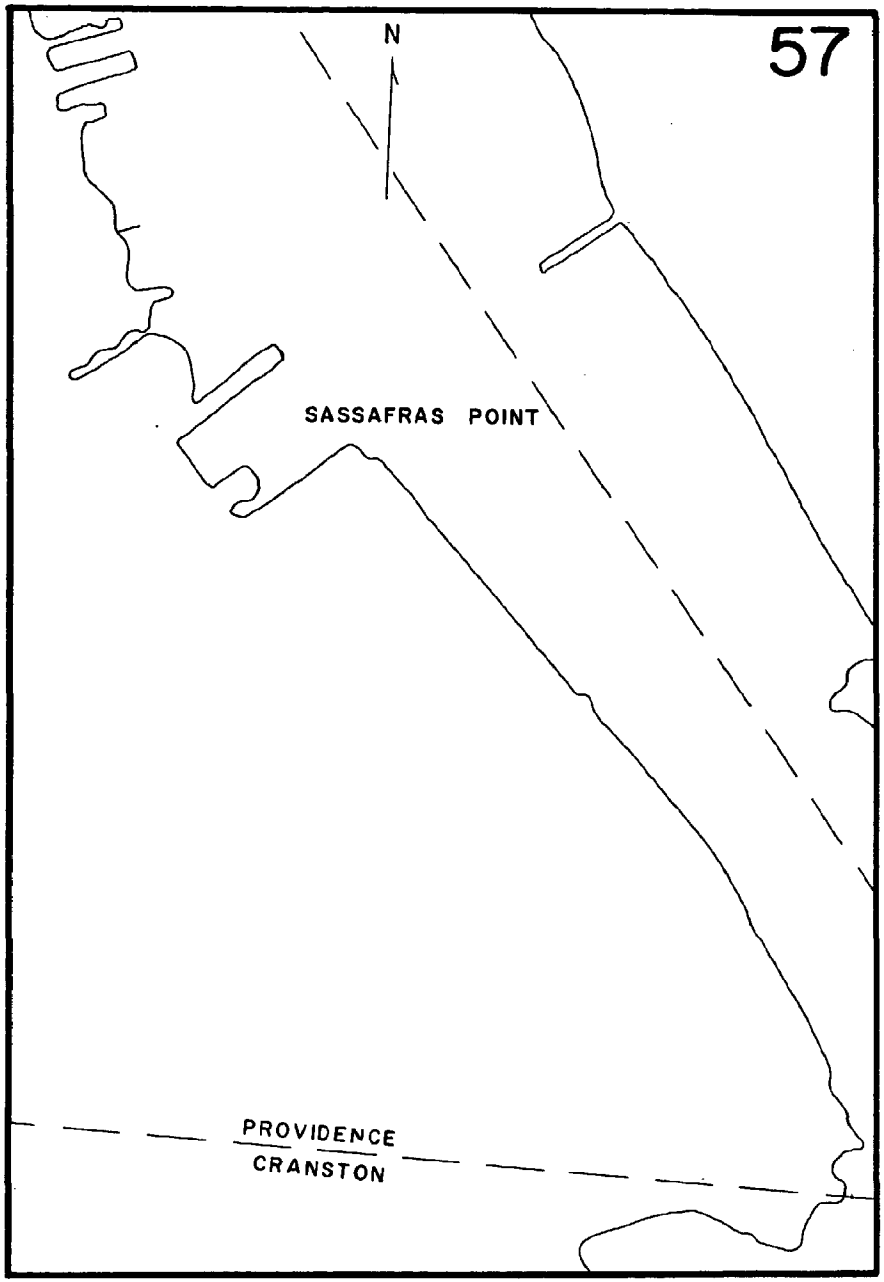

N
Samuel Gorton Ave.
ROCKY POINT
52

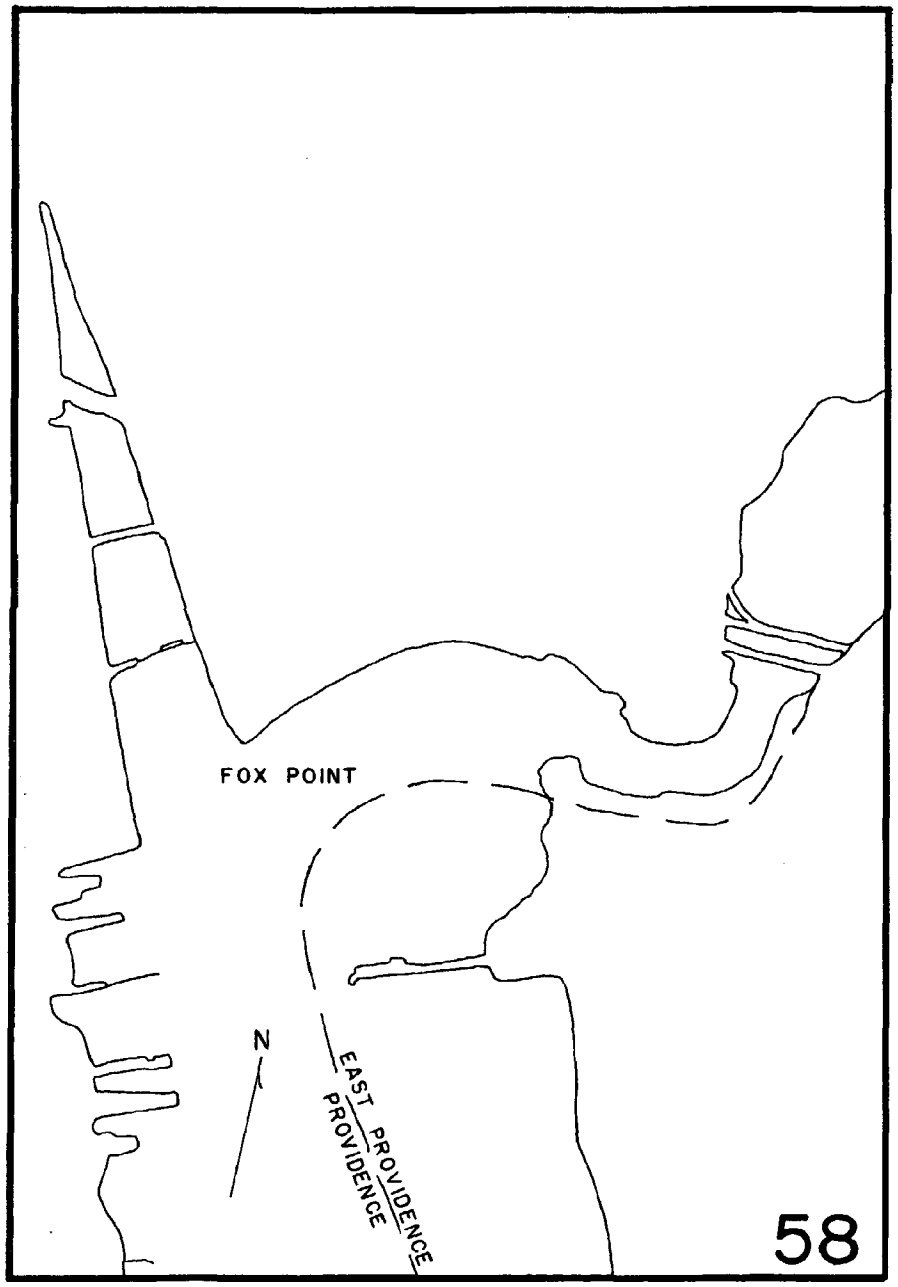

CONIMICUT POINT
N
Symonds St.
RT. 117
Tidewater Ave.
53

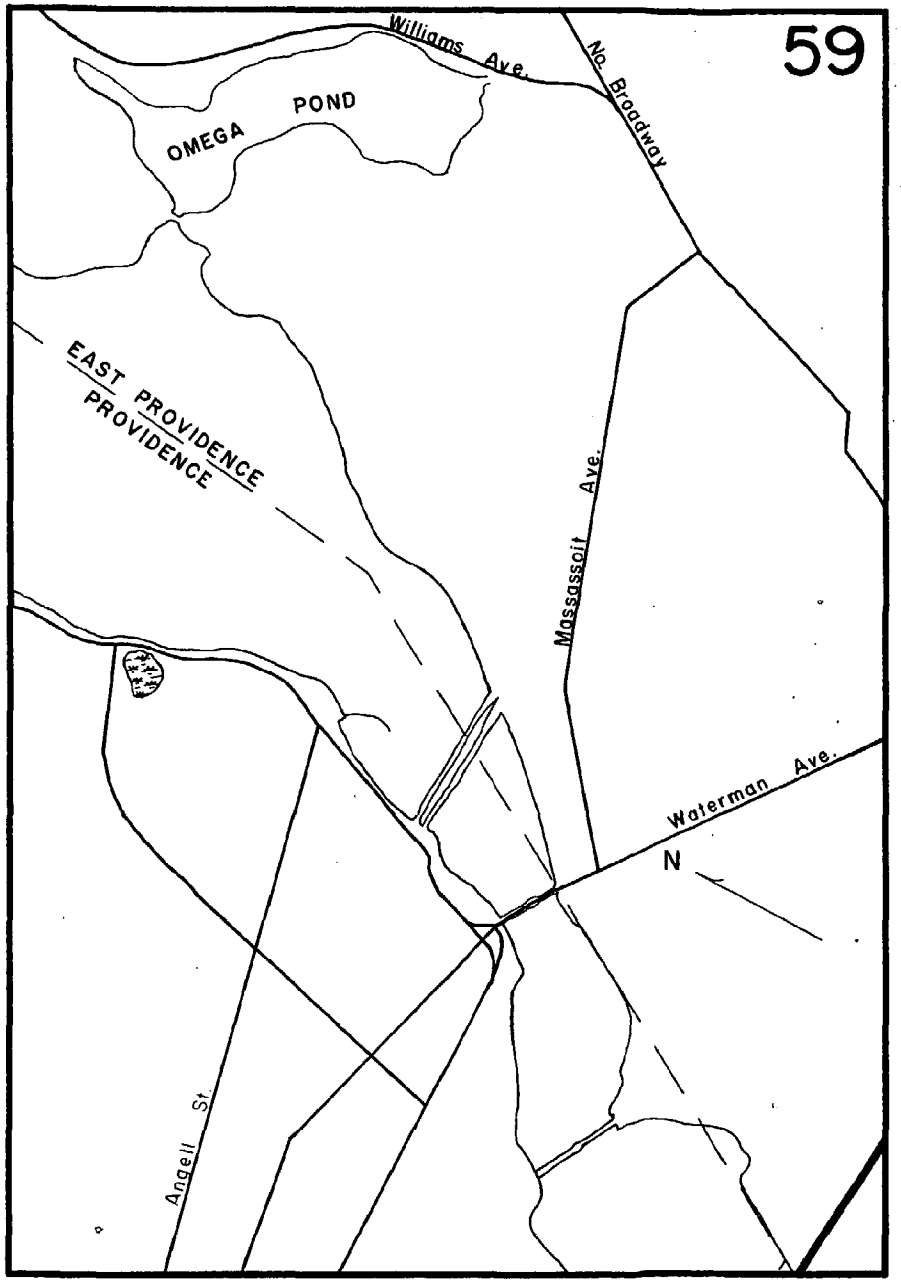

N
RT. 117
OCCUPASSATUXET
COVE
54

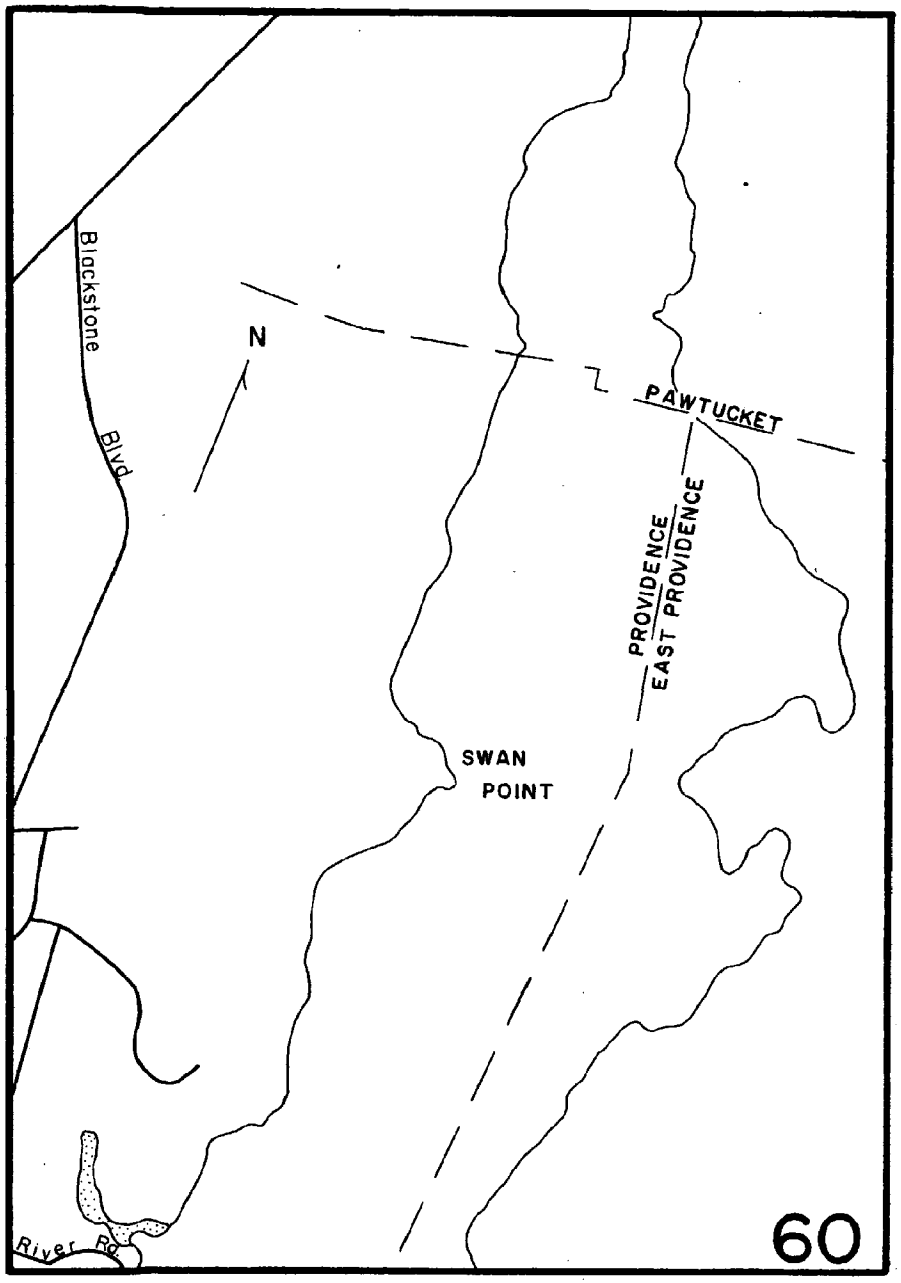

N
Narragansett
Pky.
GASPEE POINT
55

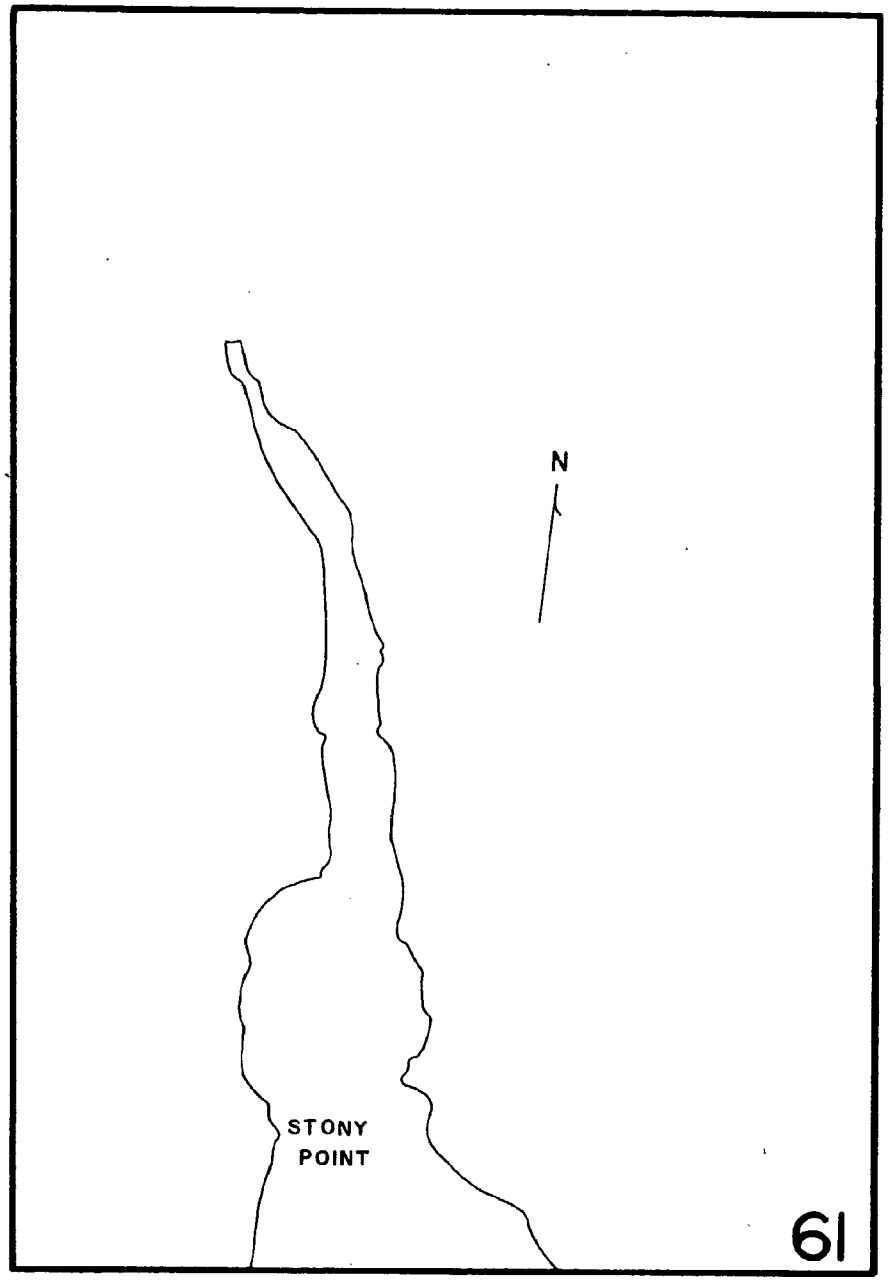

Narragansett Blvd.
N
PAWTUXET COVE
CRANSTON
WARWICK
56

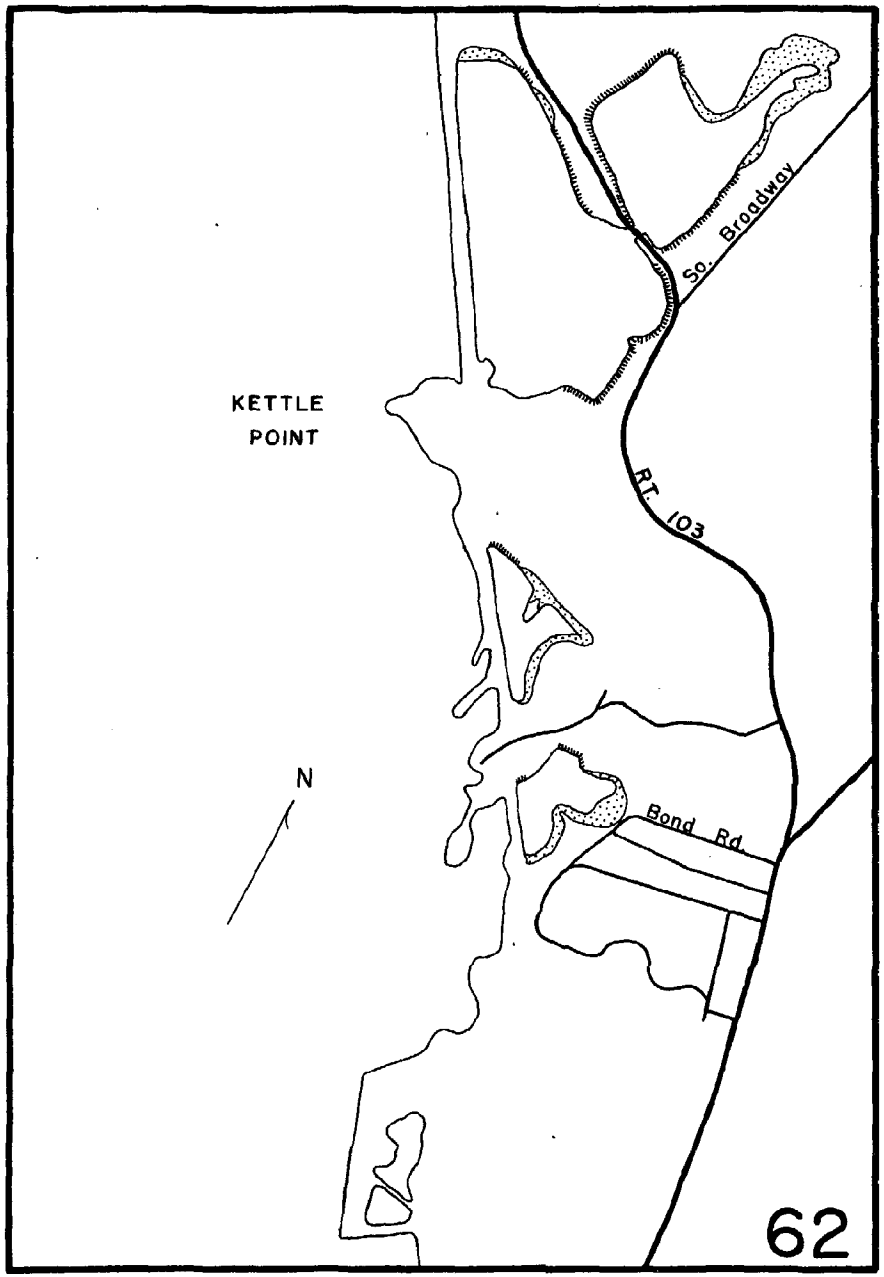

N
57
SASSAFRAS POINT
PROVIDENCE
CRANSTON

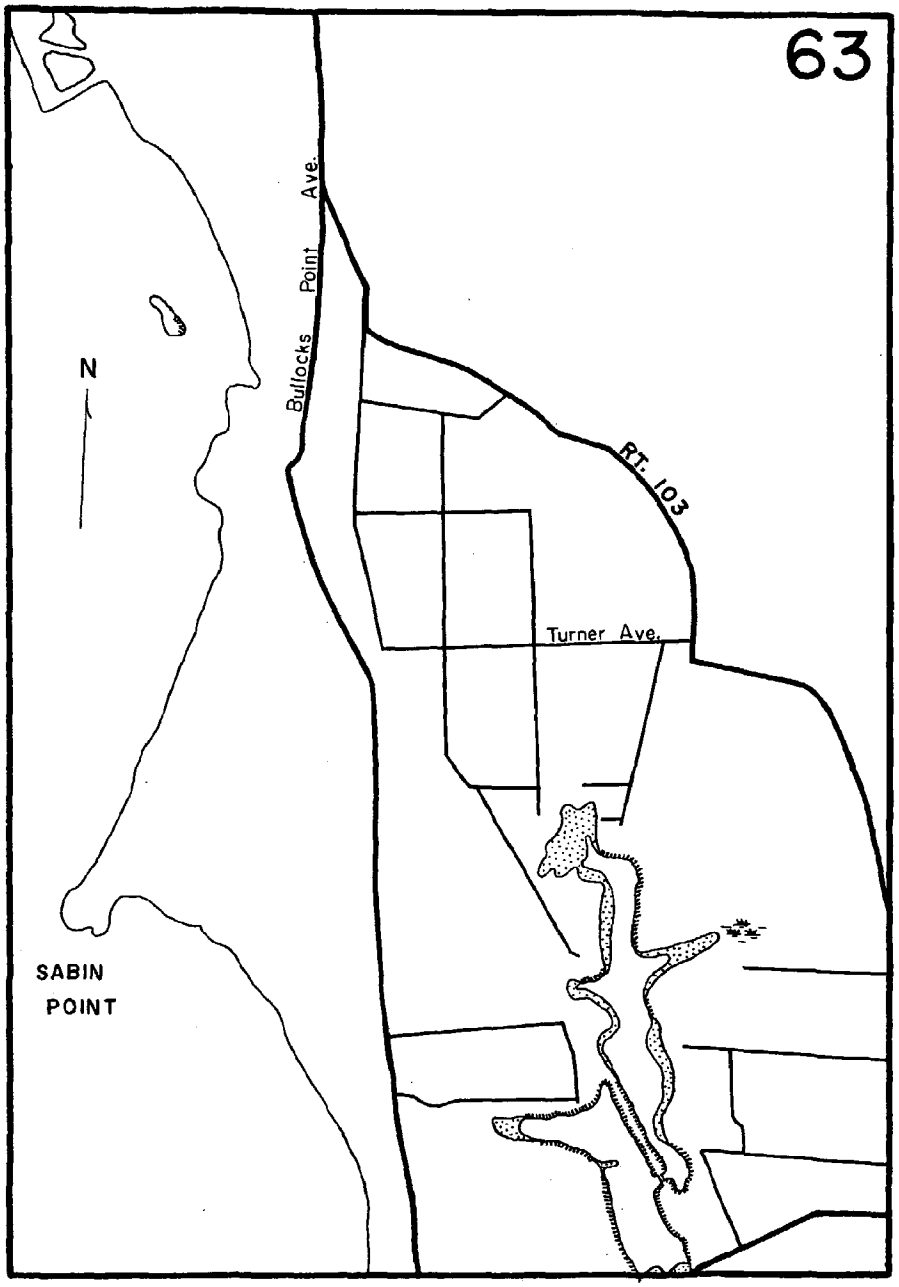

FOX POINT
N
EAST PROVIDENCE
PROVIDENCE
58

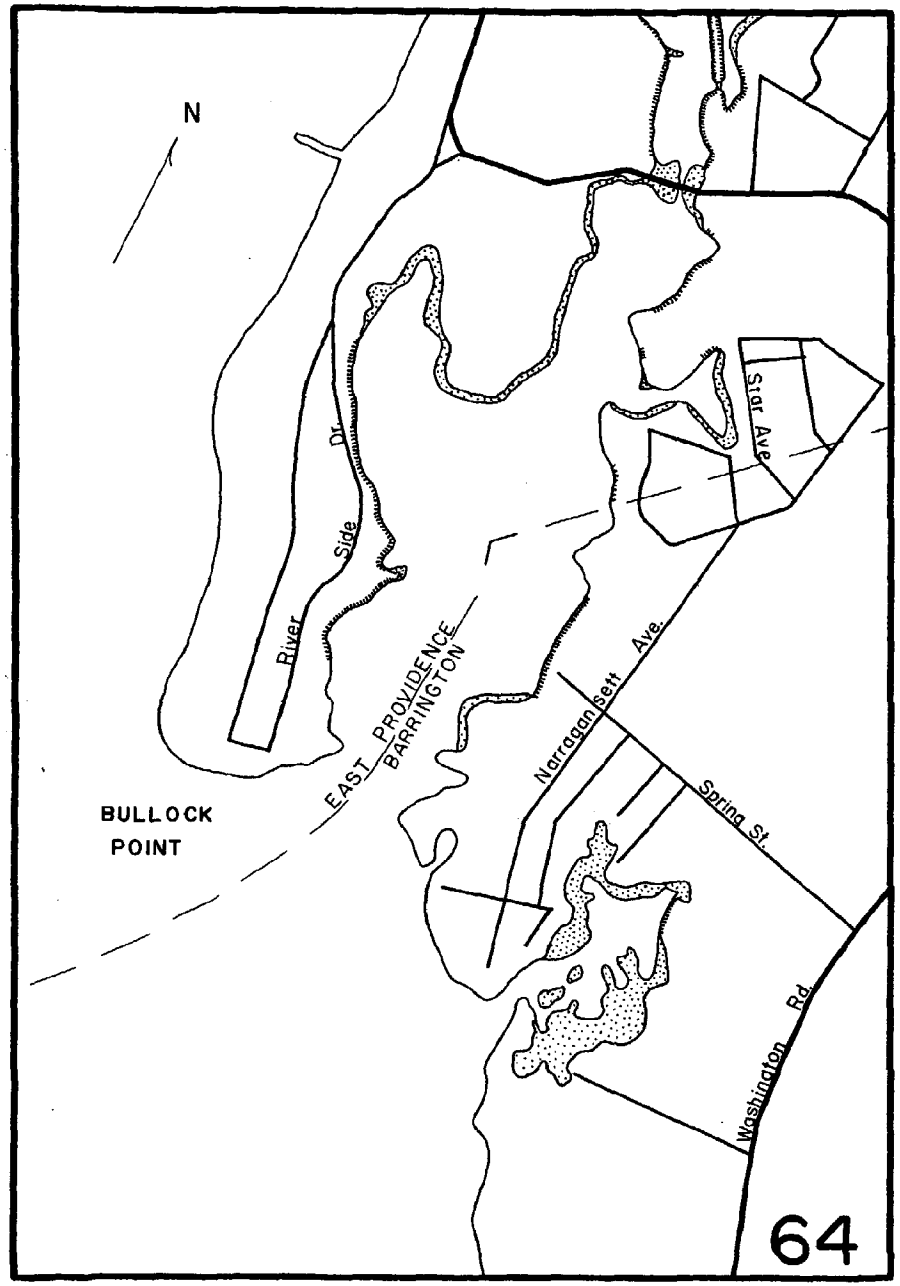

59
Williams Ave.
No. Broadway
OMEGA POND
EAST PROVIDENCE
PROVIDENCE
Massasoit Ave.
Waterman Ave.
N
Angell St.

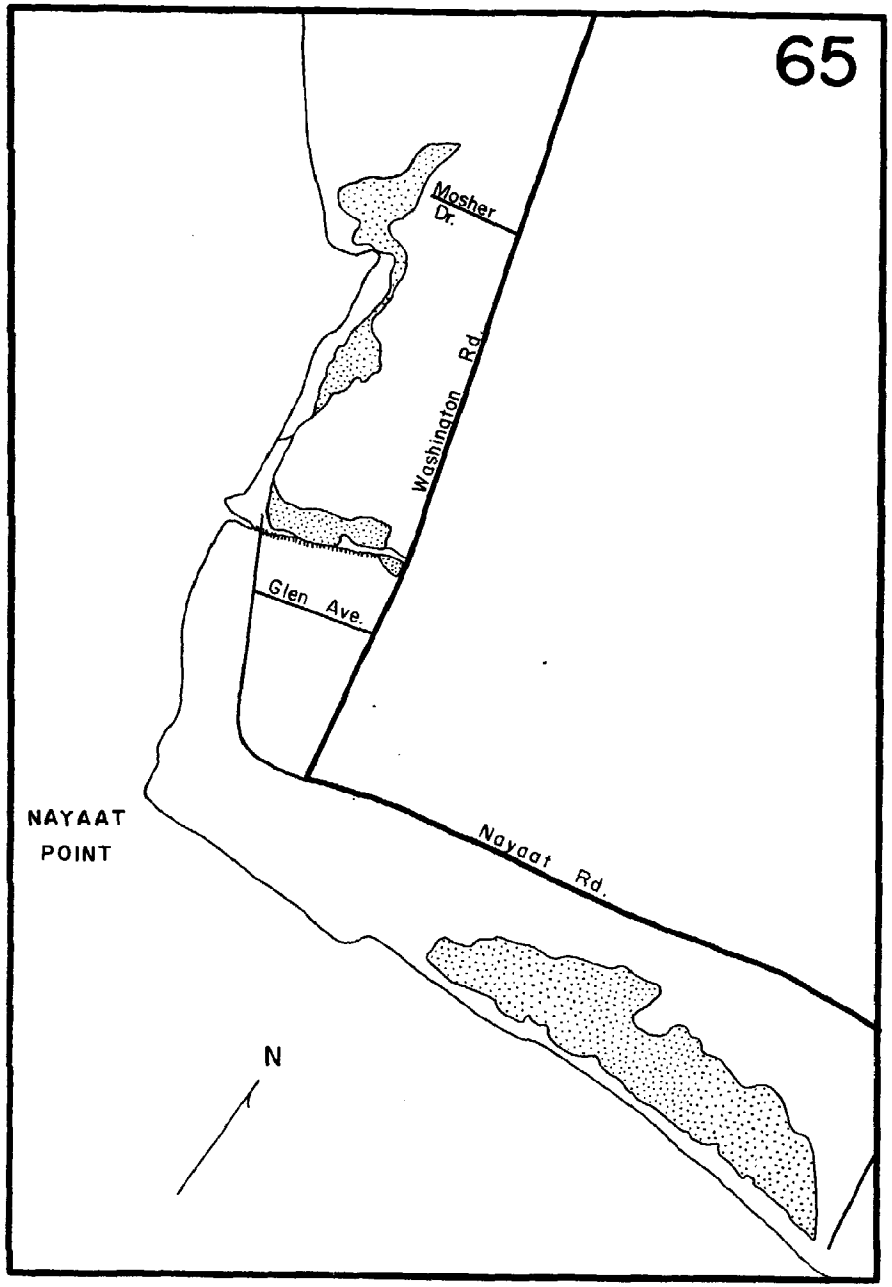

Blackstone Blvd
N
PAWTUCKET
PROVIDENCE
EAST PROVIDENCE
SWAN POINT
River Rd
60

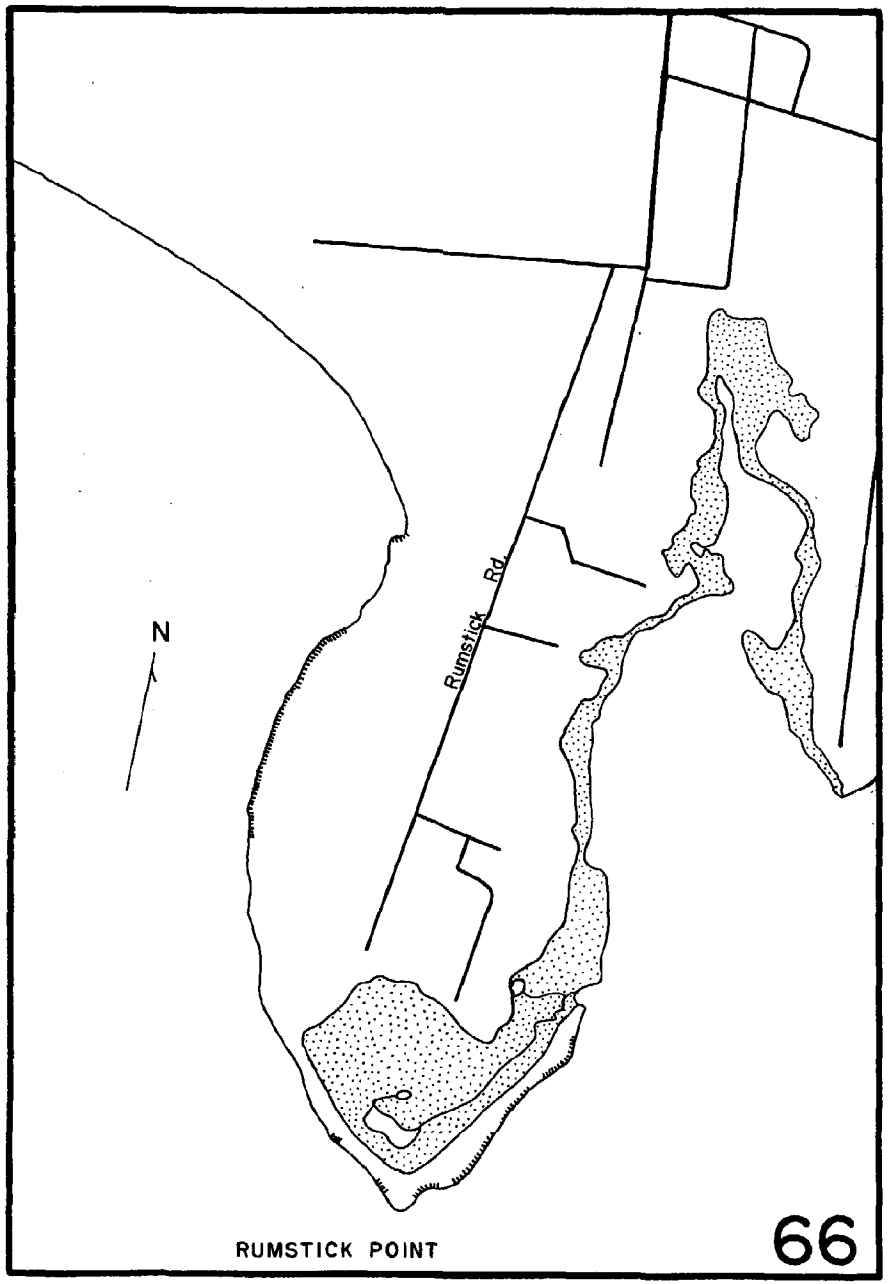

N
STONY POINT
61

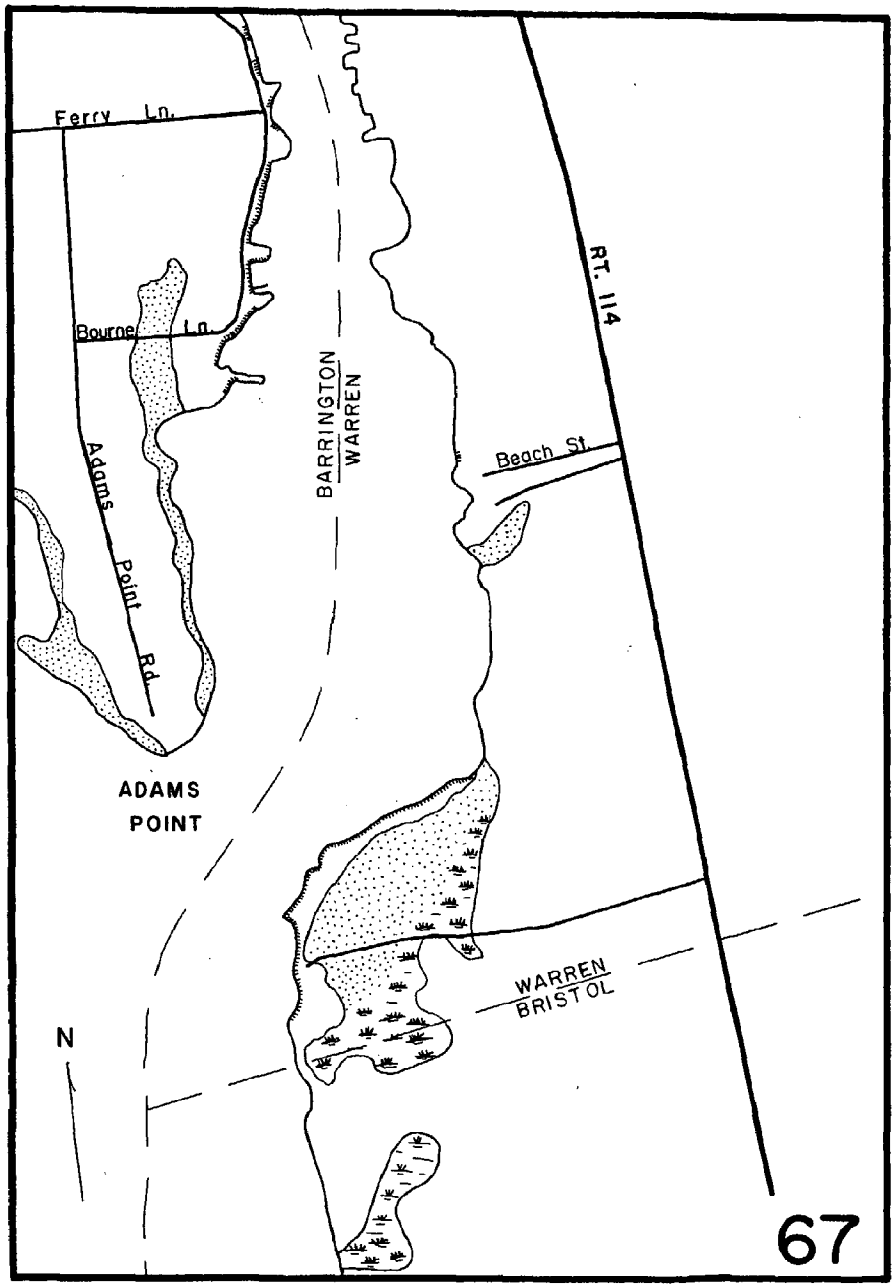

KETTLE
POINT
N
So. Broadway
RT. 103
Bond Rd.
62

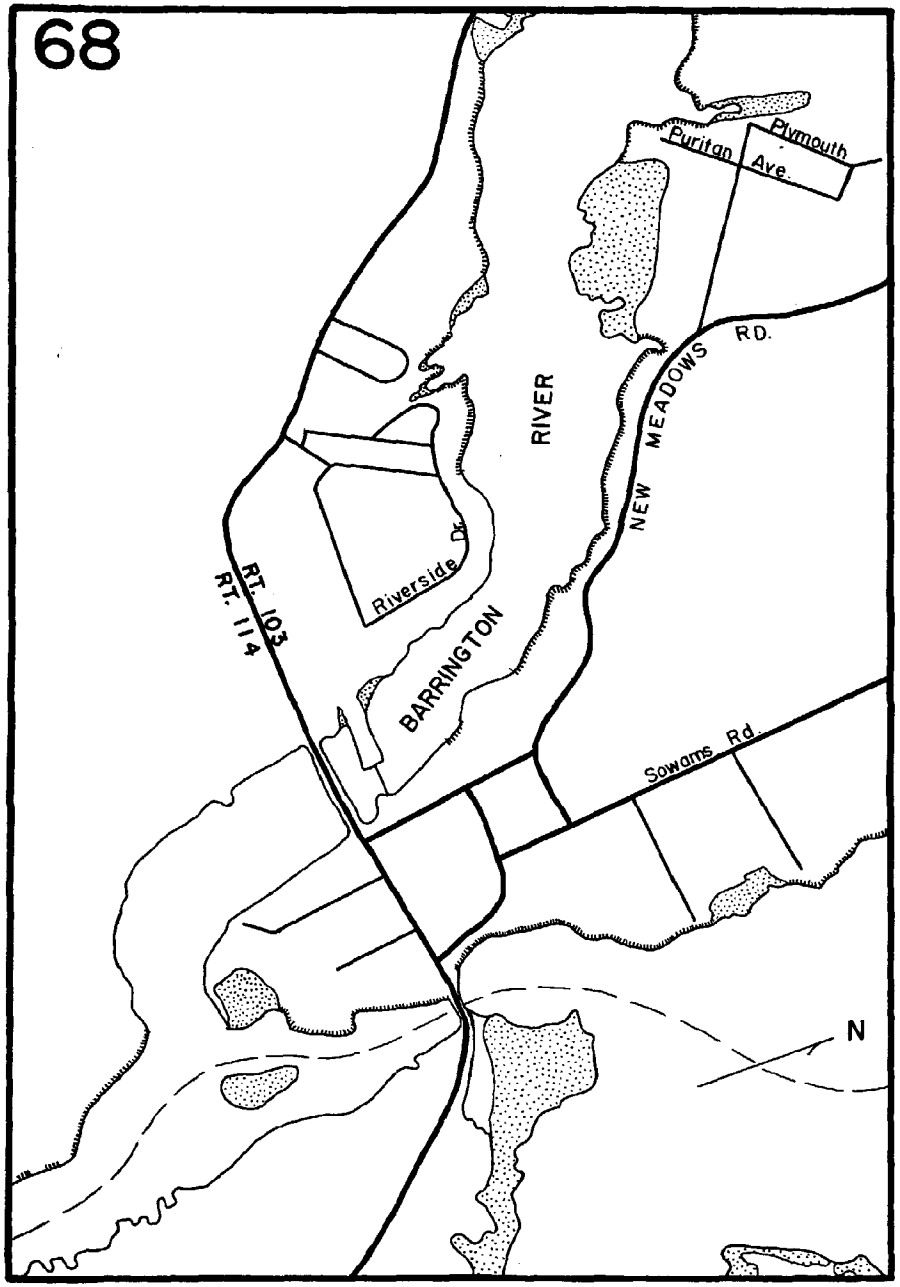

63
N
Bullocks Point Ave.
RT. 103
Turner Ave.
SABIN
POINT

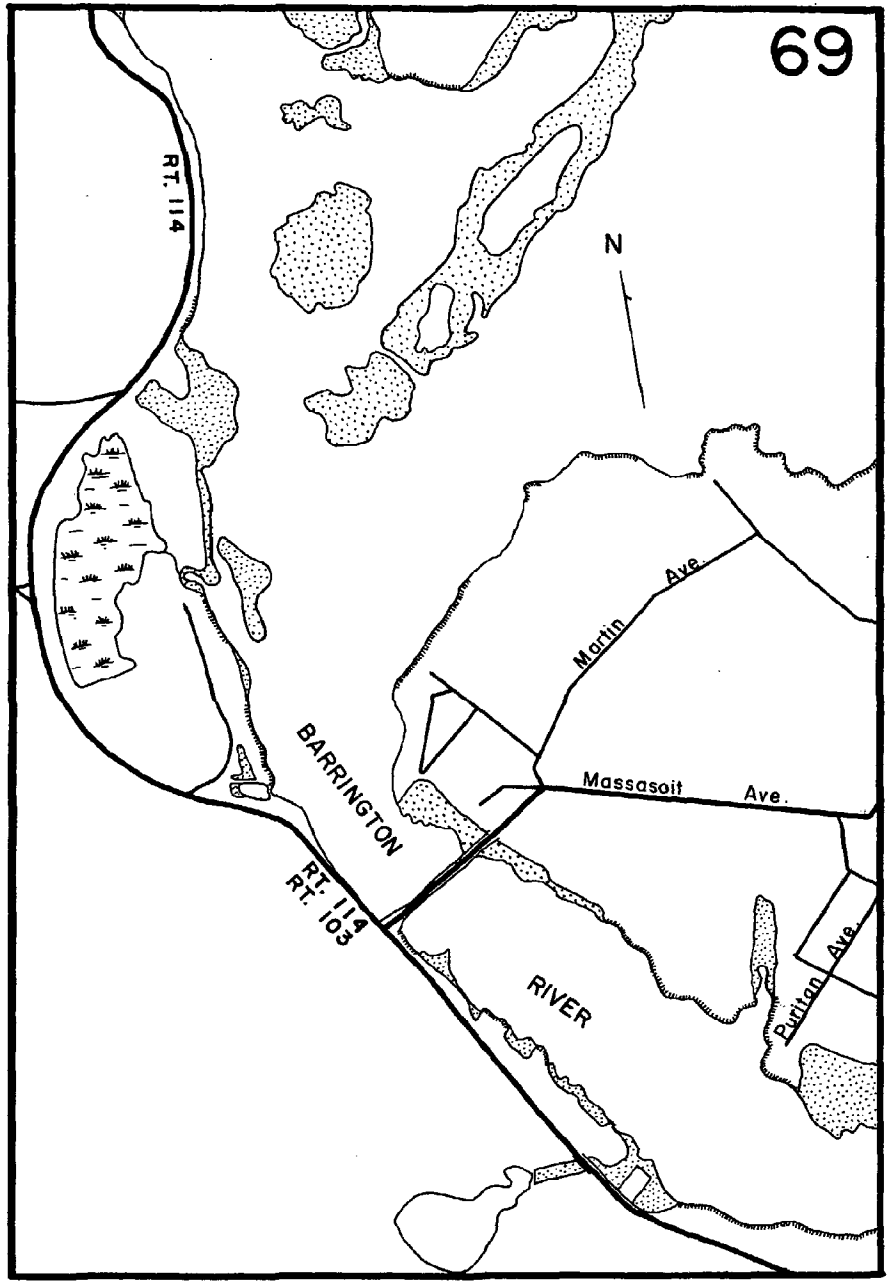

N
BULLOCK POINT
EAST PROVIDENCE
BARRINGTON
River Side Dr.
Star Ave.
Narragansett Ave.
Spring St.
Washington Rd.
64

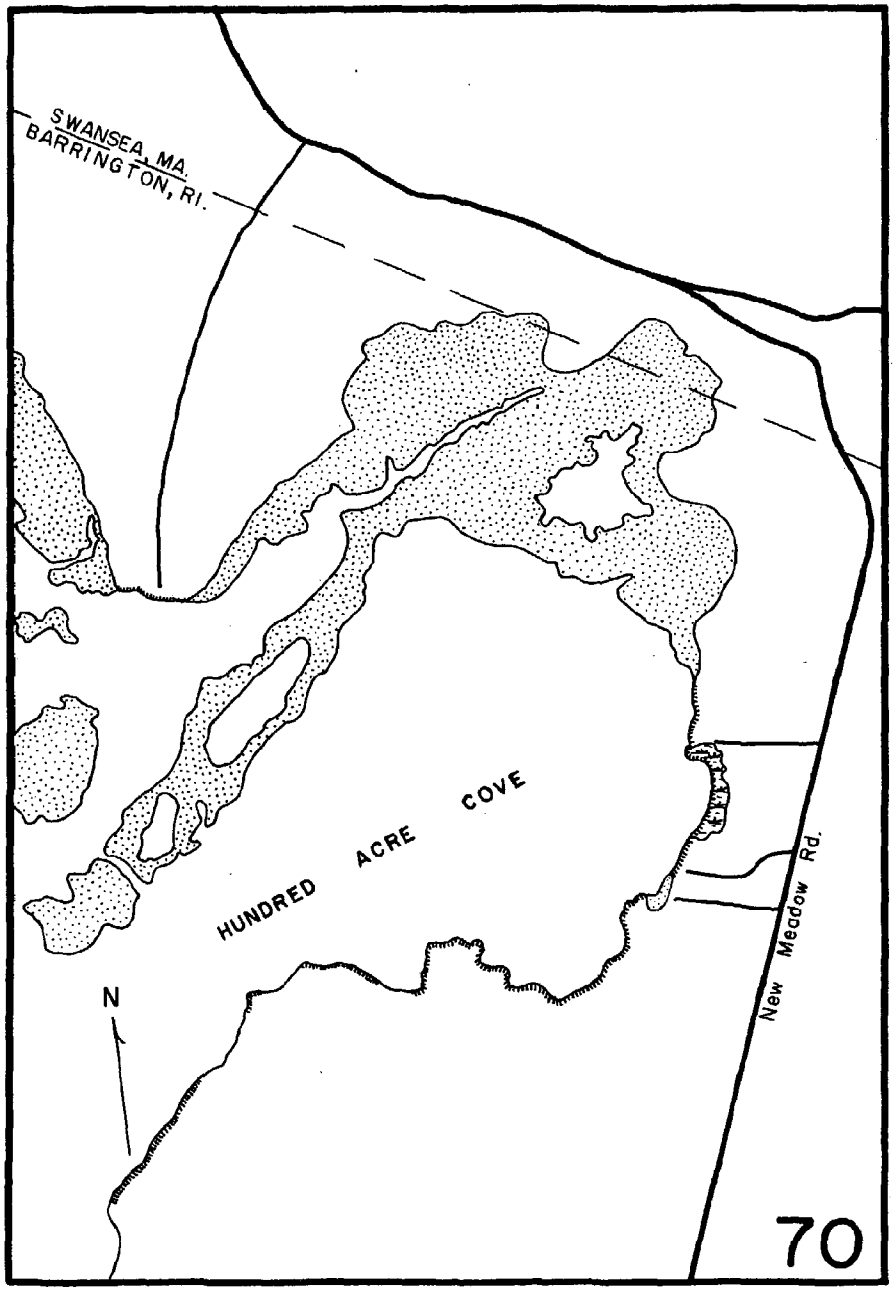

65
Mosher Dr.
Washington Rd.
Glen Ave.
NAYAAT POINT
Nayaat Rd.
N

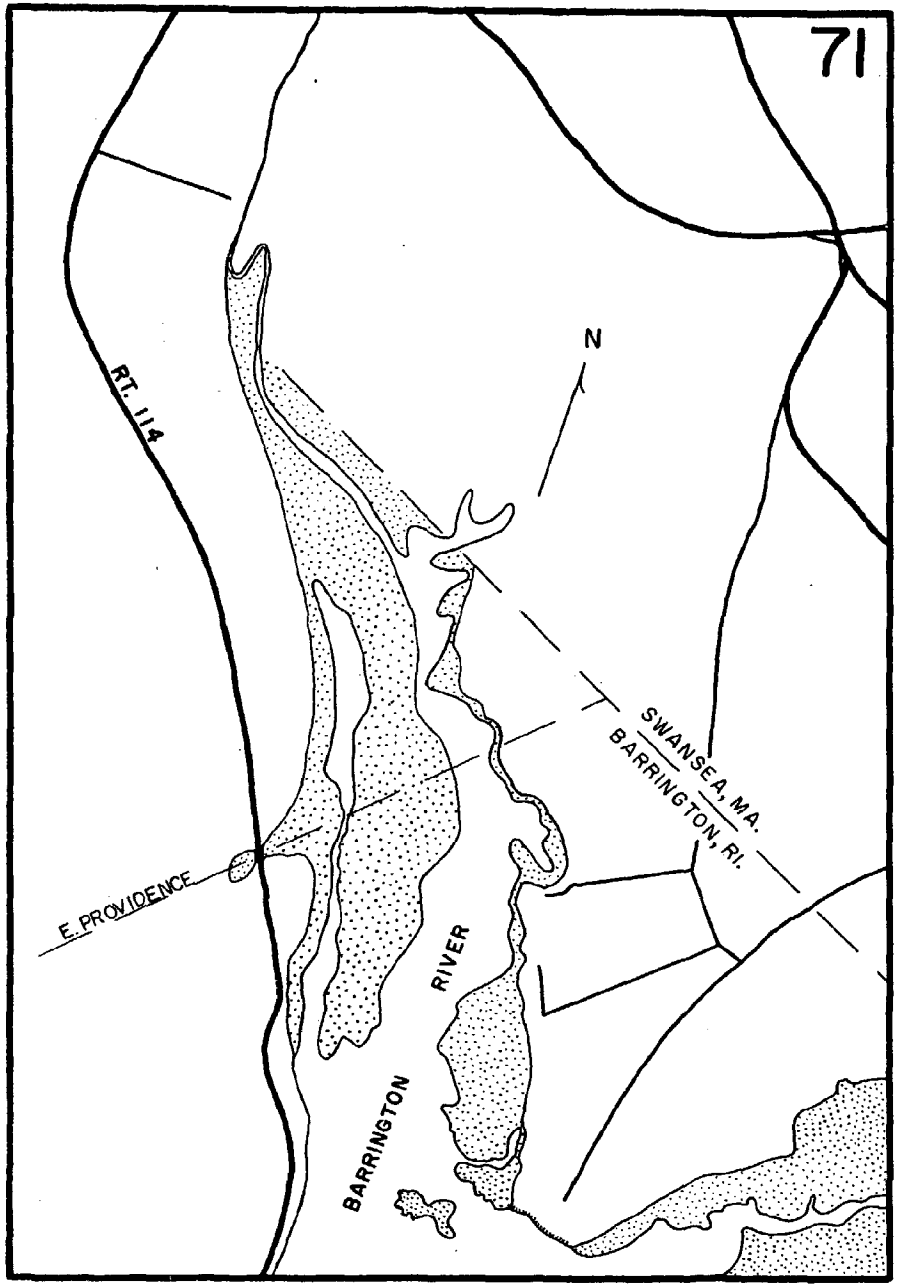

N
Rumstick Rd.
RUMSTICK POINT
66

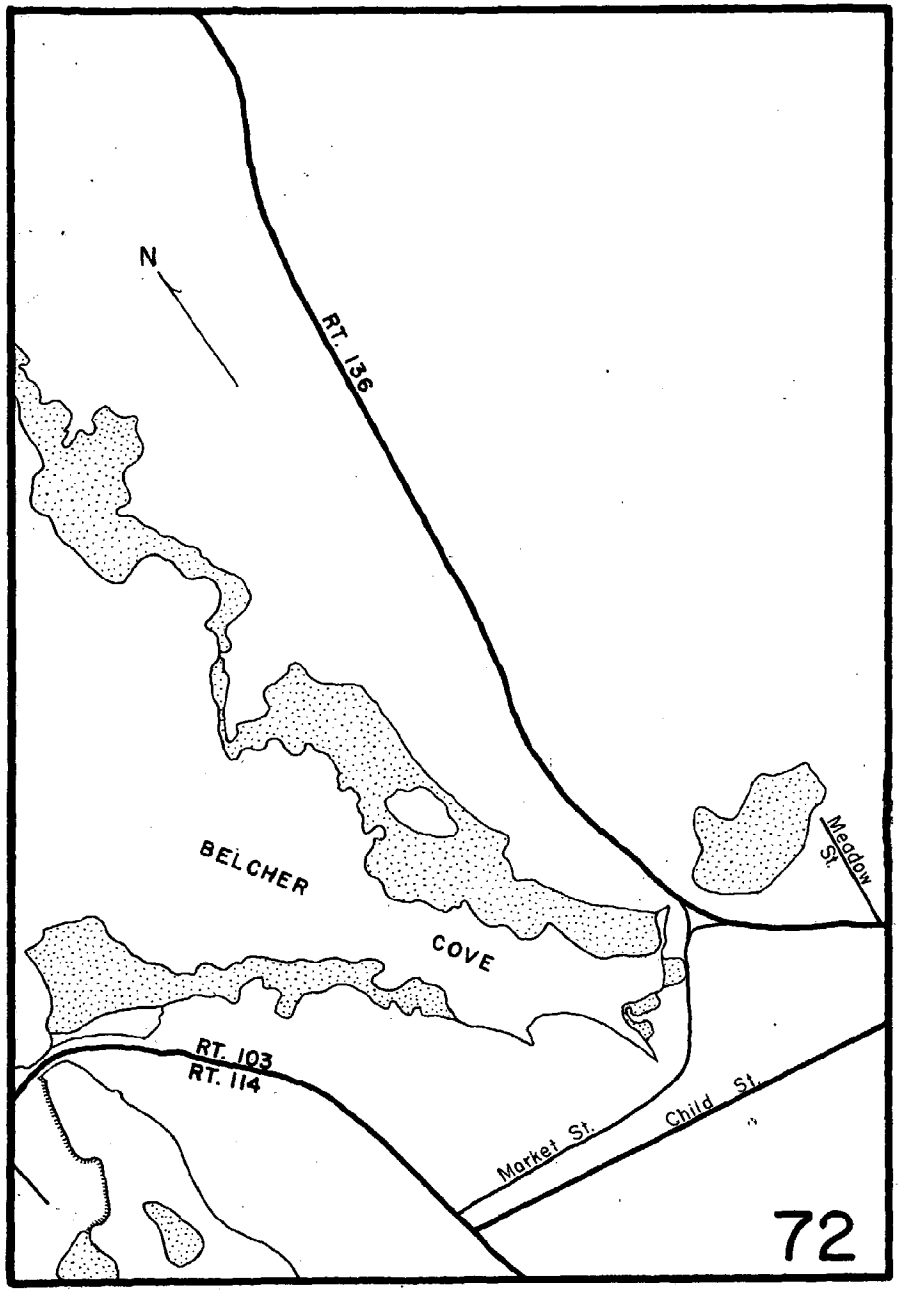

Ferry Ln.
Bourne Ln.
Adams Point Rd.
BARRINGTON
WARREN
RT. 114
Beach St.
ADAMS
POINT
WARREN
BRISTOL
N
67

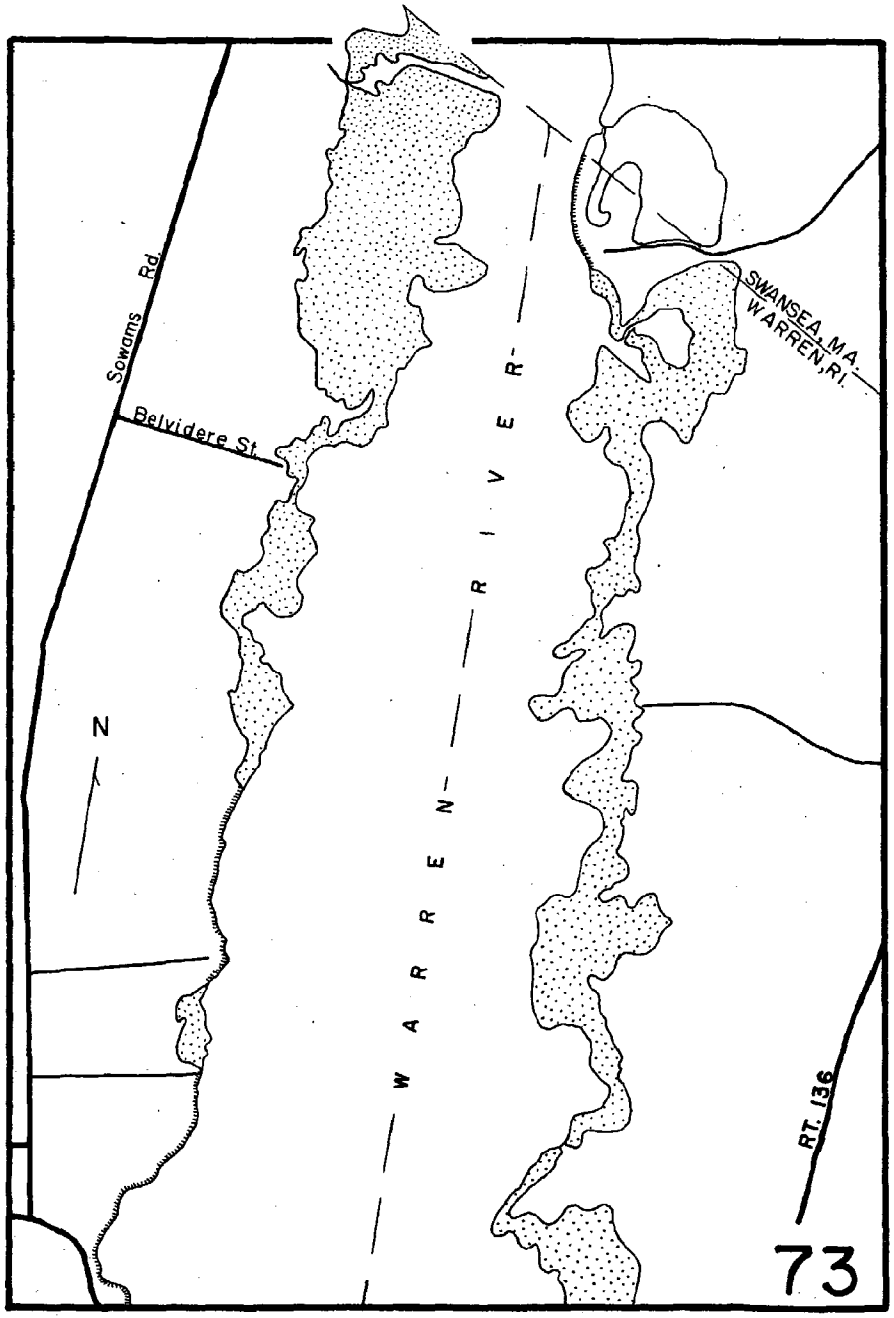

68
Plymouth
Puritan Ave.
RIVER
NEW MEADOWS RD.
Riverside
RT. 103
RT. 114
BARRINGTON
Sowams Rd.
N

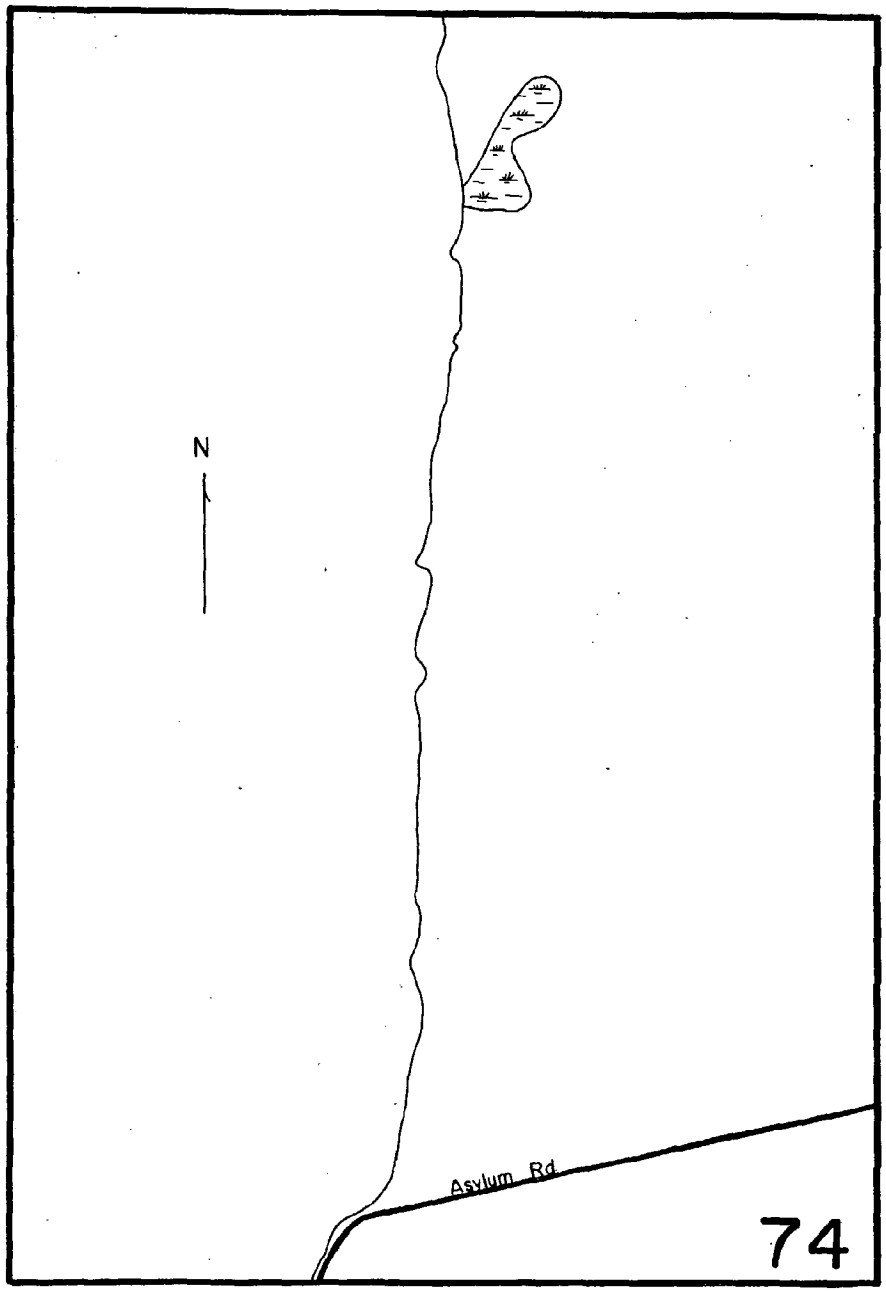

69
RT. 114
N
Martin Ave.
Massasoit Ave.
BARRINGTON
RT. 114
RT. 103
RIVER
Puritan Ave.

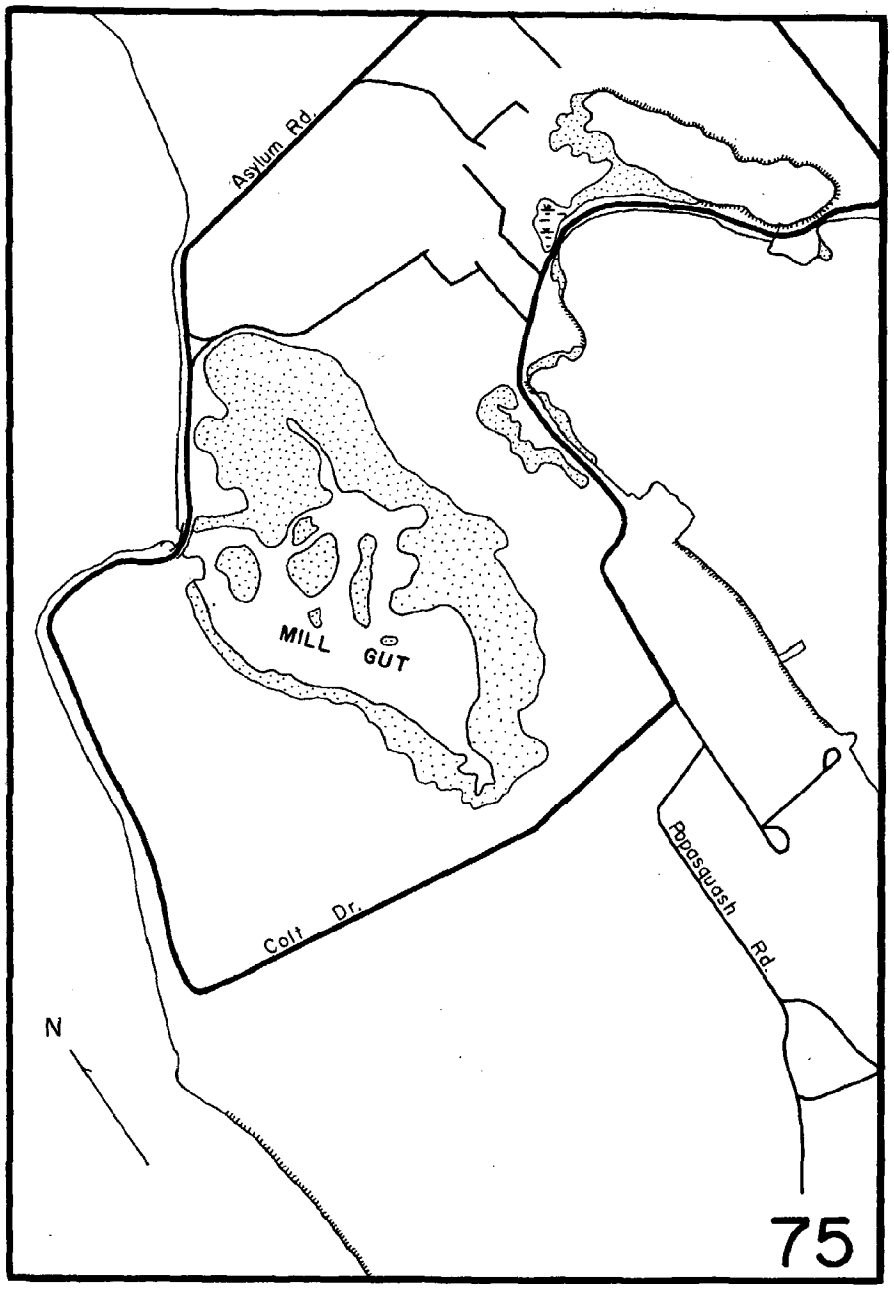

SWANSEA, MA.
BARRINGTON, RI.
HUNDRED ACRE COVE
New Meadow Rd.
N
70

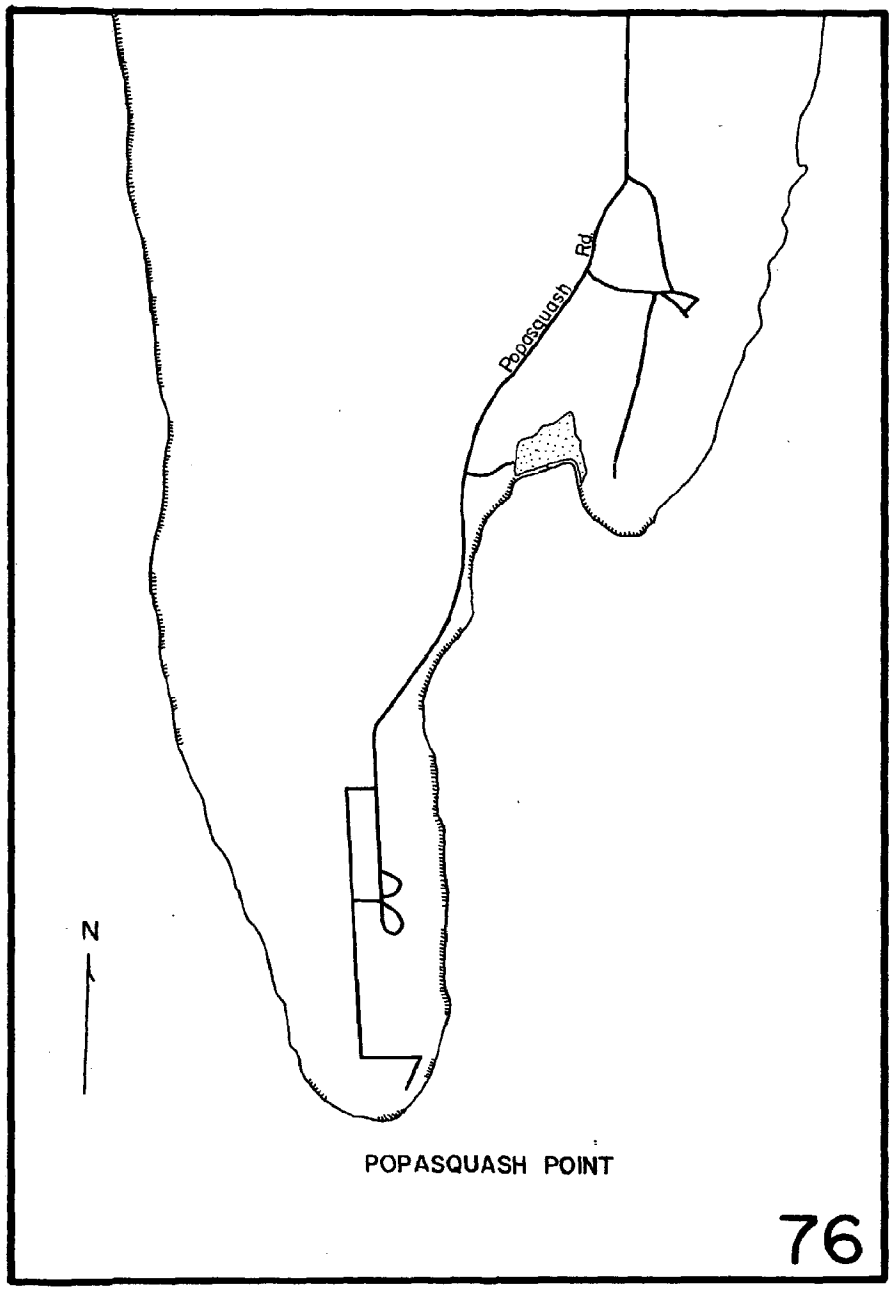

71
RT. 114
N
SWANSEA, MA.
BARRINGTON, RI.
E. PROVIDENCE
BARRINGTON RIVER

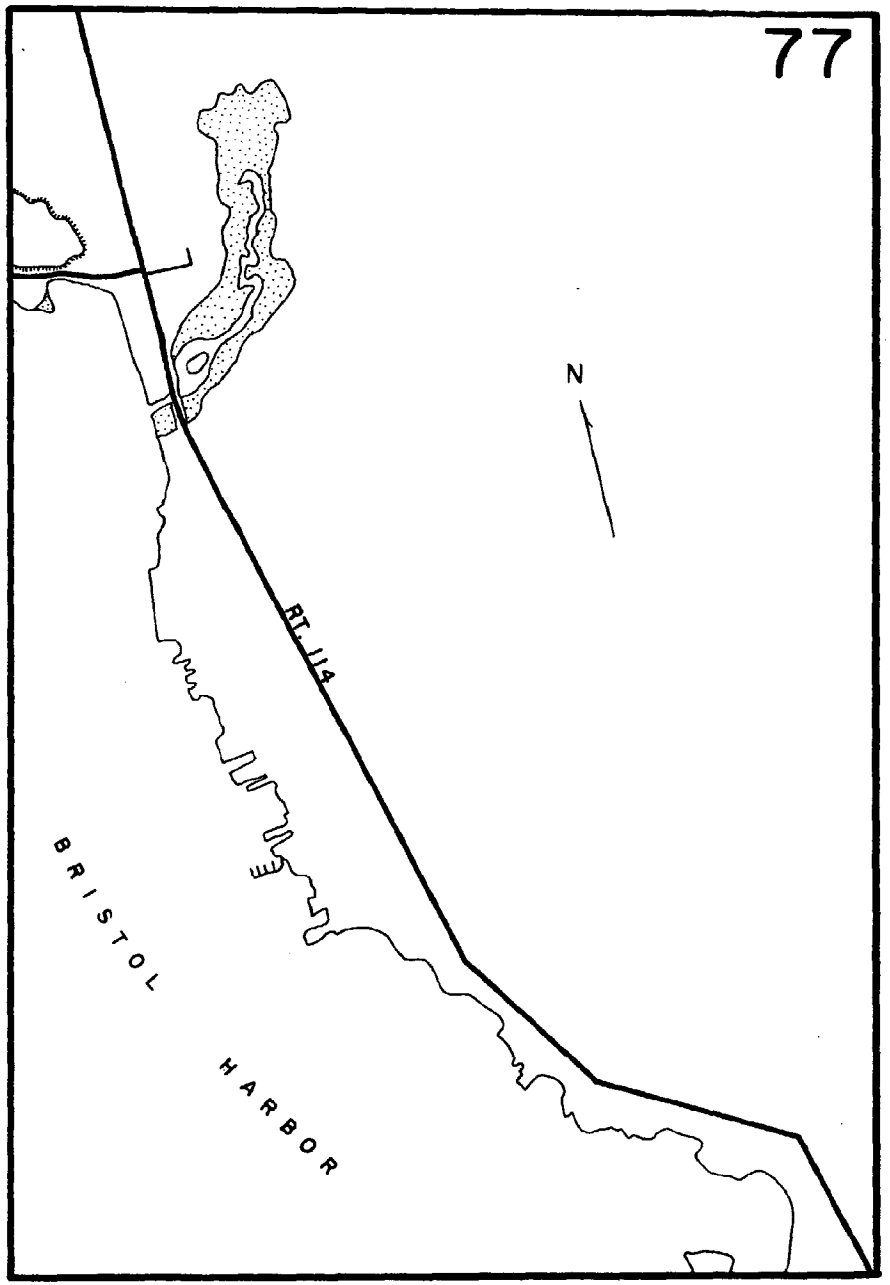

N
RT. 136
BELCHER
COVE
Meadow St.
RT. 103
RT. 114
Market St.
Child St.
72

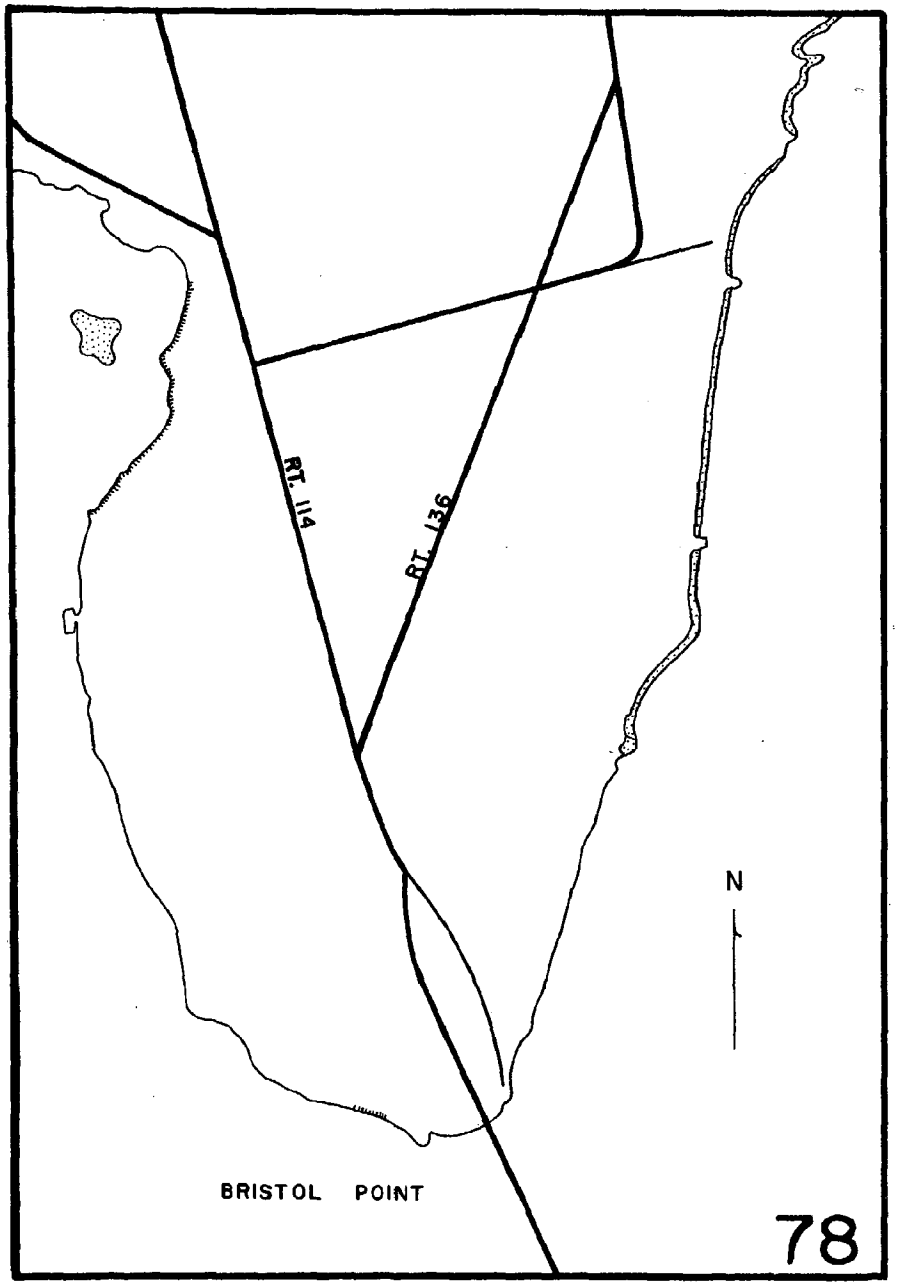

Sowams Rd.
Belvidere St.
N
WARREN RIVER
SWANSEA, MA.
WARREN, RI.
RT. 136
73

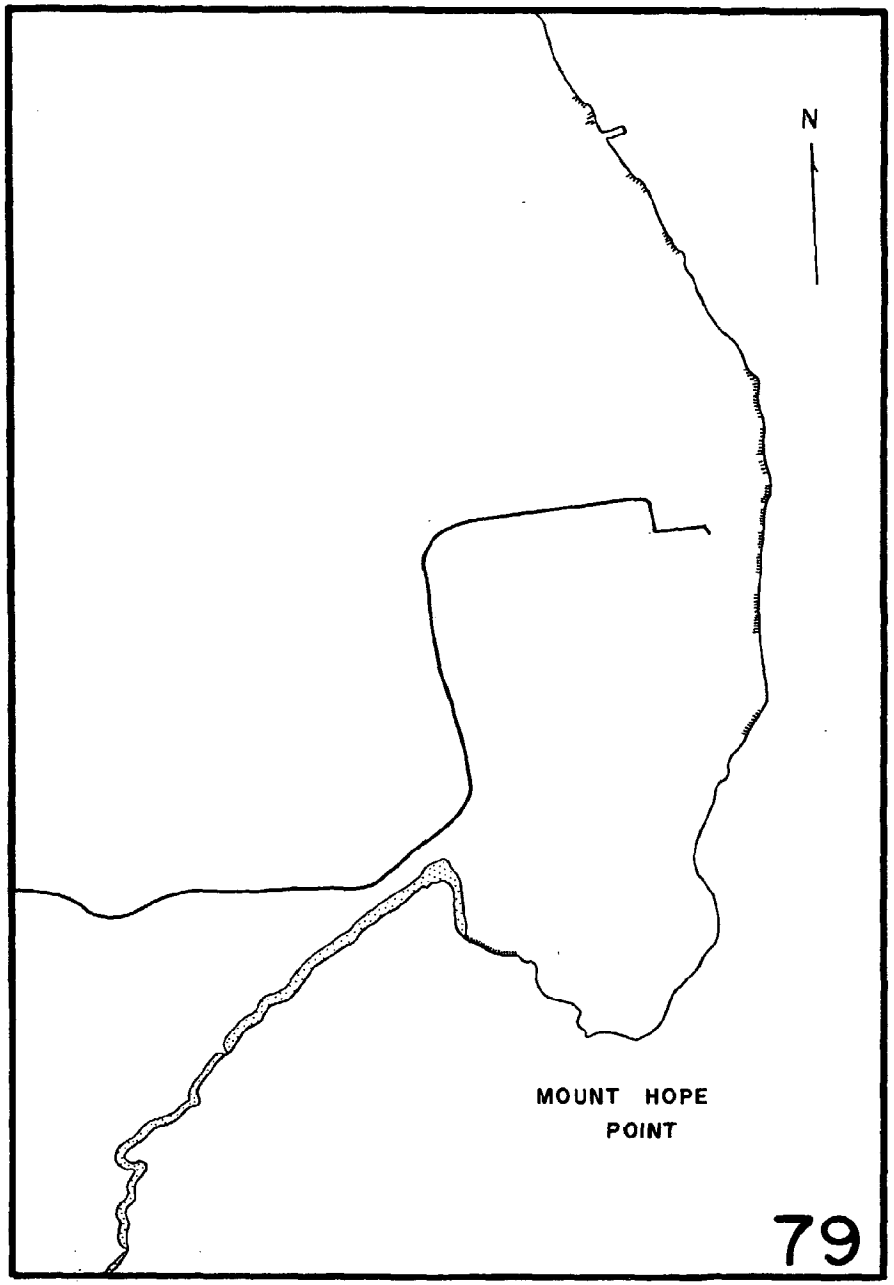

N
Asylum Rd.
74

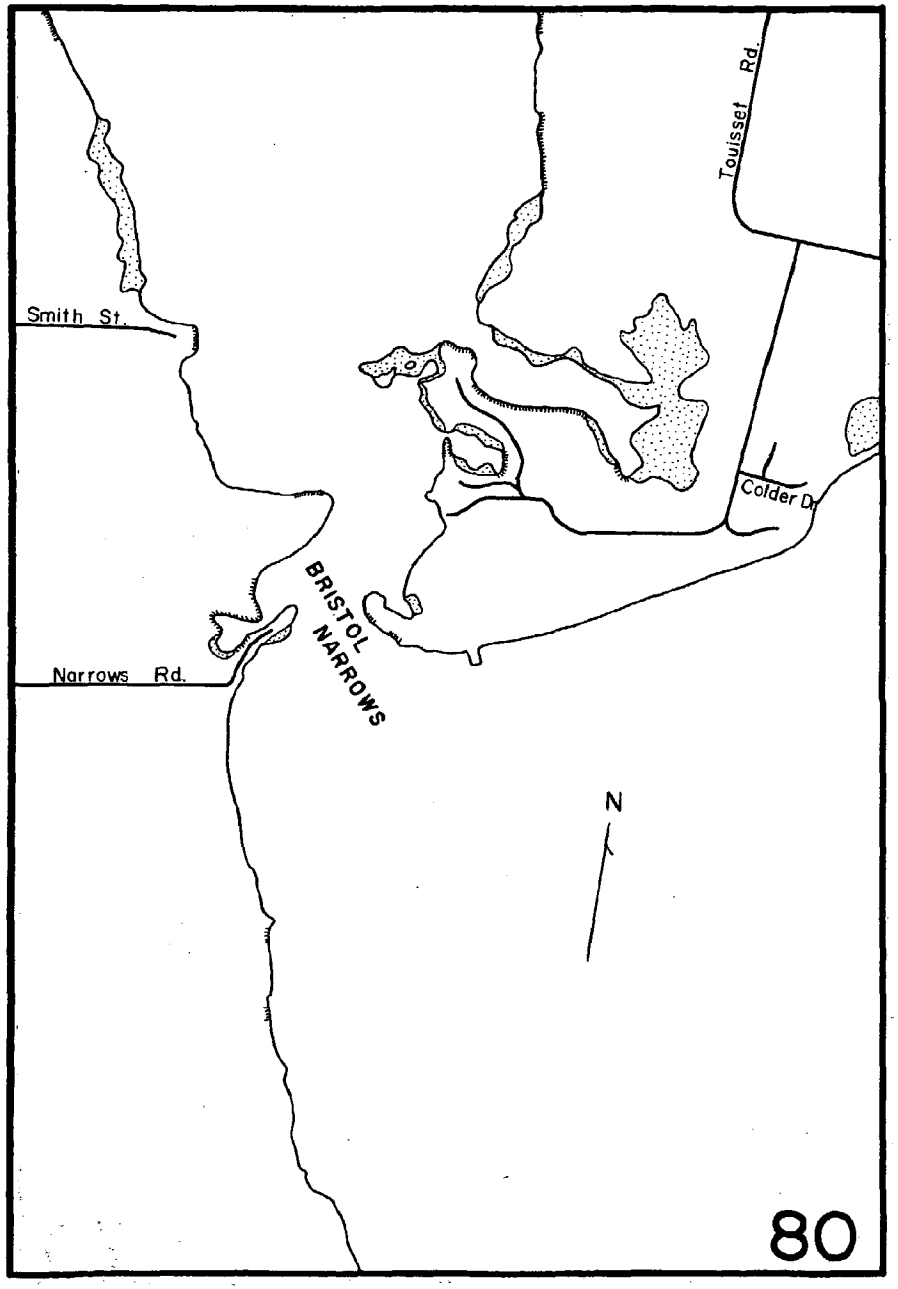

Asylum Rd.
MILL GUT
Colt Dr.
Popasquash Rd.
N
75

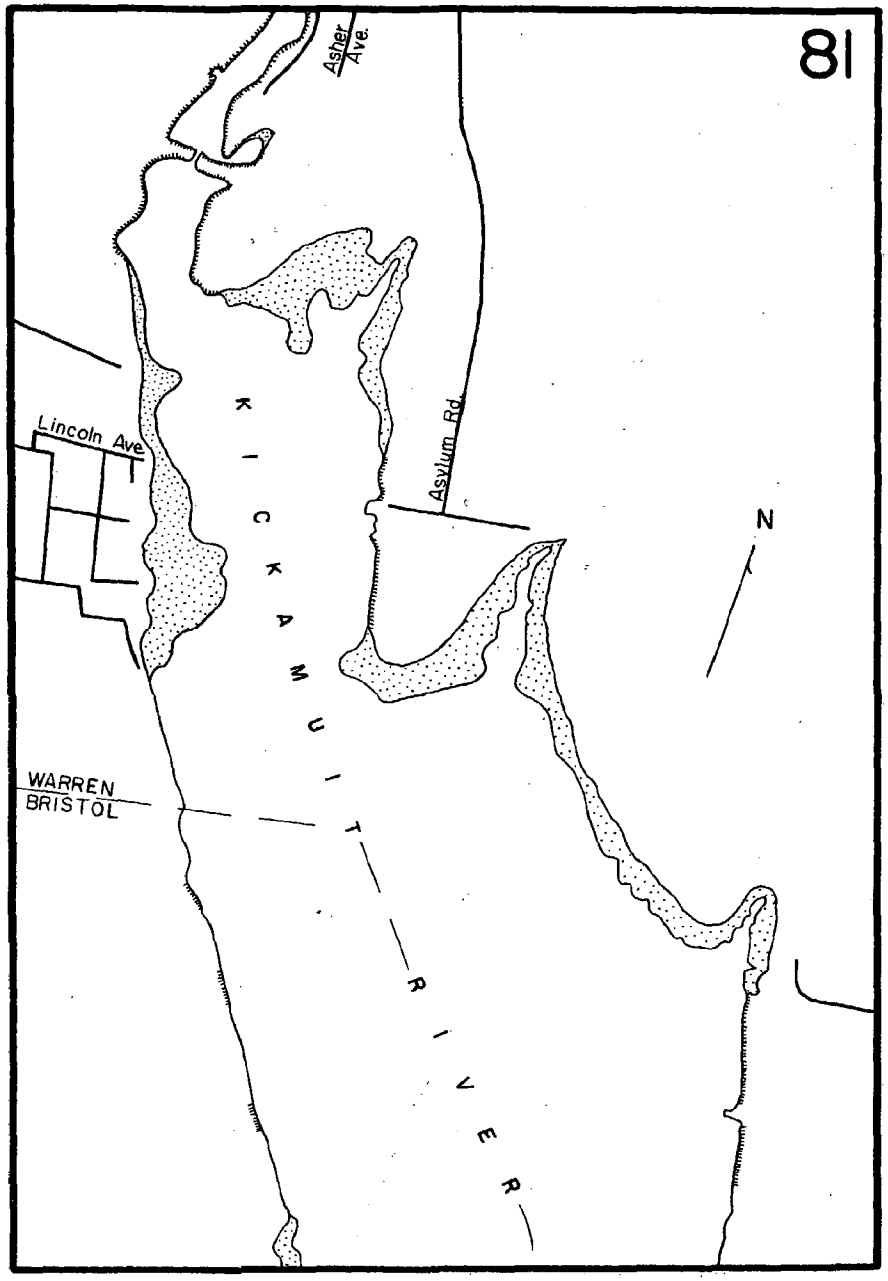

Popasquash Rd.
N
POPASQUASH POINT
76

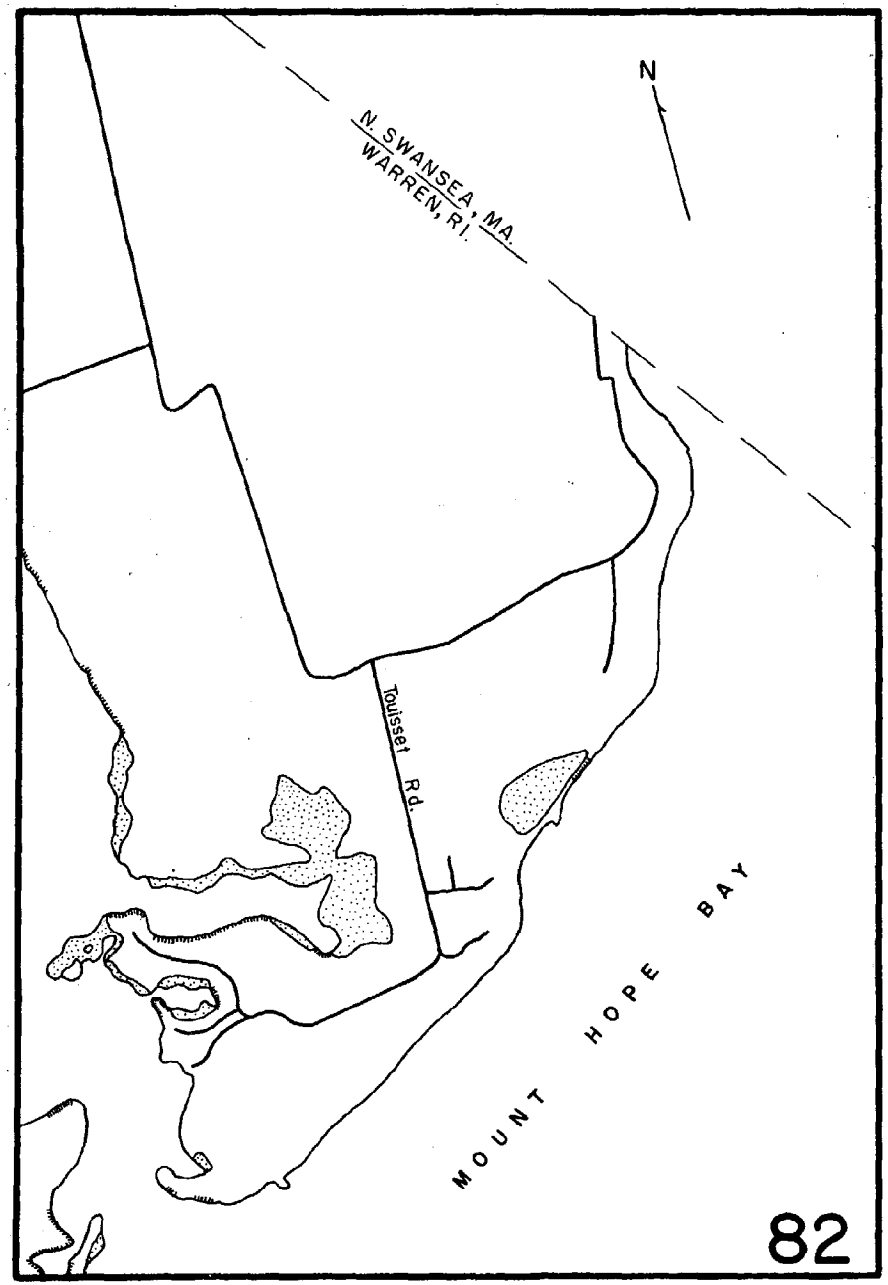

77
N
RT. 114
BRISTOL
HARBOR

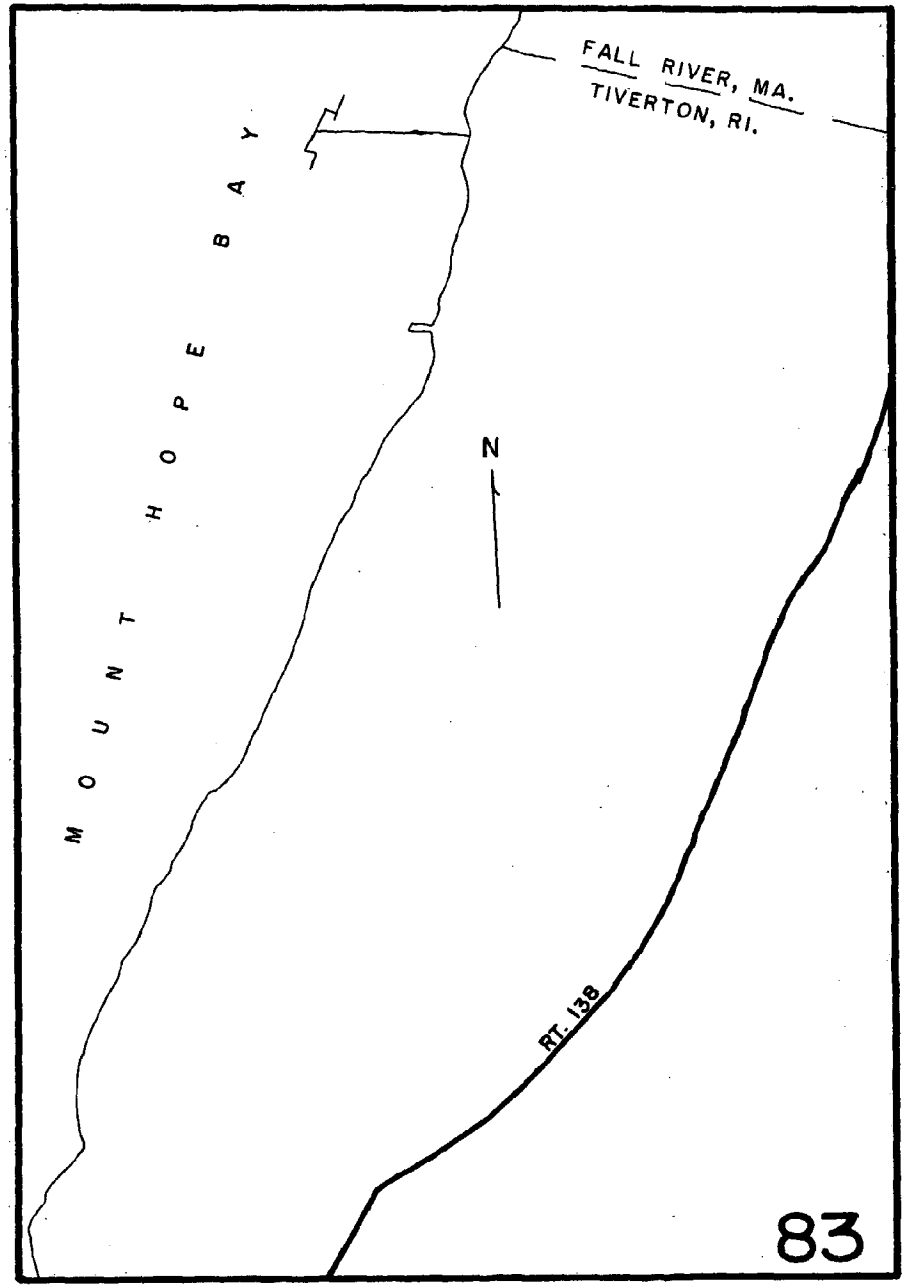

RT. 114
RT. 136
N
BRISTOL POINT
78

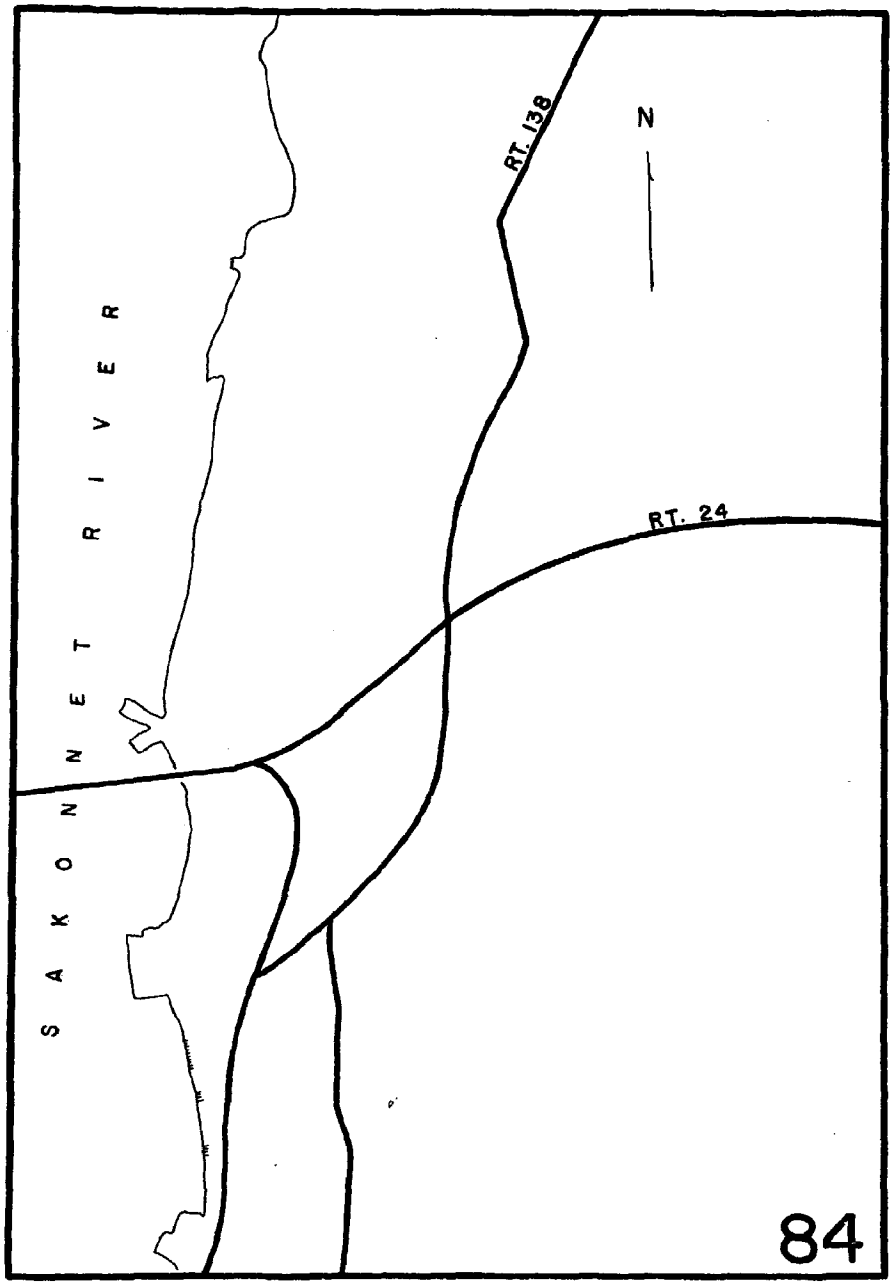

N
MOUNT HOPE
POINT
79

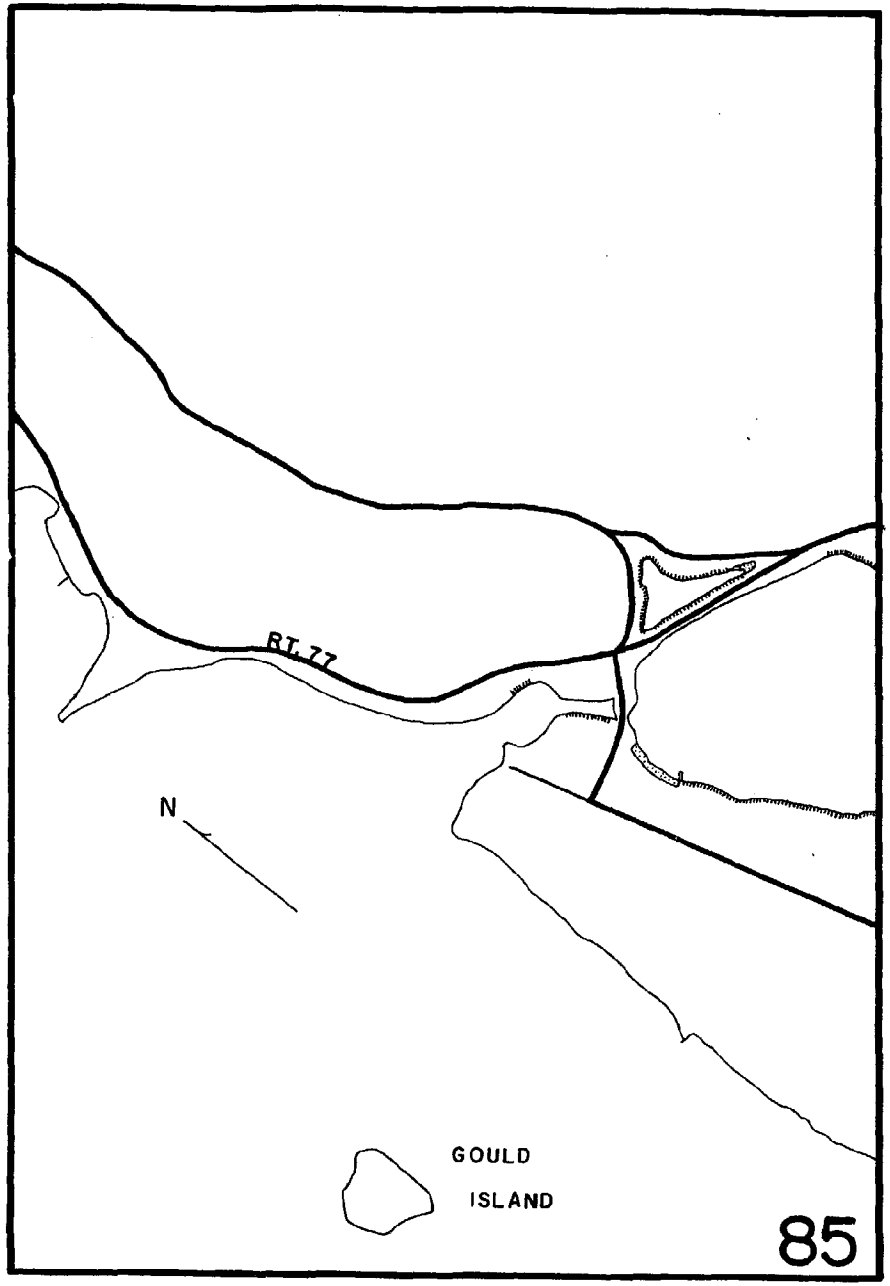

Touisset Rd.
Smith St.
Colder Dr.
BRISTOL NARROWS
Narrows Rd.
N
80

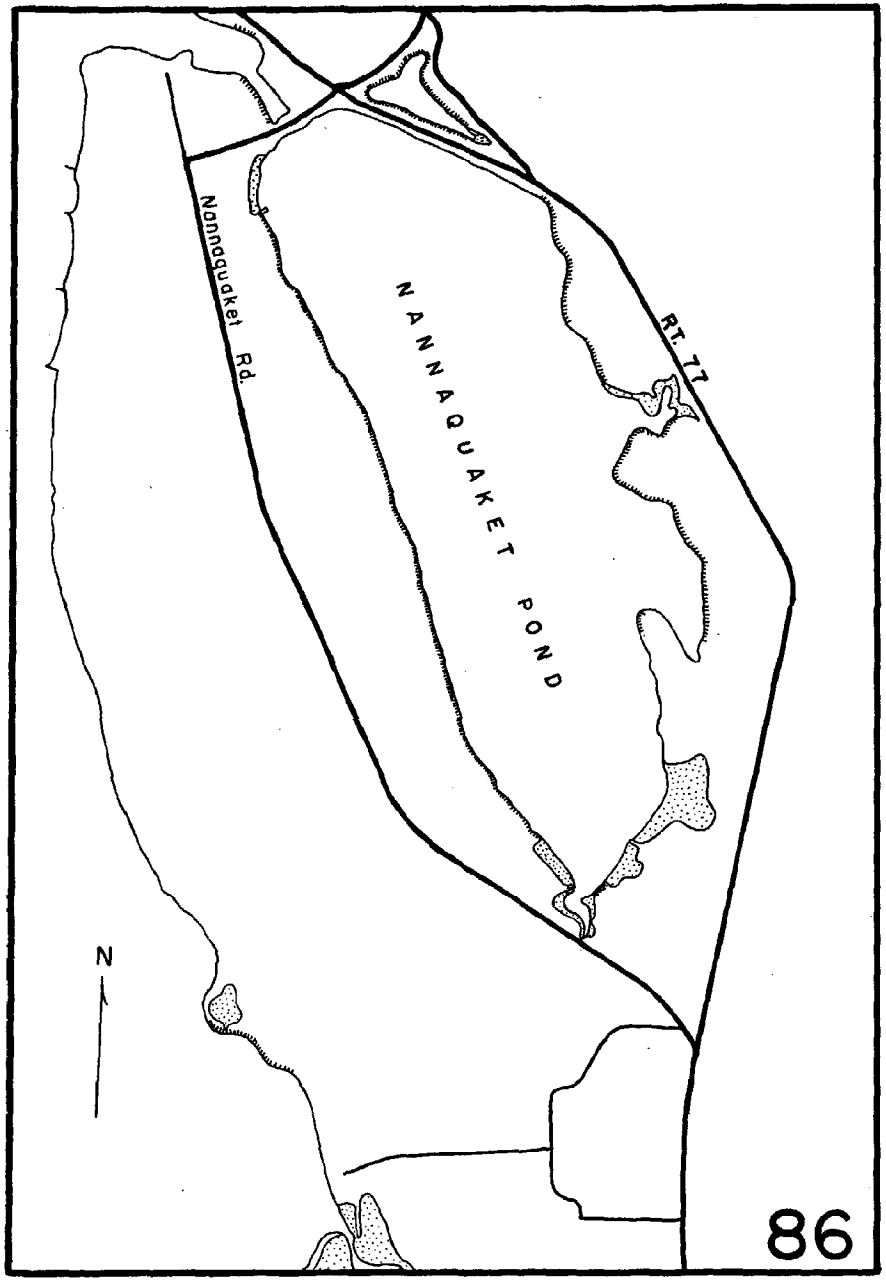

81
Asher Ave.
Lincoln Ave.
Asylum Rd.
KICKAMUIT RIVER
N
WARREN
BRISTOL

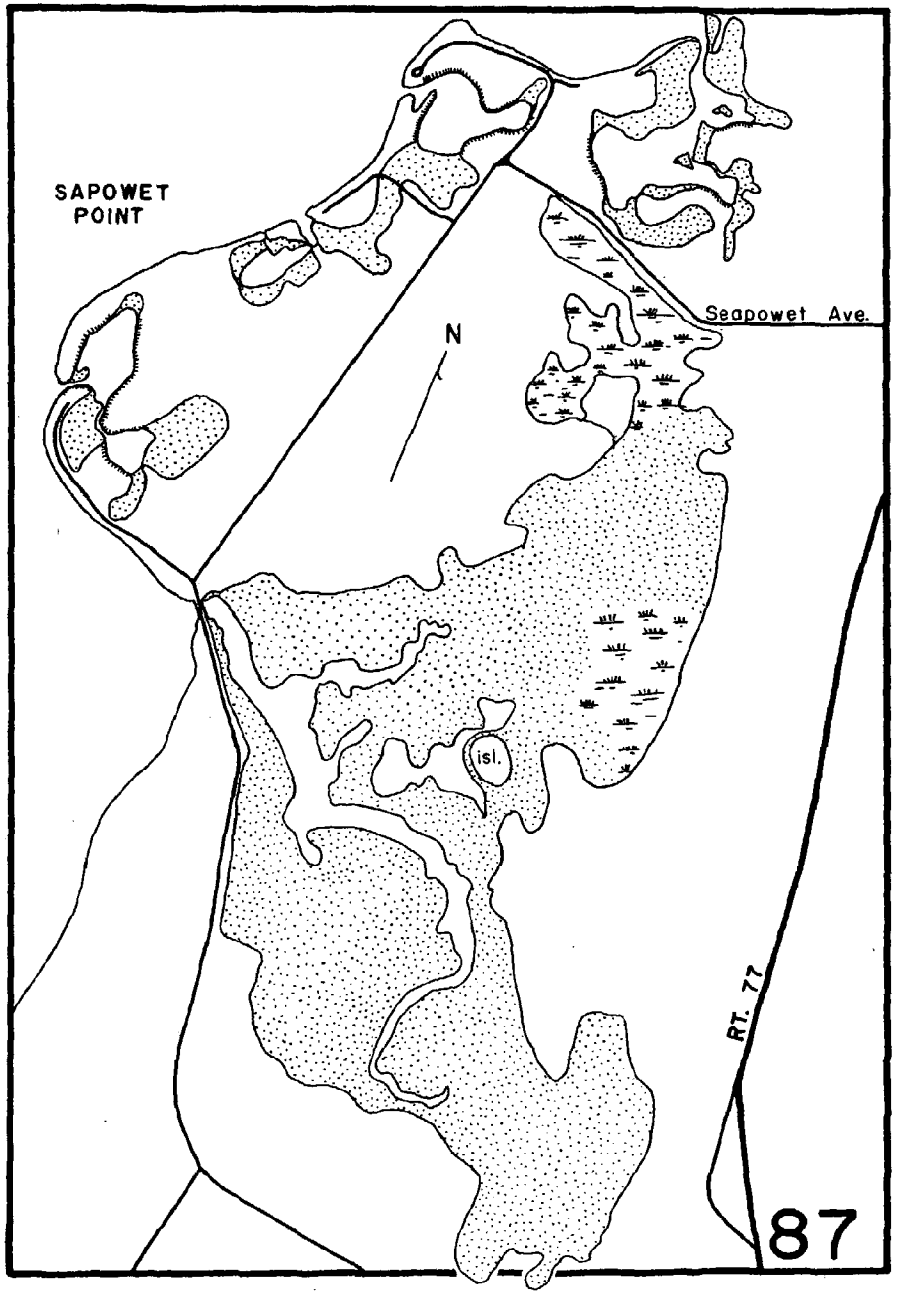

N
N. SWANSEA, MA.
WARREN, RI.
Touisset Rd.
MOUNT HOPE BAY
82

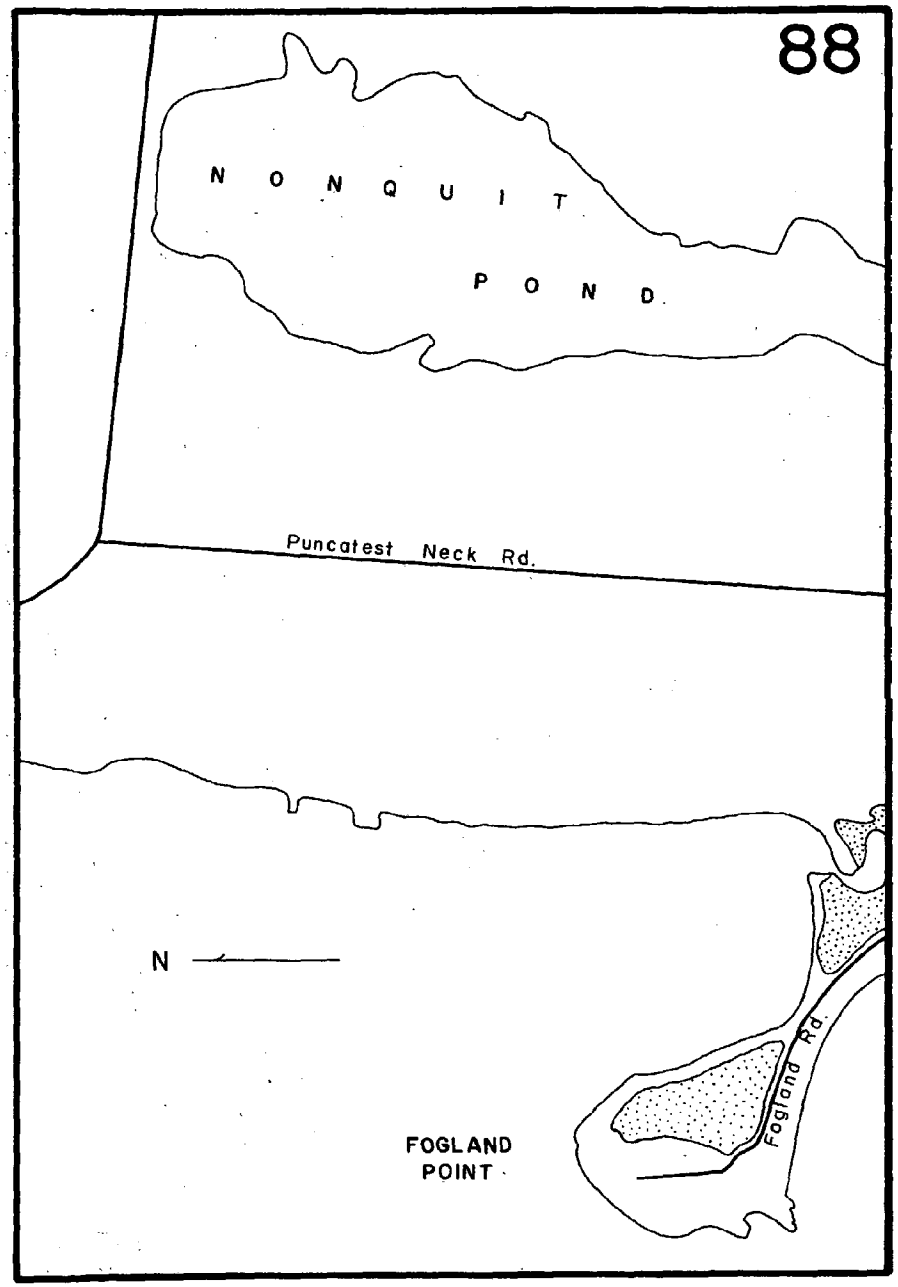

FALL RIVER, MA.
TIVERTON, RI.
MOUNT HOPE BAY
N
RT. 138
83

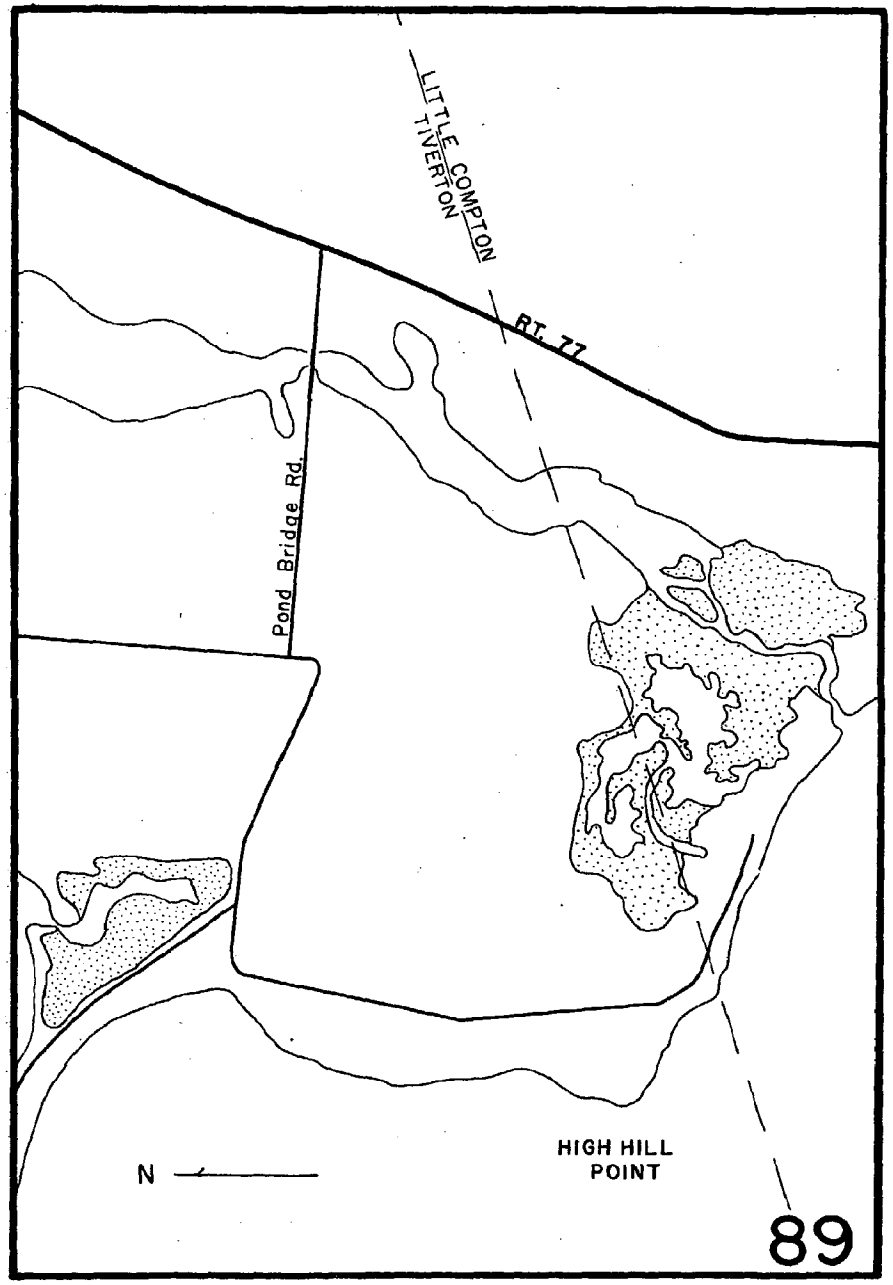

SAKONNET RIVER
RT. 138
N
RT. 24
84

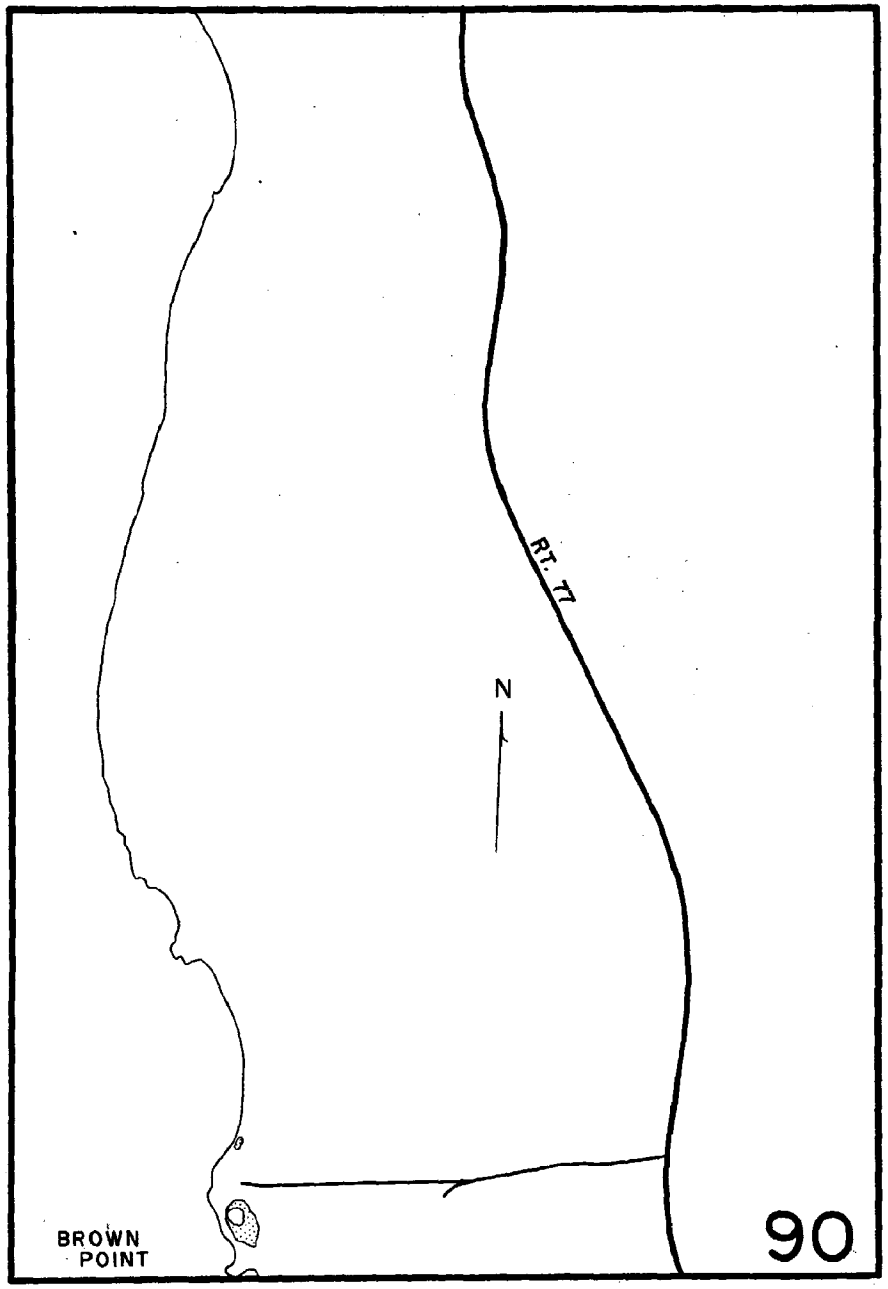

RT. 77
N
GOULD
ISLAND
85

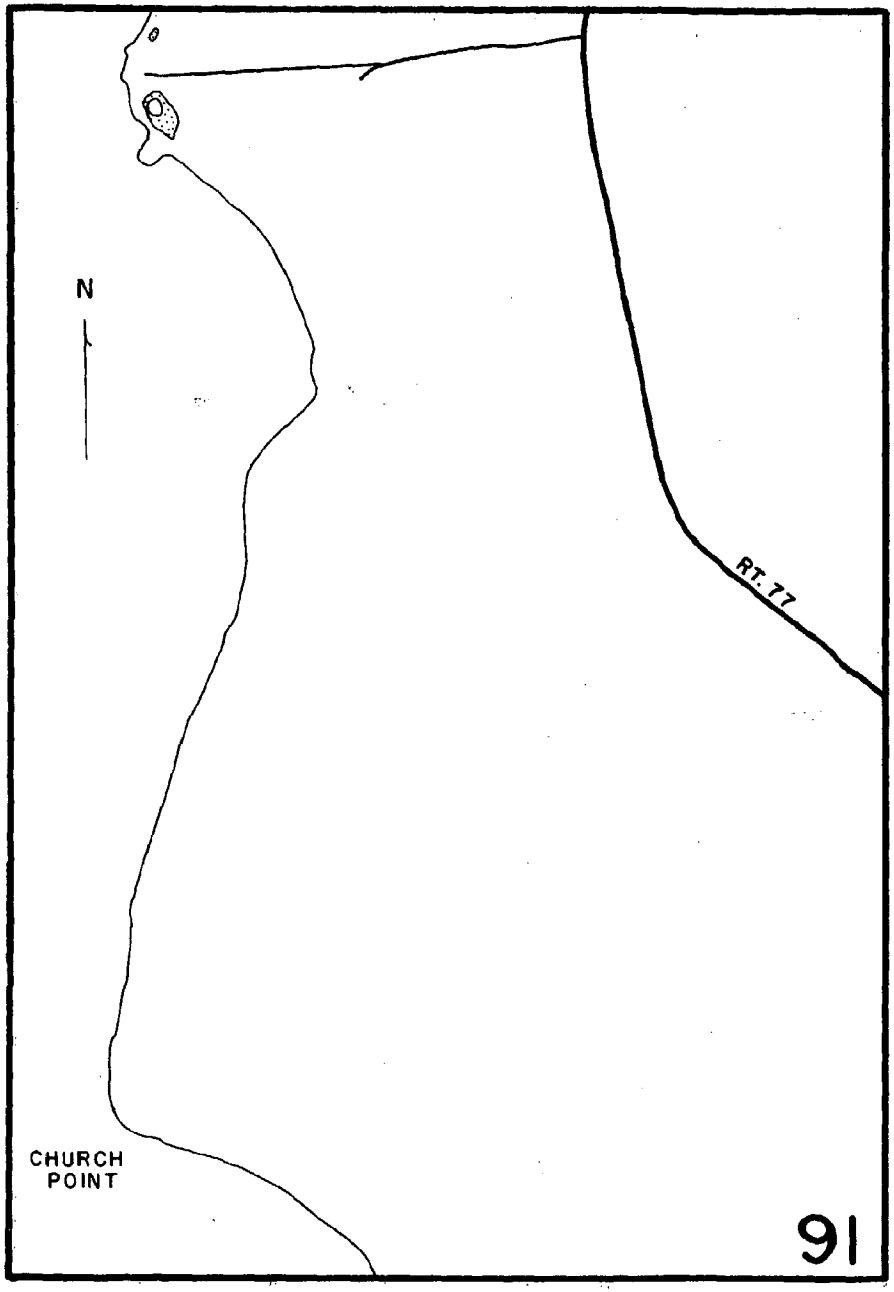

Nannaquaket Rd.
NANNAQUAKET POND
RT. 77
N
86

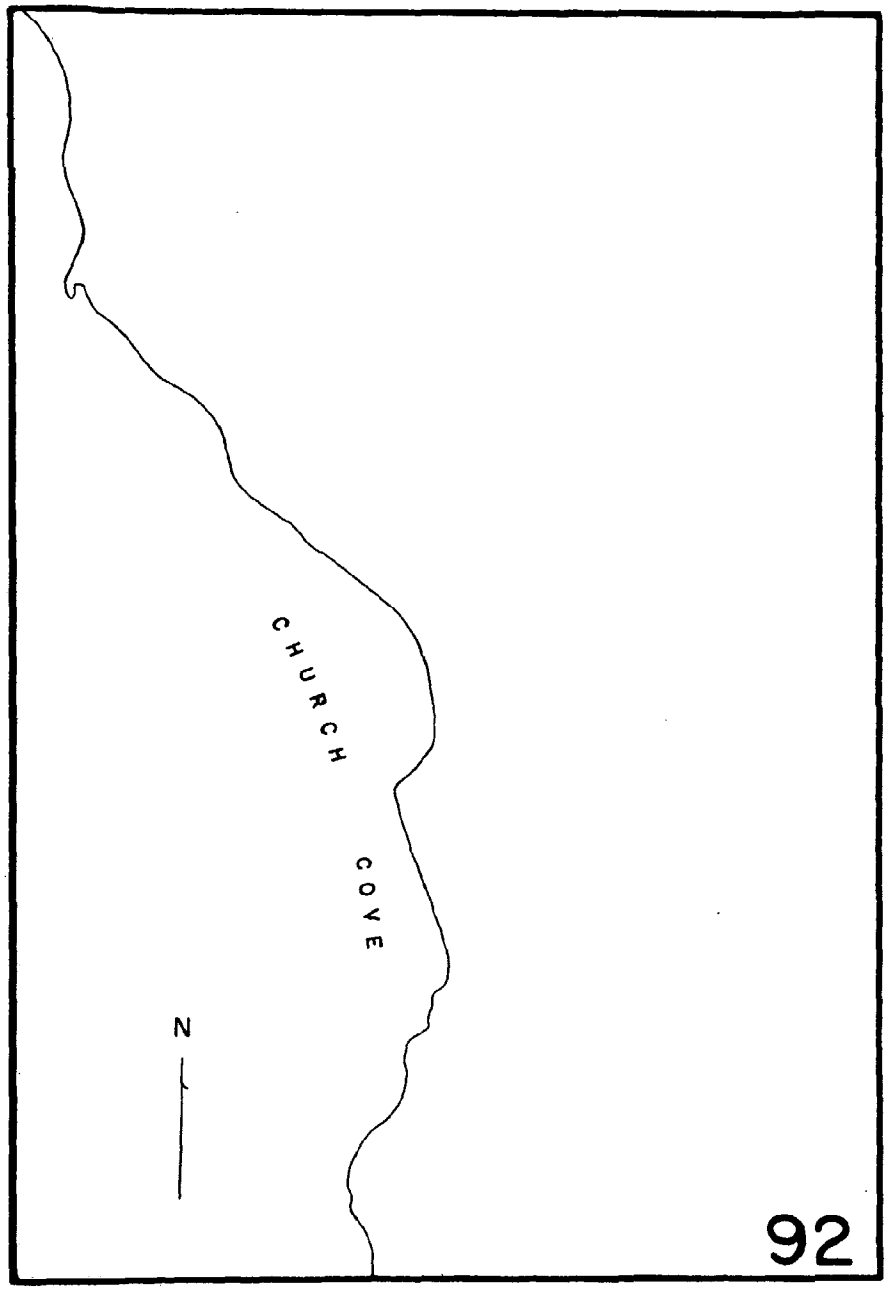

SAPOWET POINT
Seapowet Ave.
N
isl.
RT. 77
87

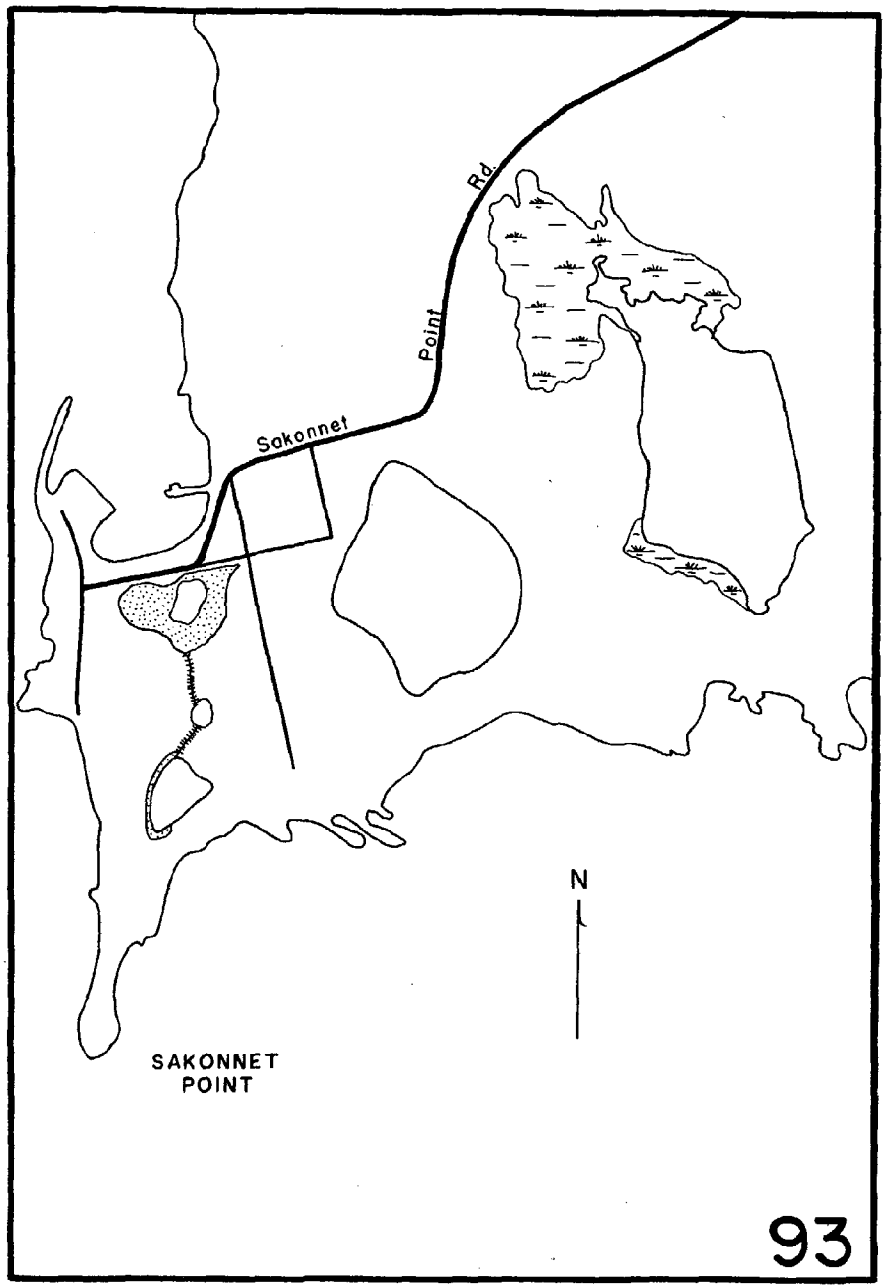

88
NONQUIT
POND
Puncatest Neck Rd.
N
Fogland Rd.
FOGLAND
POINT

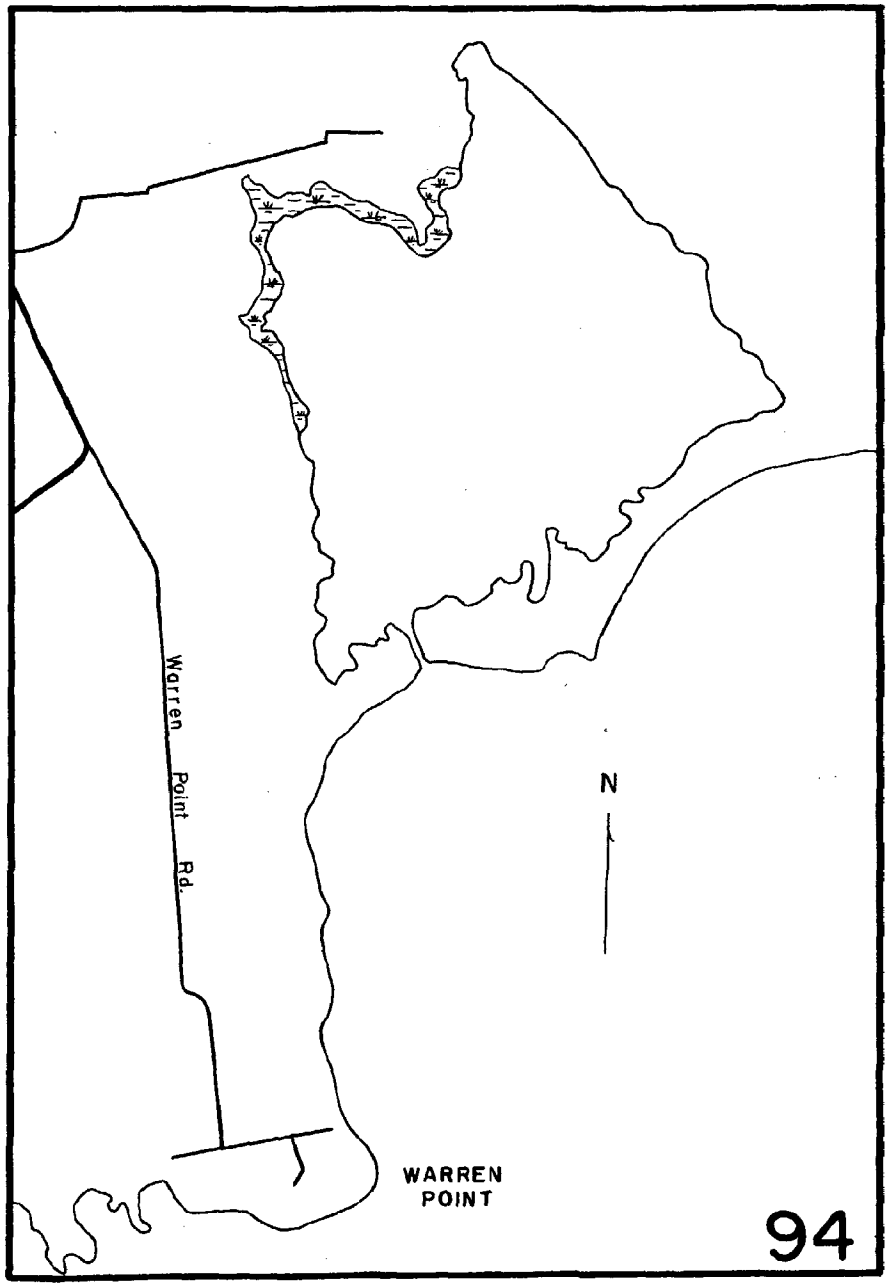

LITTLE COMPTON
TIVERTON
RT. 77
Pond Bridge Rd.
N
HIGH HILL
POINT
89

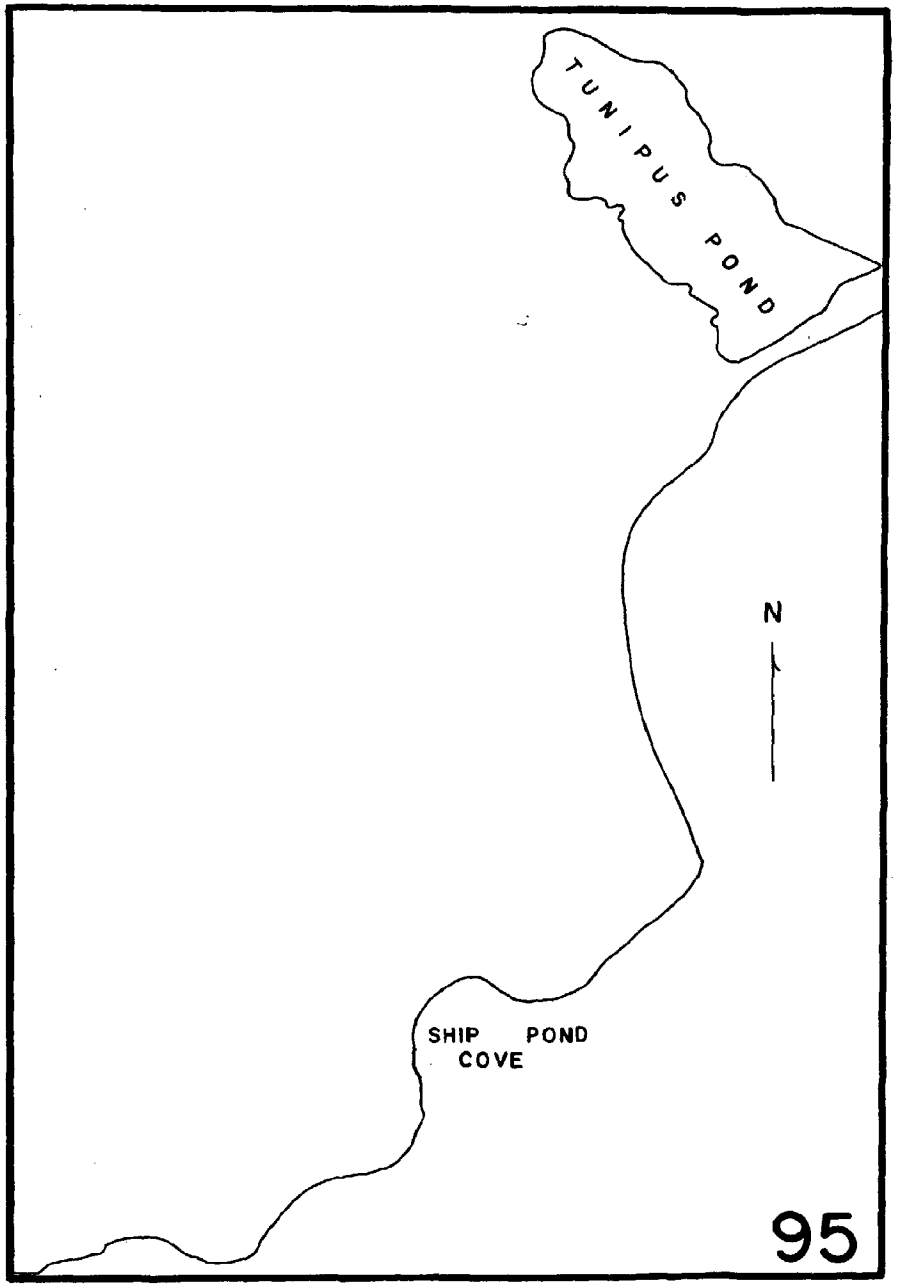

RT. 77
N
BROWN POINT
90

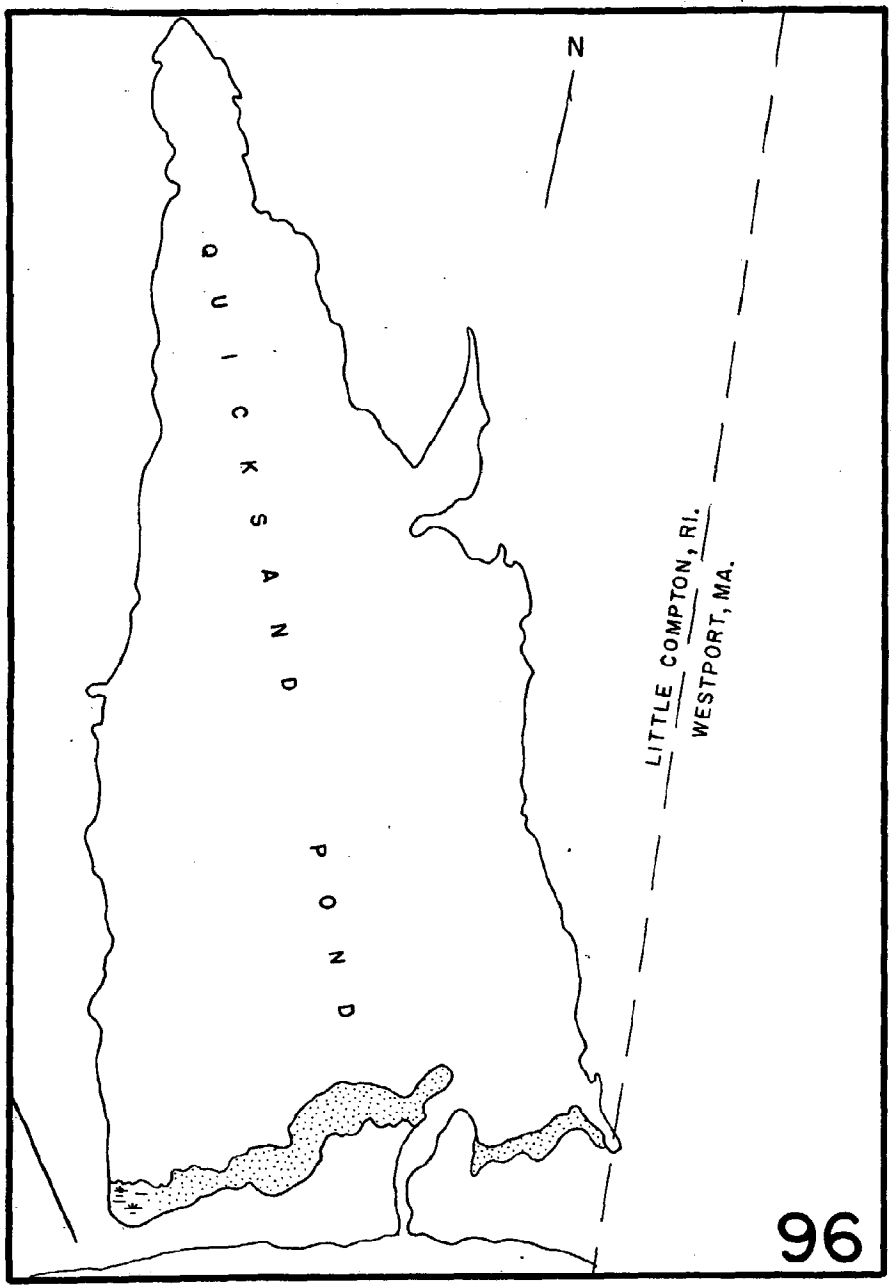

N
RT. 77
CHURCH POINT
91

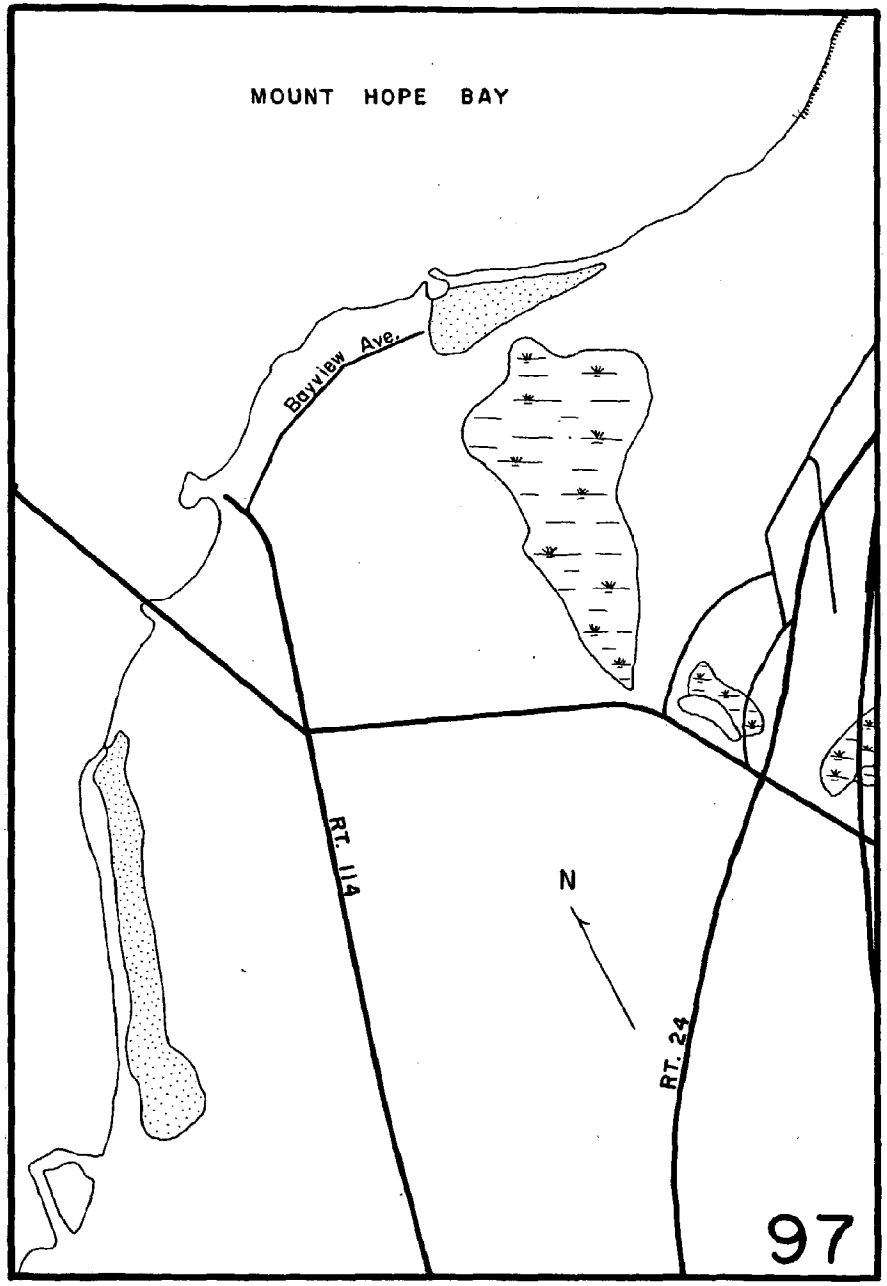

CHURCH
COVE
N
92

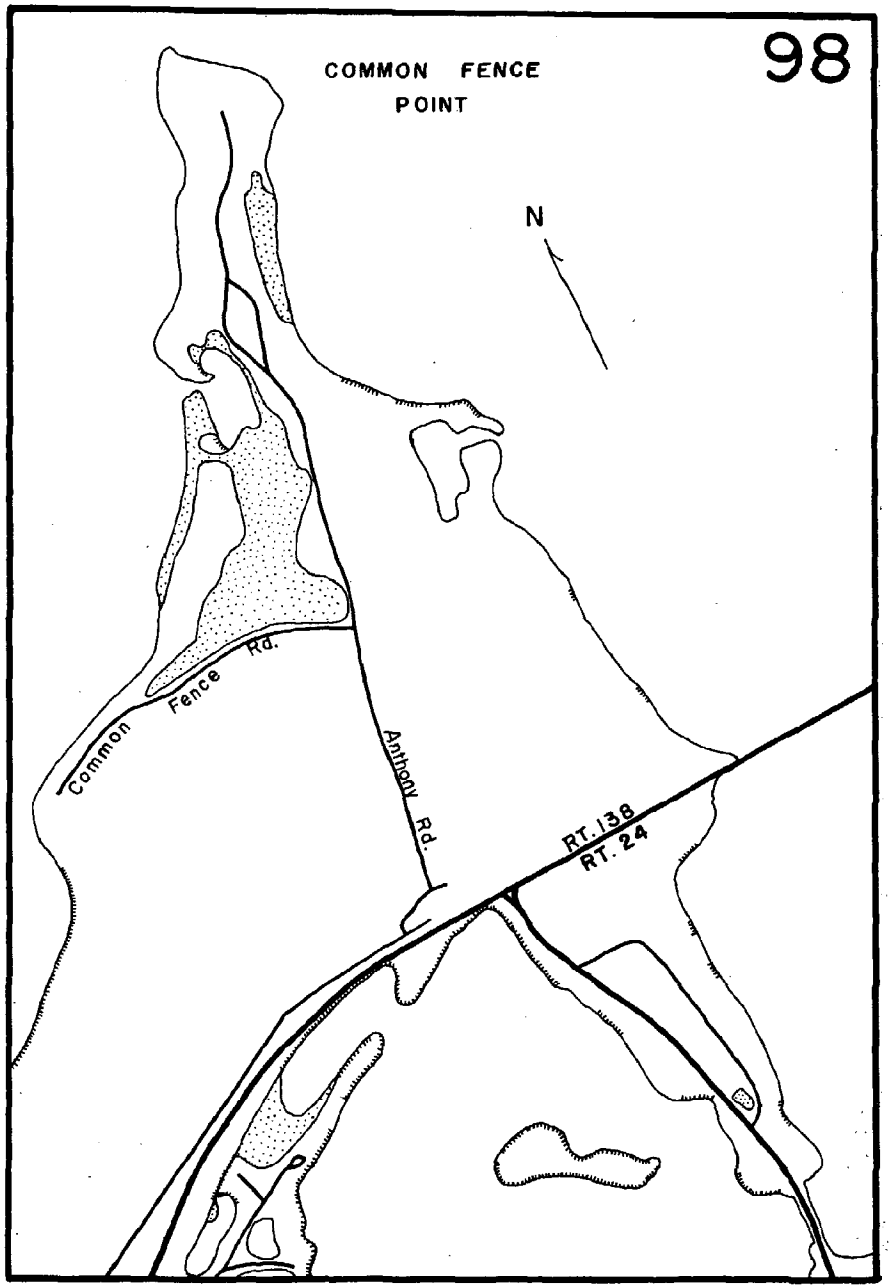

Sakonnet
Point
Rd
SAKONNET
POINT
N
93

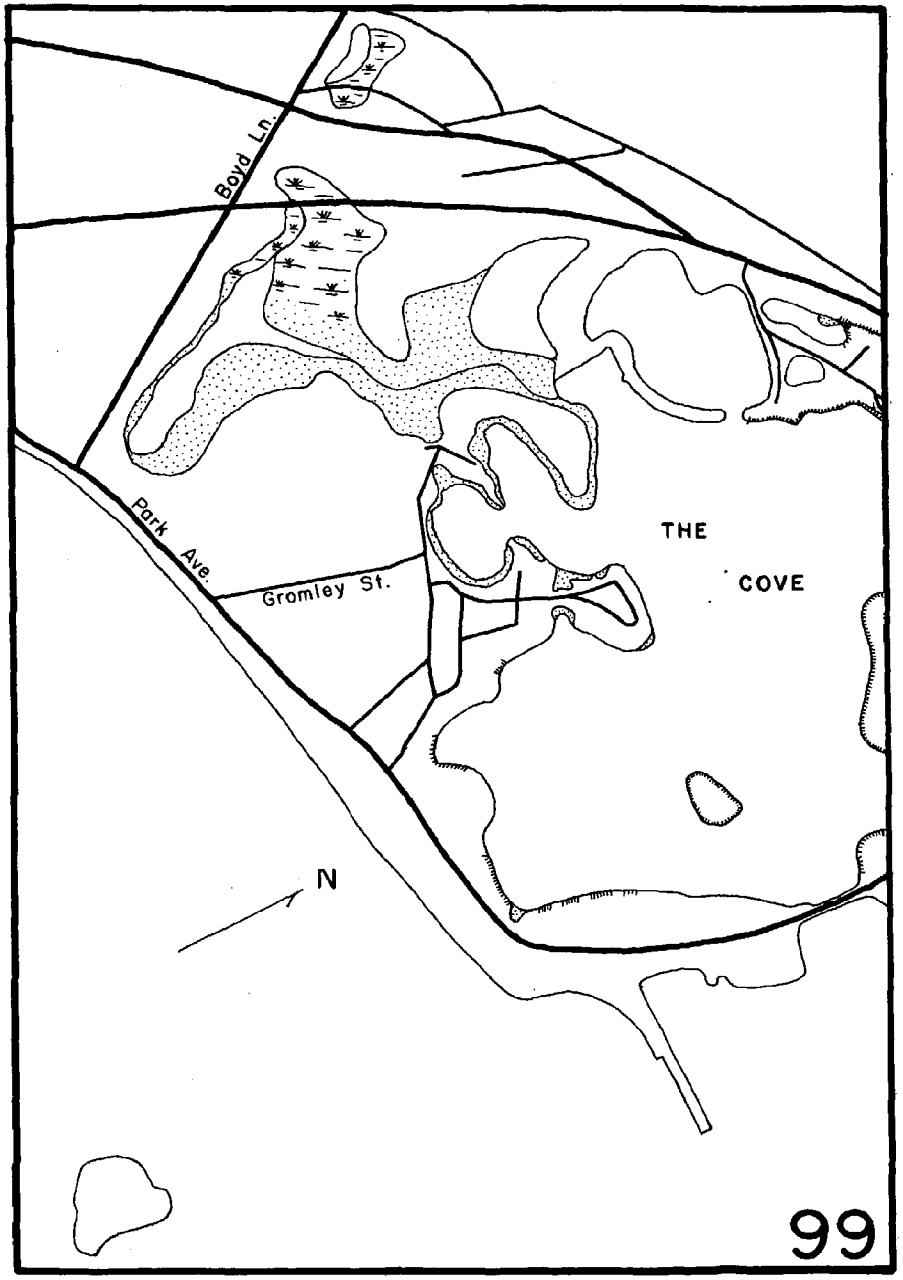

Warren Point Rd.
N
WARREN POINT
94

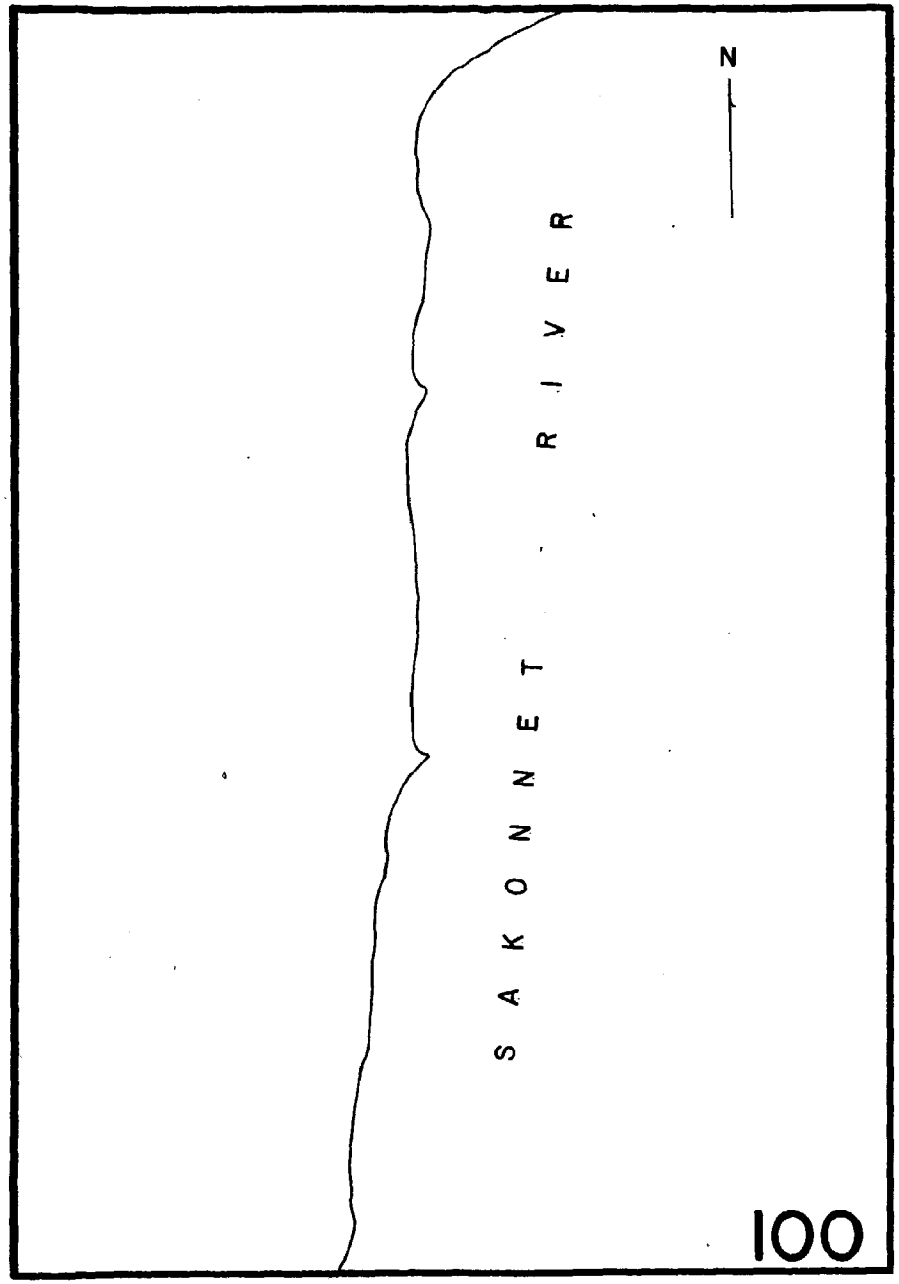

TUNIPUS POND
N
SHIP POND COVE
95

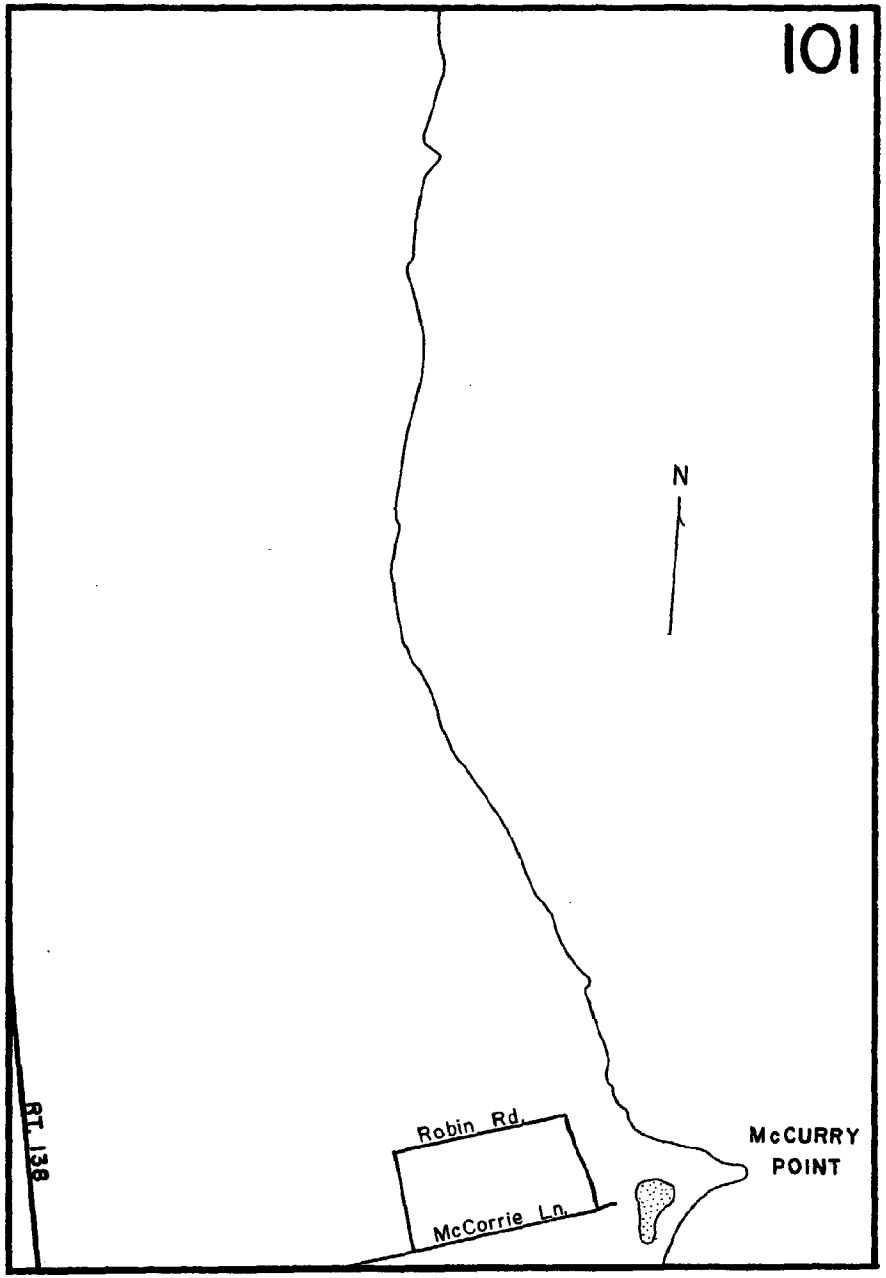

N
QUICKSAND POND
LITTLE COMPTON, RI.
WESTPORT, MA.
96

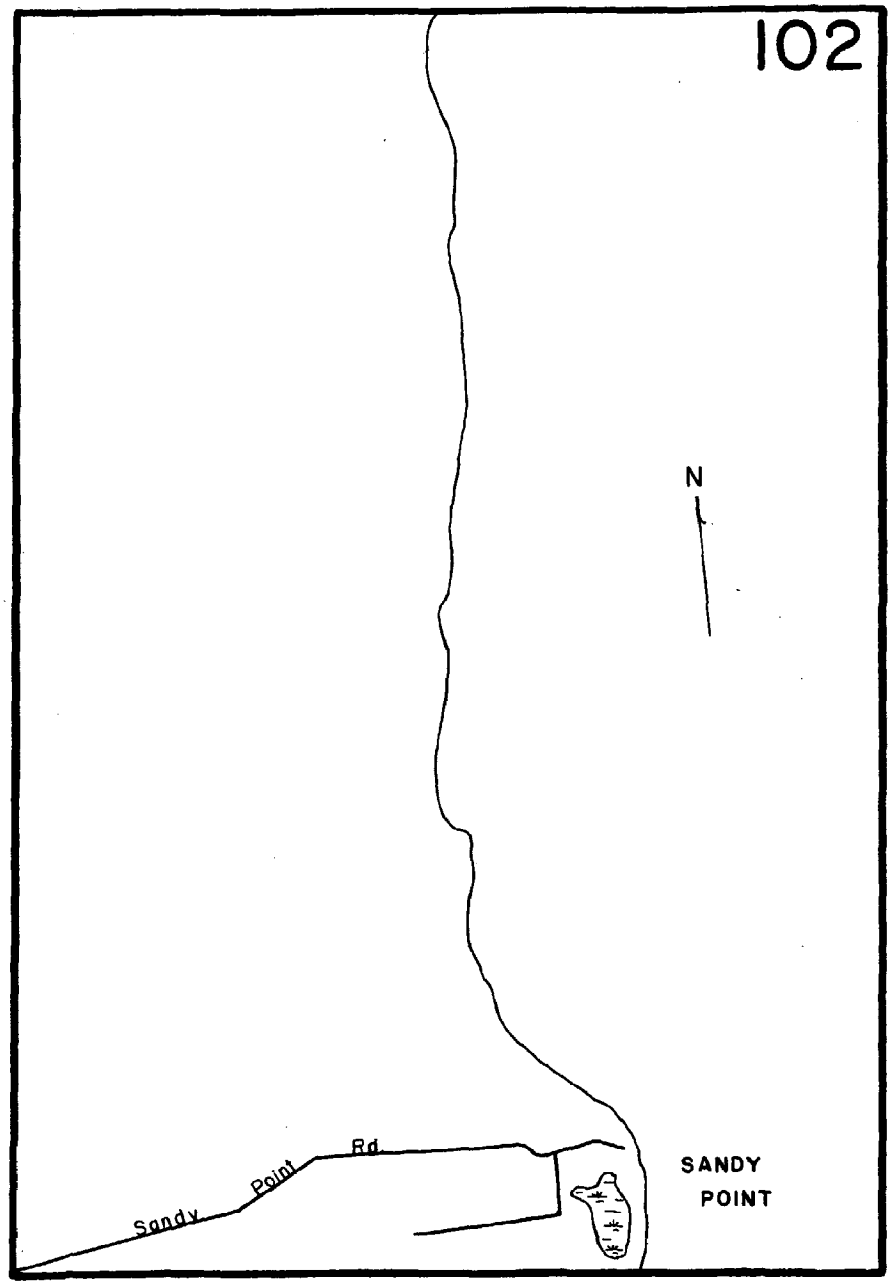

MOUNT HOPE BAY
Bayview Ave.
RT. 114
N
RT. 24
97

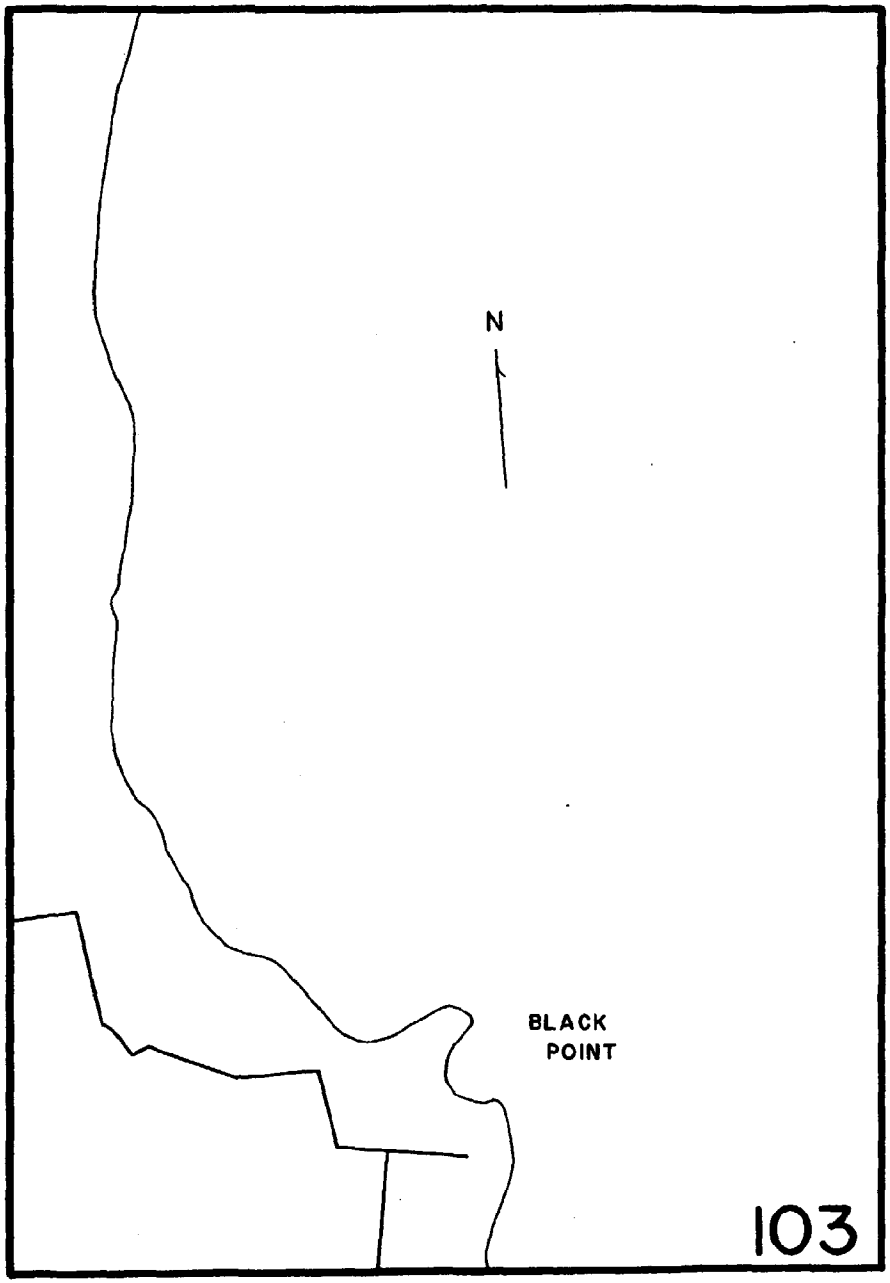

98
COMMON FENCE
POINT
N
Common Fence Rd.
Anthony Rd.
RT. 138
RT. 24

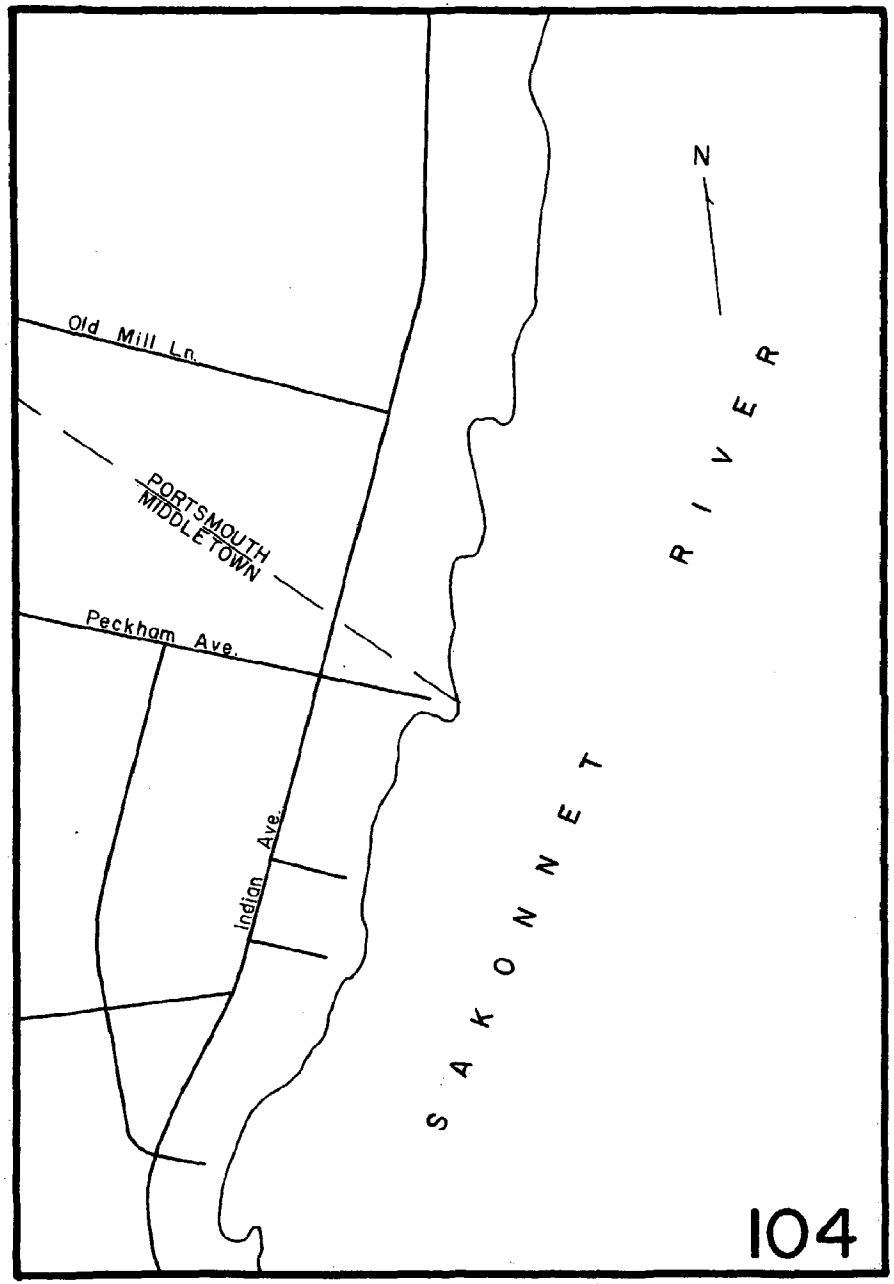

Boyd Ln.
Park Ave.
Gromley St.
THE
COVE
N
99

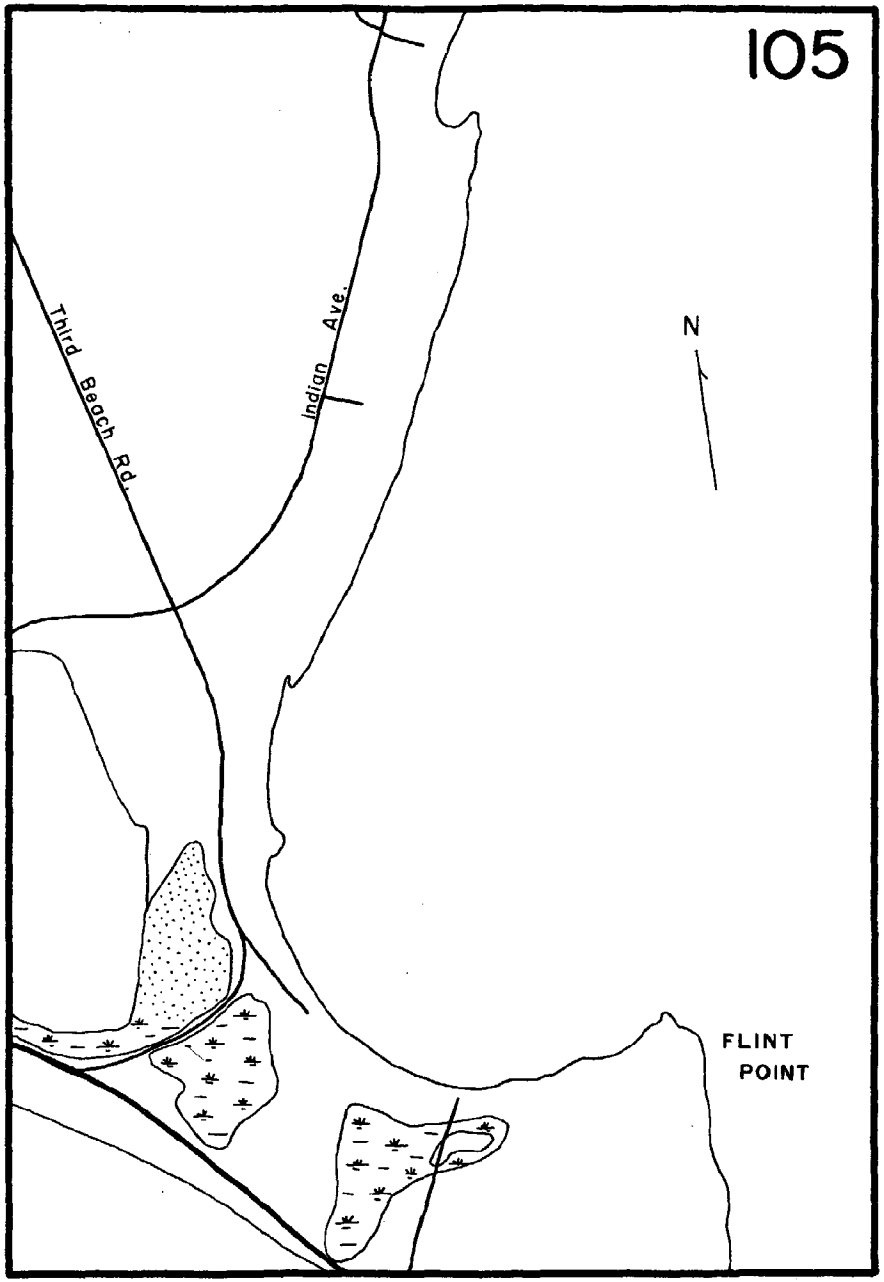

N
SAKONNET RIVER
100

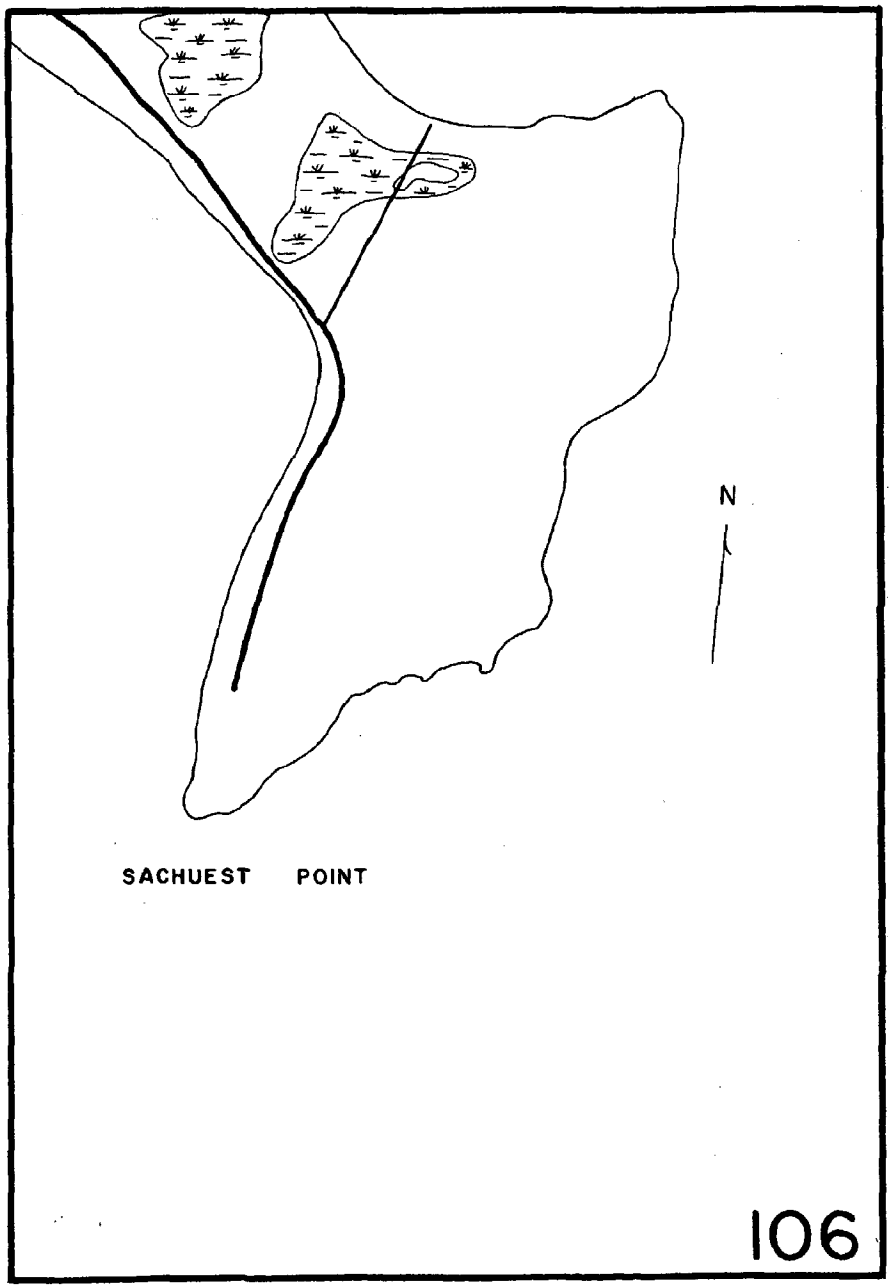

101
N
RT. 138
Robin Rd.
McCorrie Ln.
McCURRY POINT

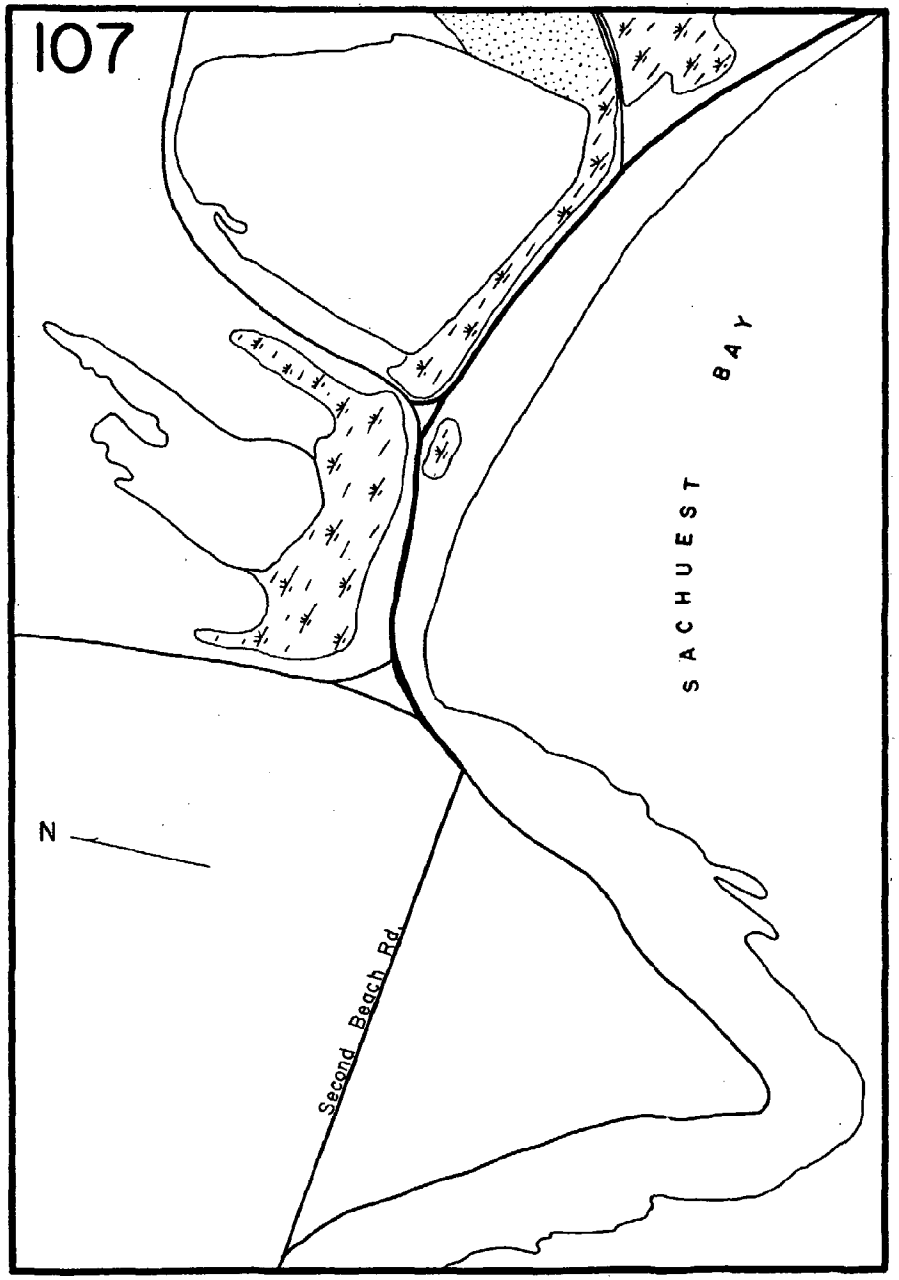

102
N
Sandy Point Rd.
SANDY POINT

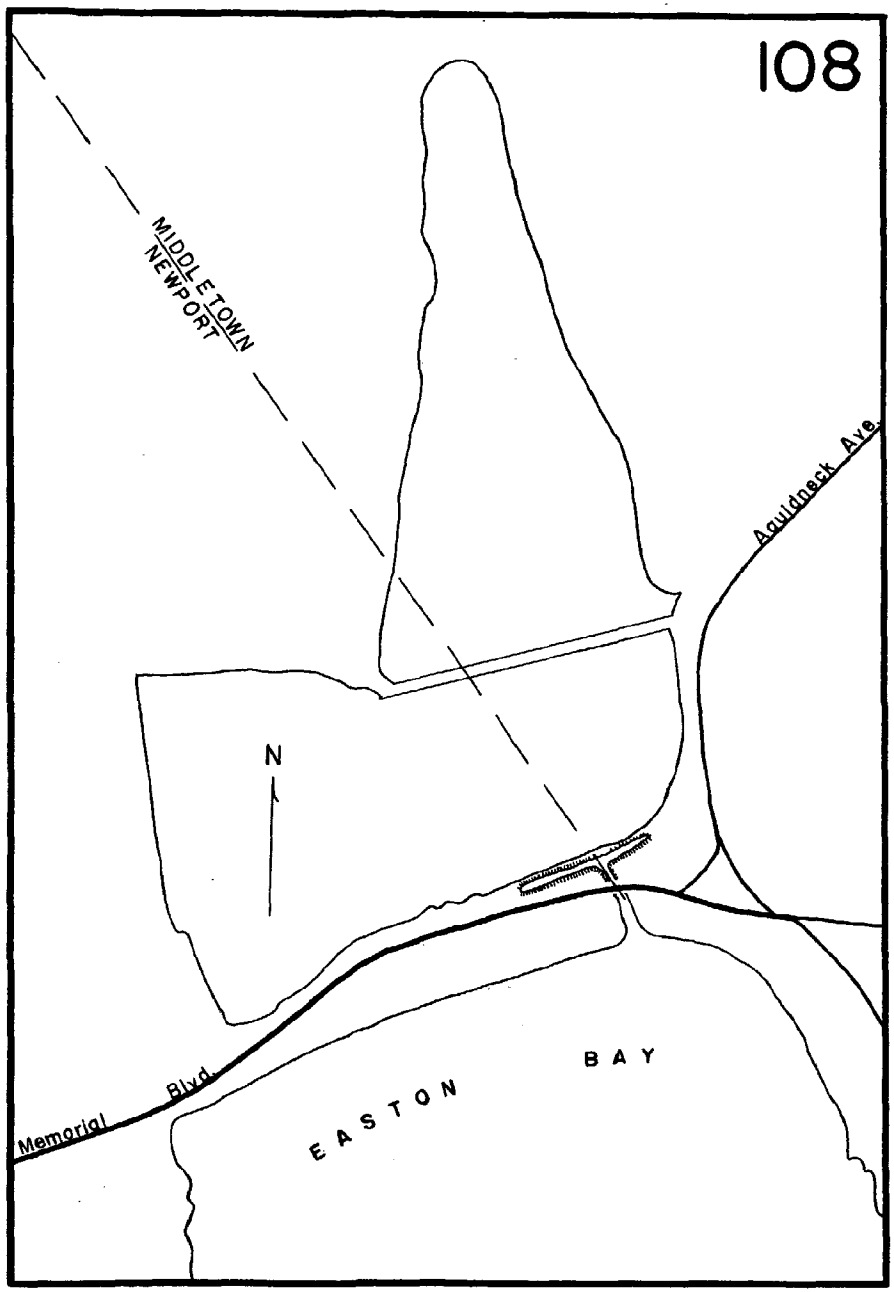

N
BLACK POINT
103

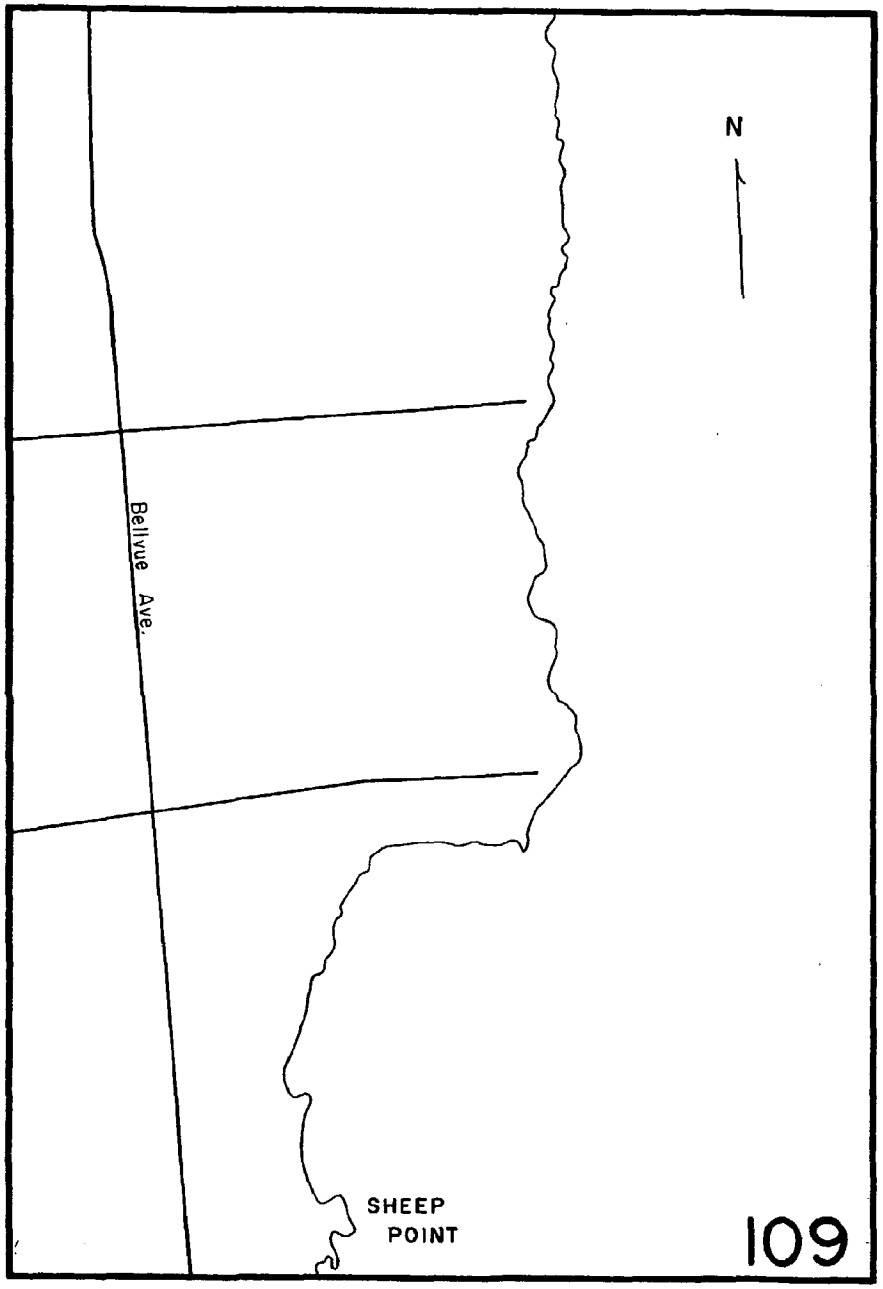

N
Old Mill Ln.
PORTSMOUTH
MIDDLETOWN
Peckham Ave.
Indian Ave.
SAKONNET
RIVER
104

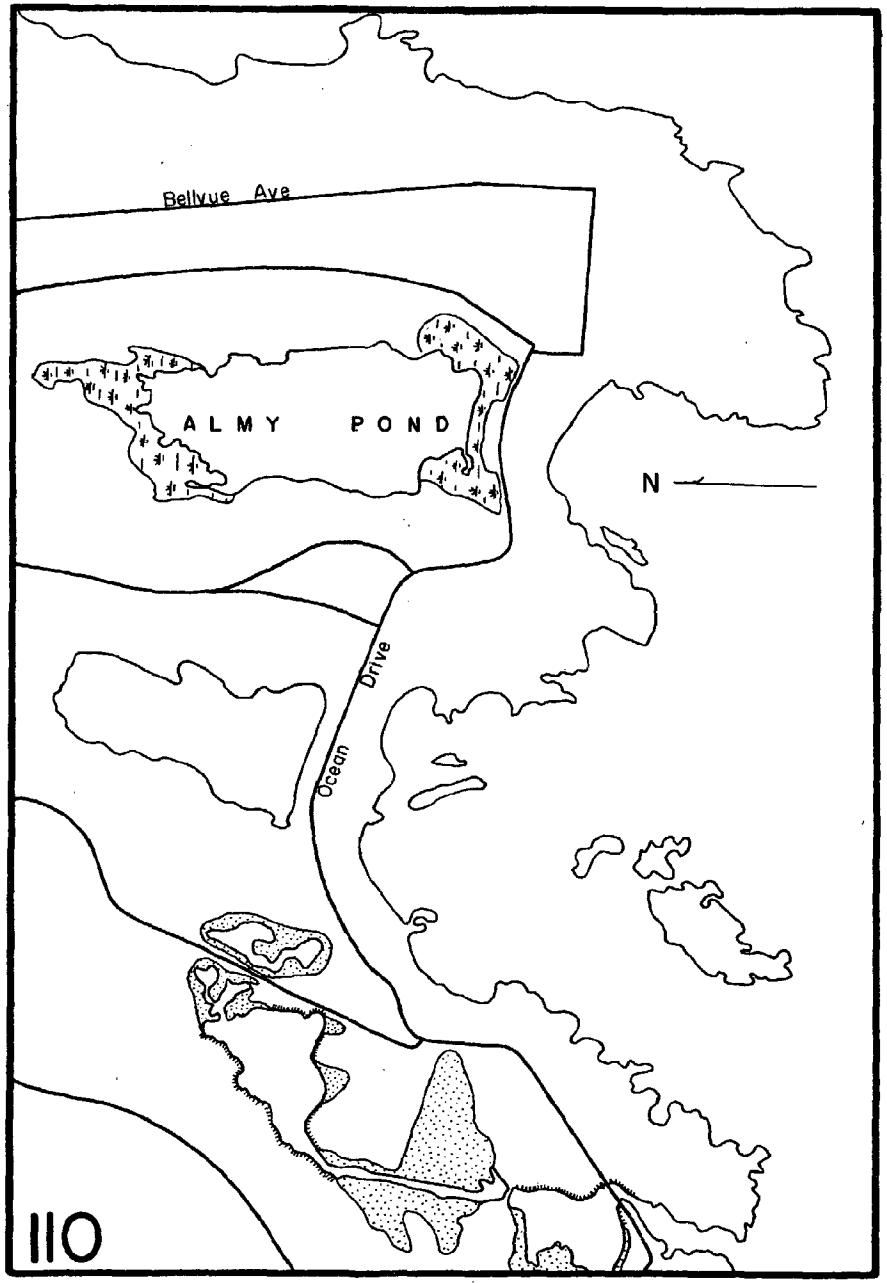

105
Third Beach Rd.
Indian Ave.
N
FLINT
POINT

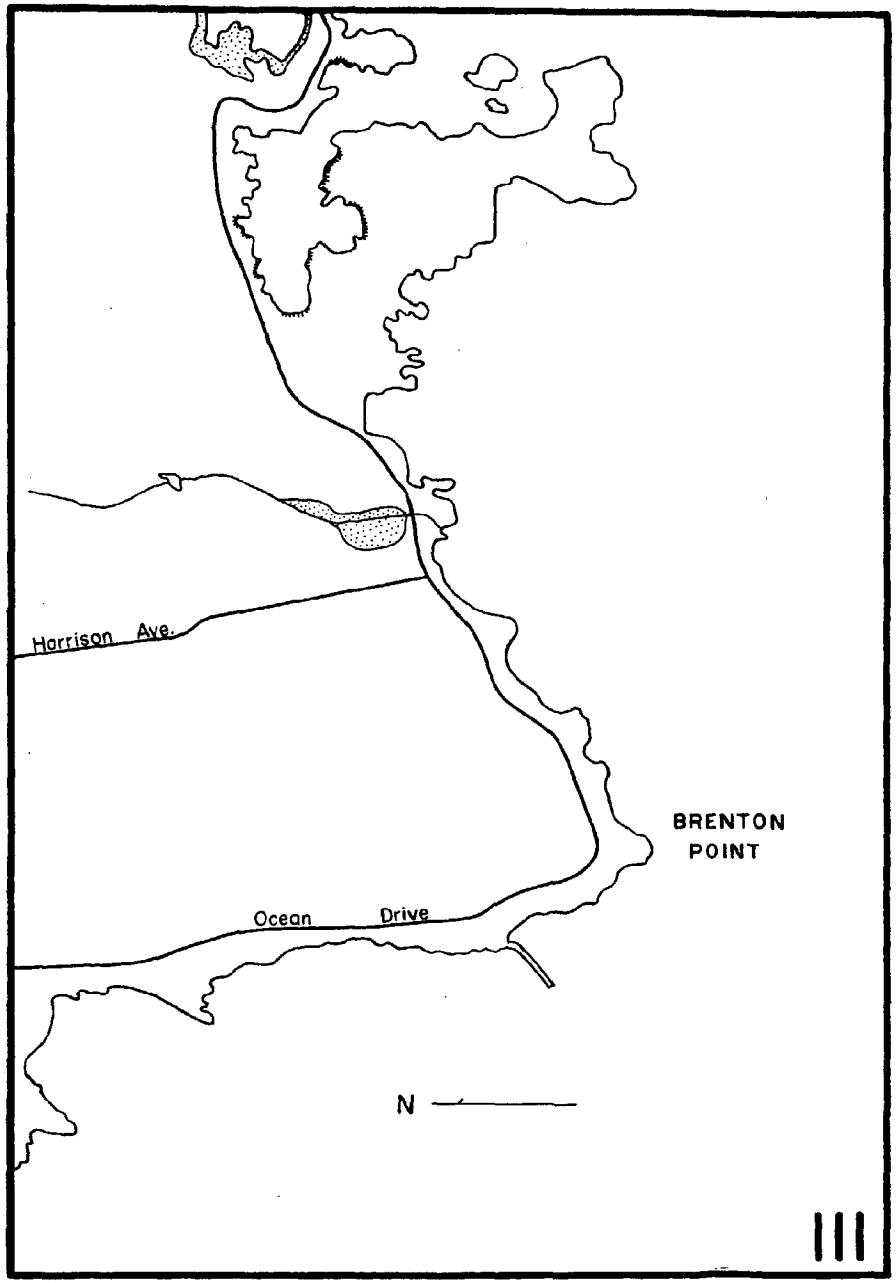

N
SACHUEST POINT
106

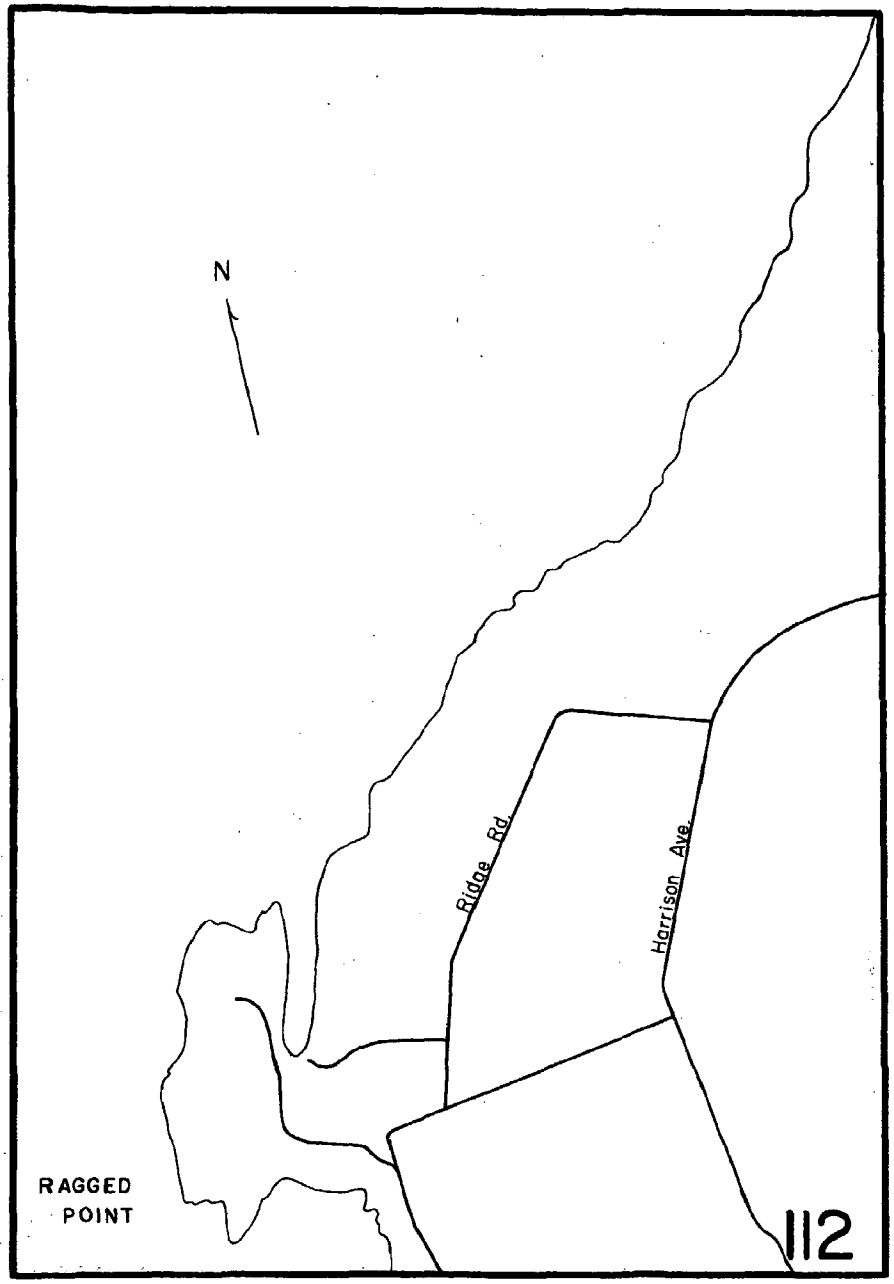

107
SACHUEST BAY
N
Second Beach Rd.

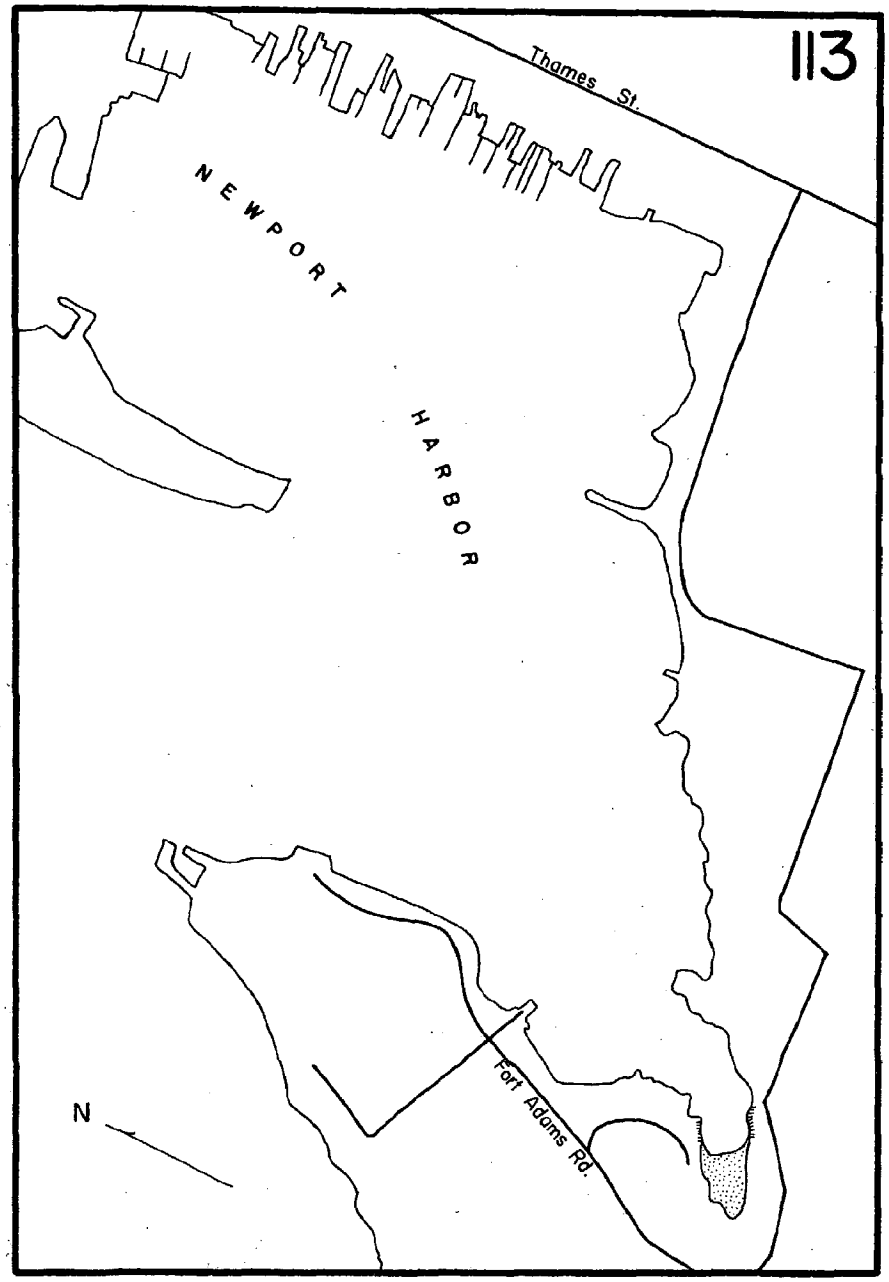

108
MIDDLETOWN
NEWPORT
Aquidneck Ave.
N
Memorial Blvd
EASTON BAY

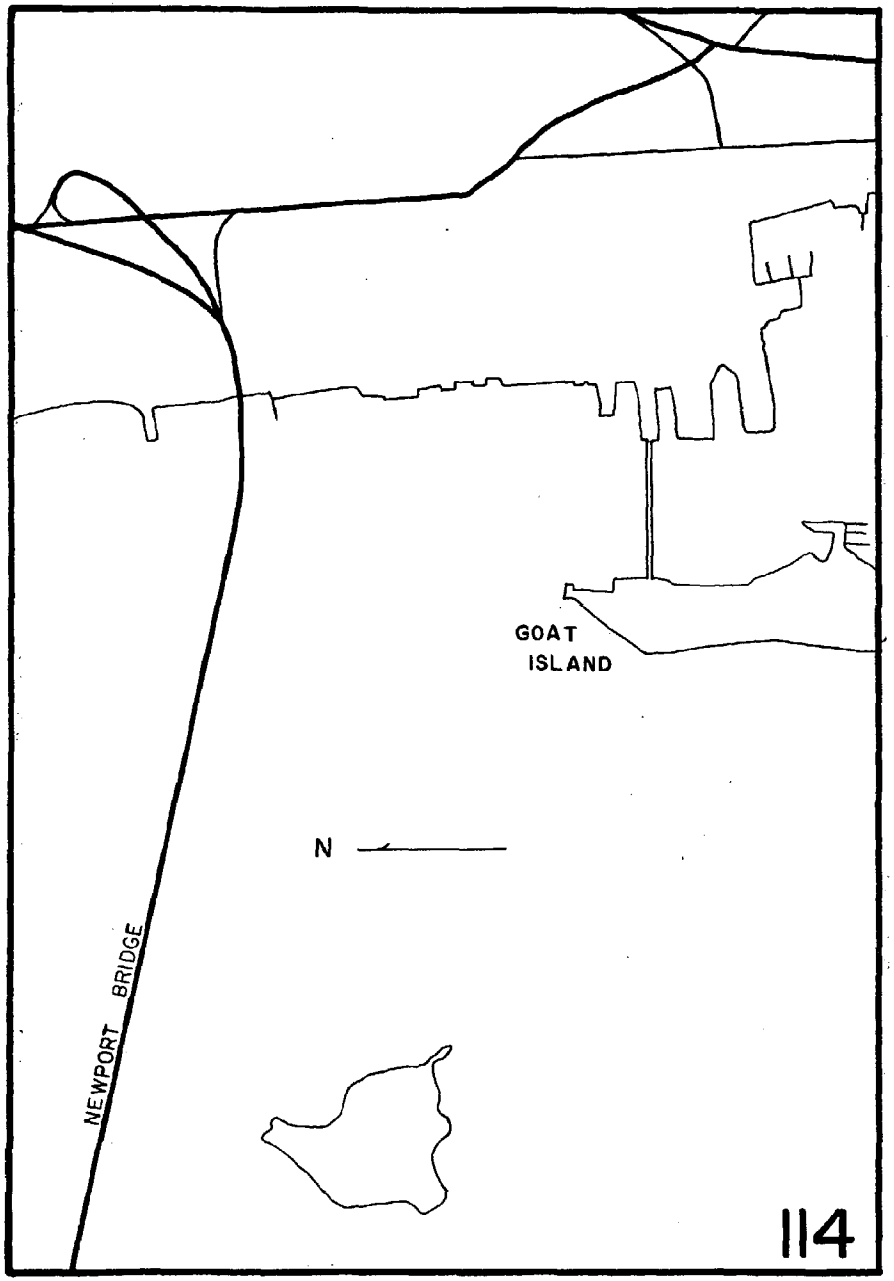

N
Bellvue Ave.
SHEEP POINT
109

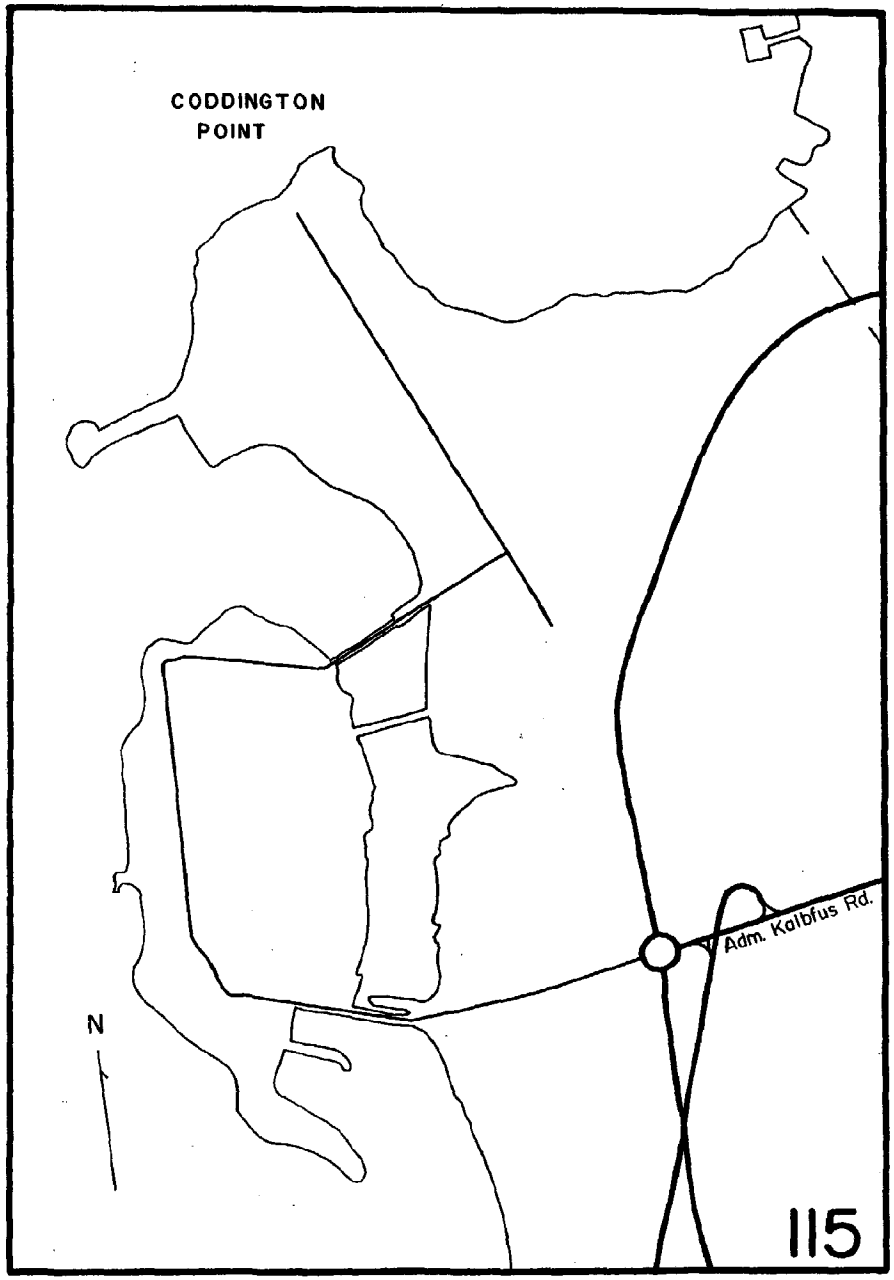

Bellvue Ave
ALMY POND
N
Ocean Drive
110


Harrison Ave.
BRENTON POINT
Ocean Drive
N
111


N
Ridge Rd.
Harrison Ave.
RAGGED POINT
112

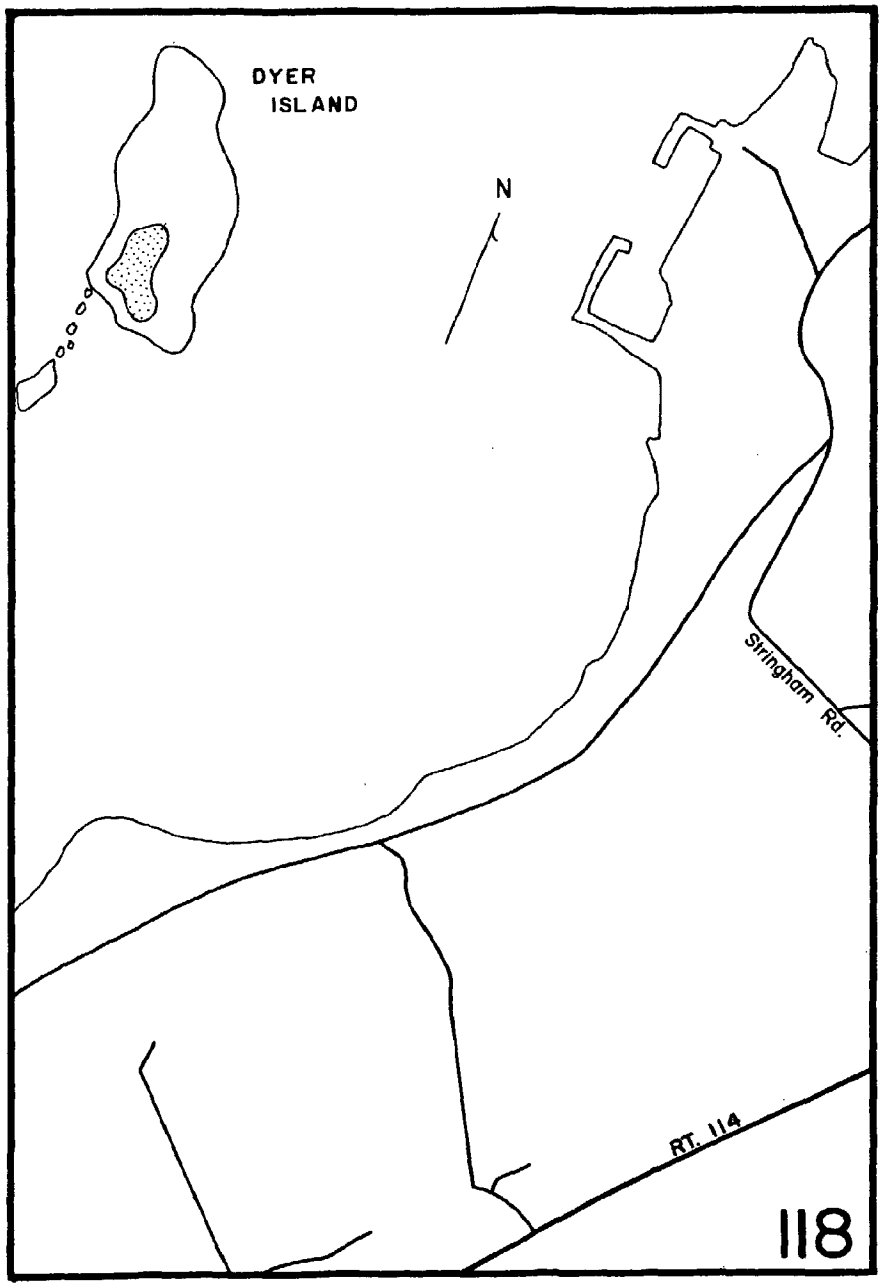

113
Thames St.
NEWPORT HARBOR
N
Fort Adams Rd.

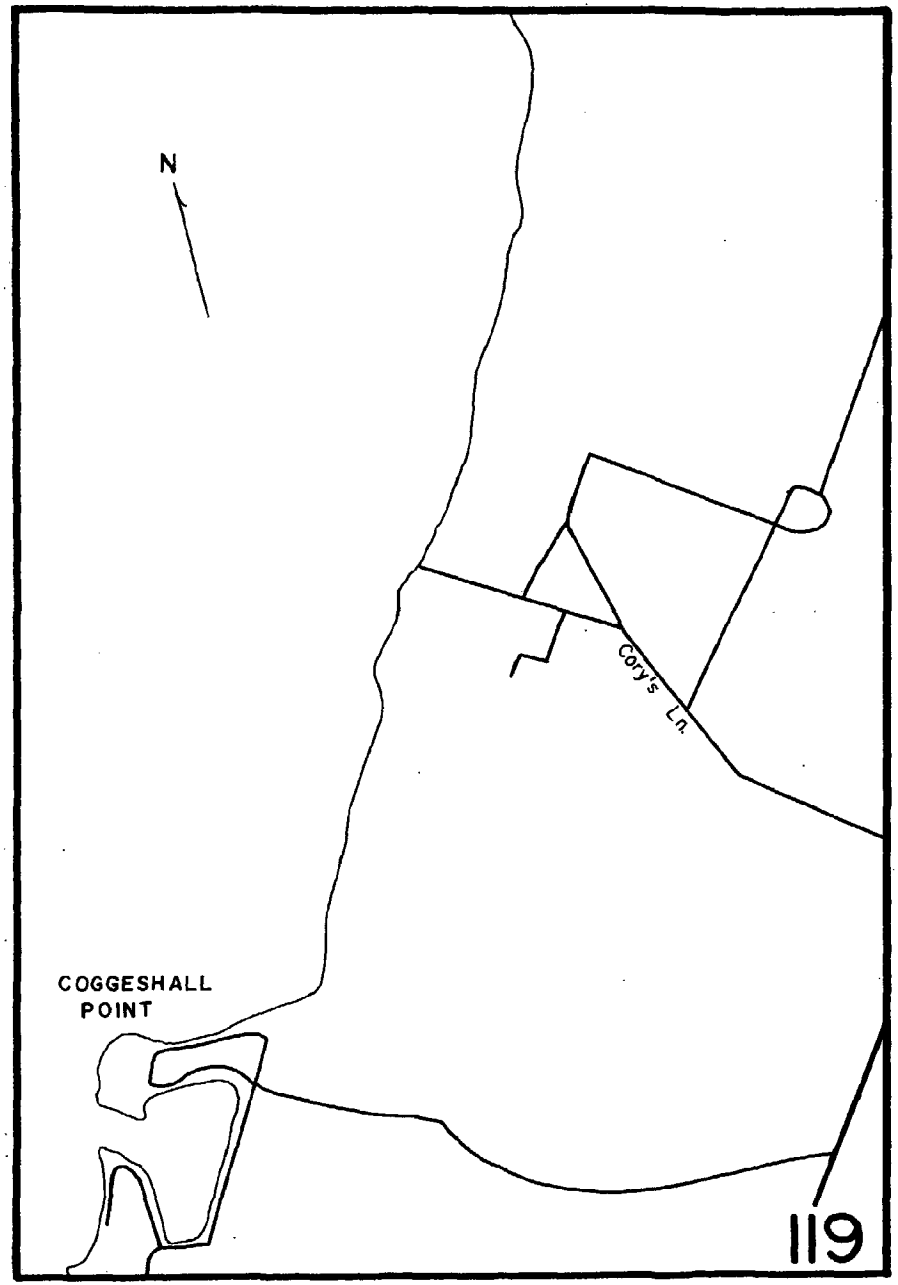

GOAT
ISLAND
N
NEWPORT BRIDGE
114

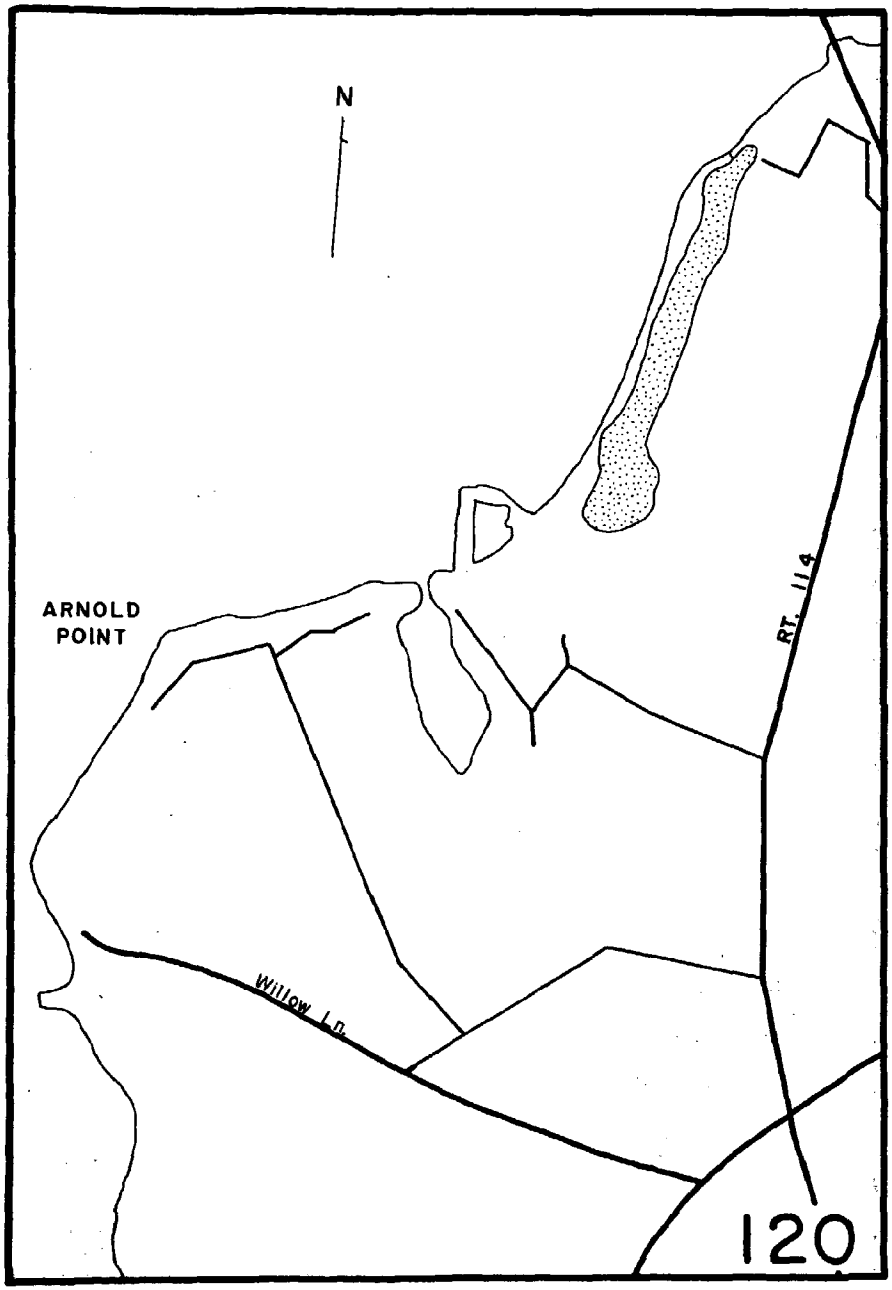

CODDINGTON
POINT
Adm. Kalbfus Rd.
N
115

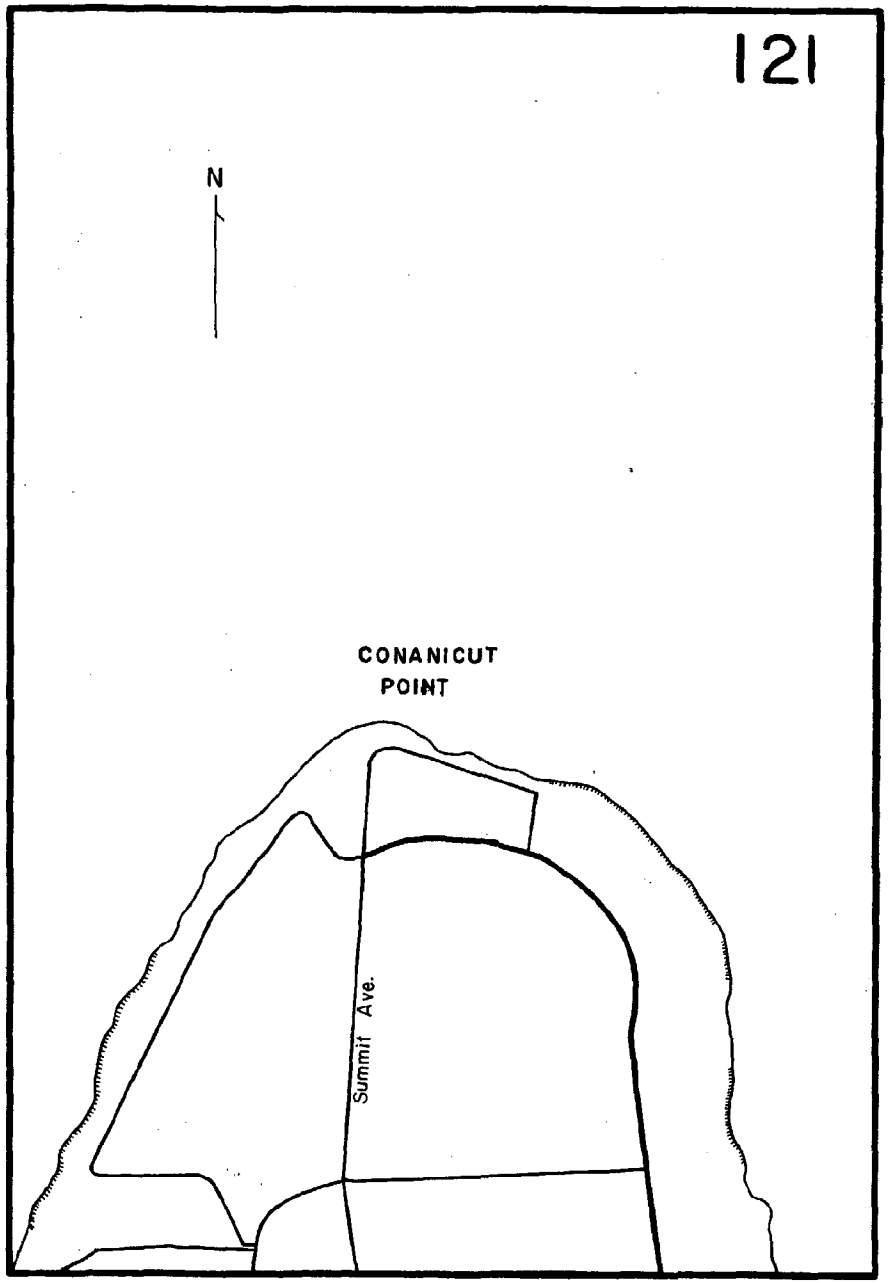
EAST PASSAGE
N
116

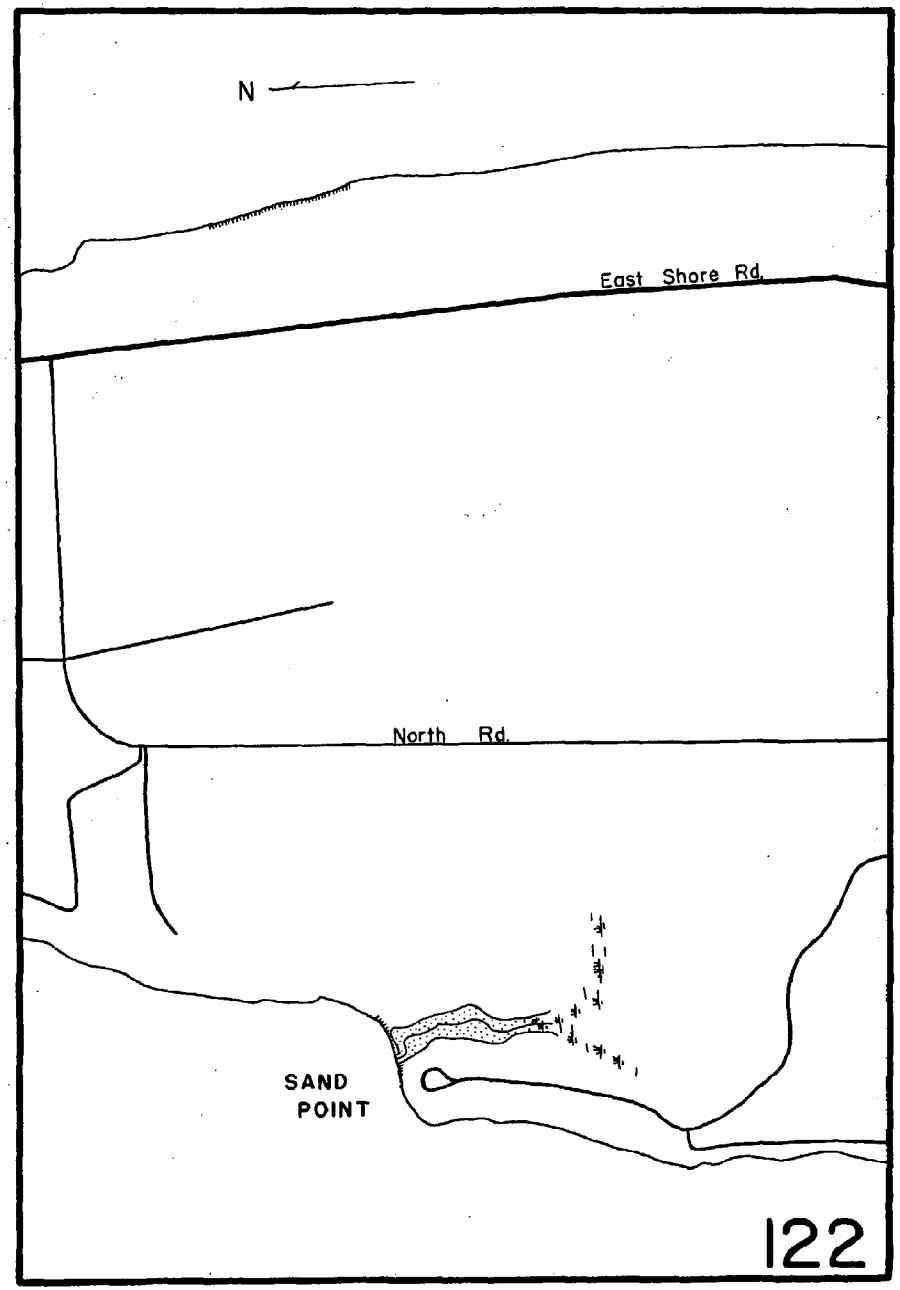
EAST PASSAGE
N
PORTSMOUTH
MIDDLETOWN
RT. 114
117

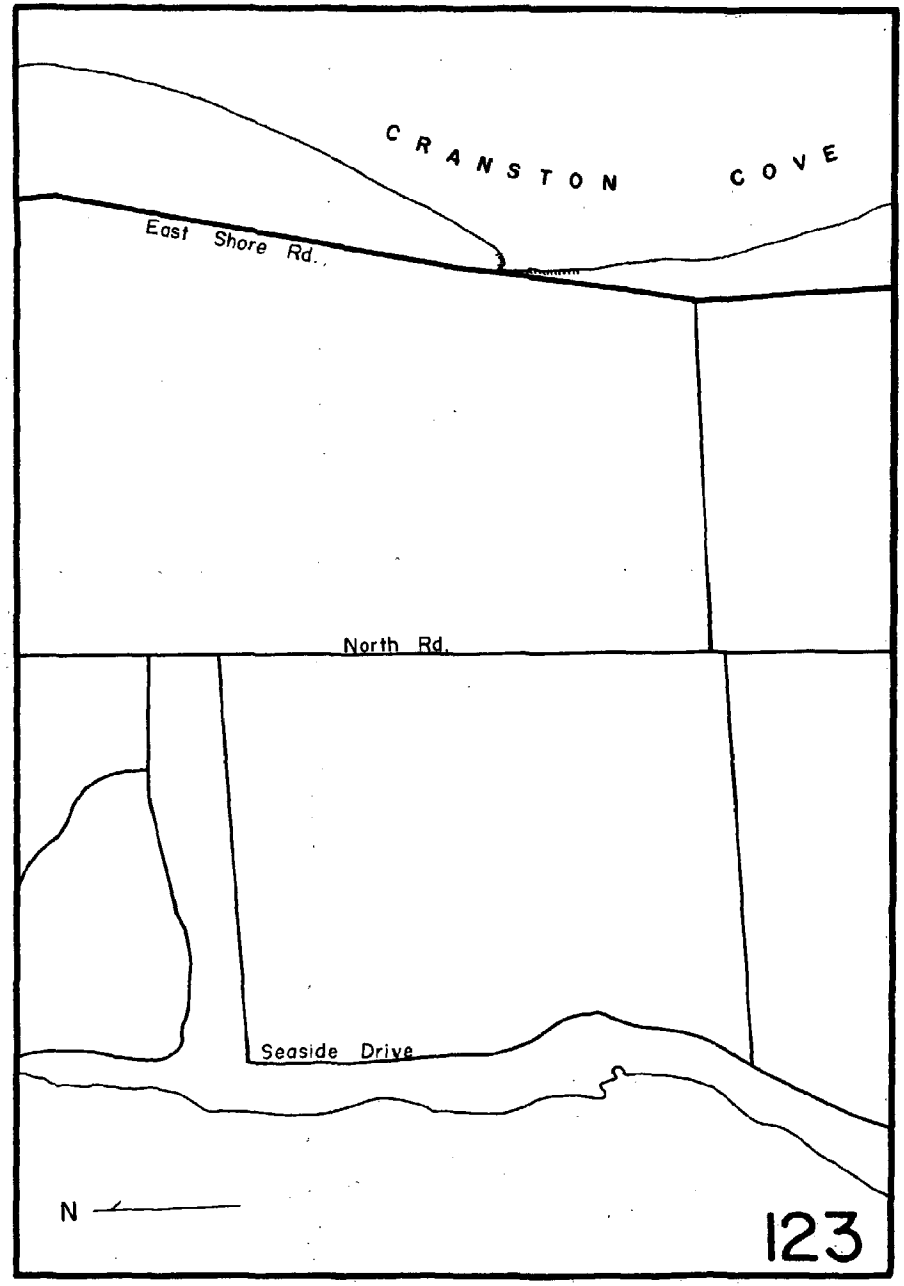

DYER
ISLAND
N
Stringham Rd.
RT. 114
118

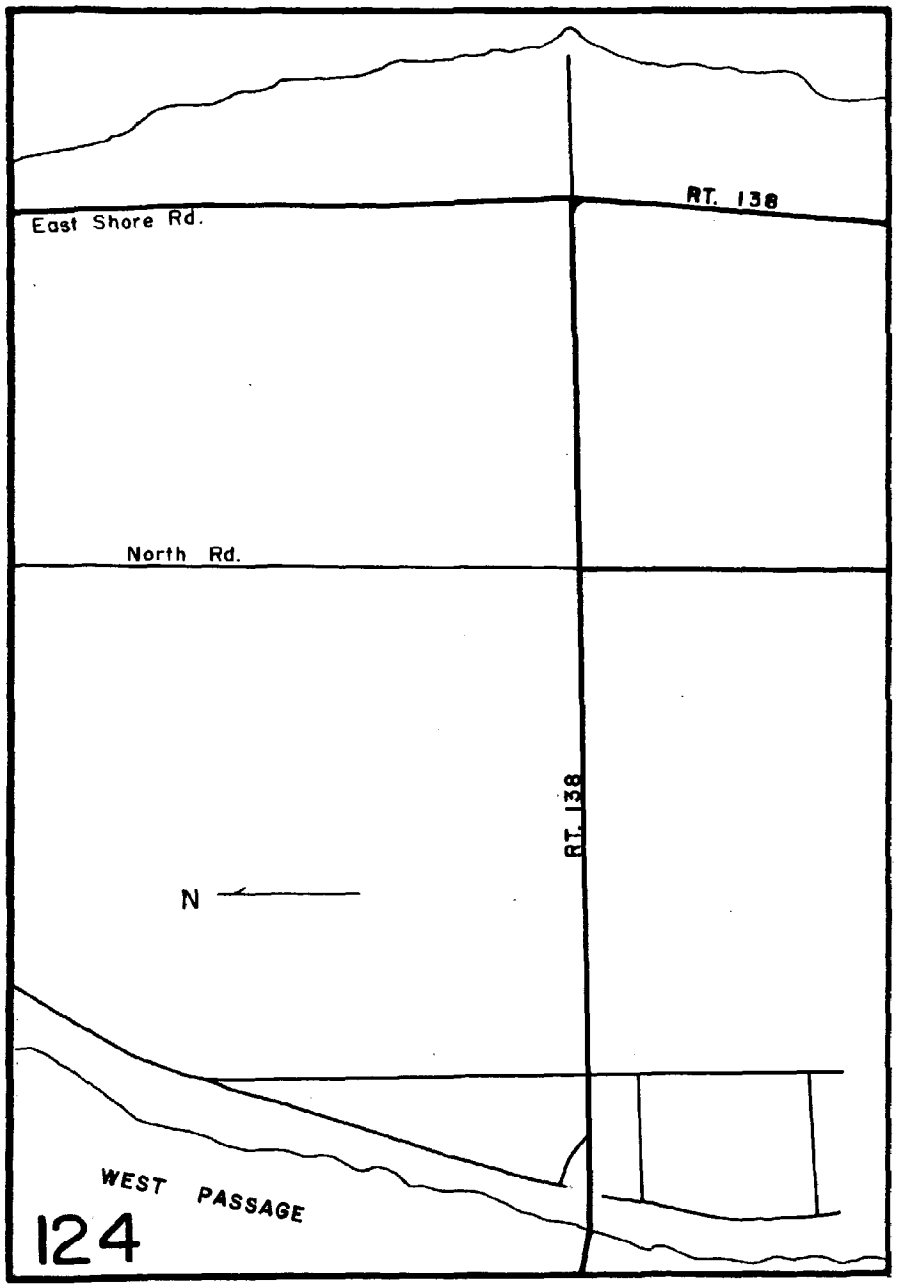

N
Cory's Ln.
COGGESHALL
POINT
119

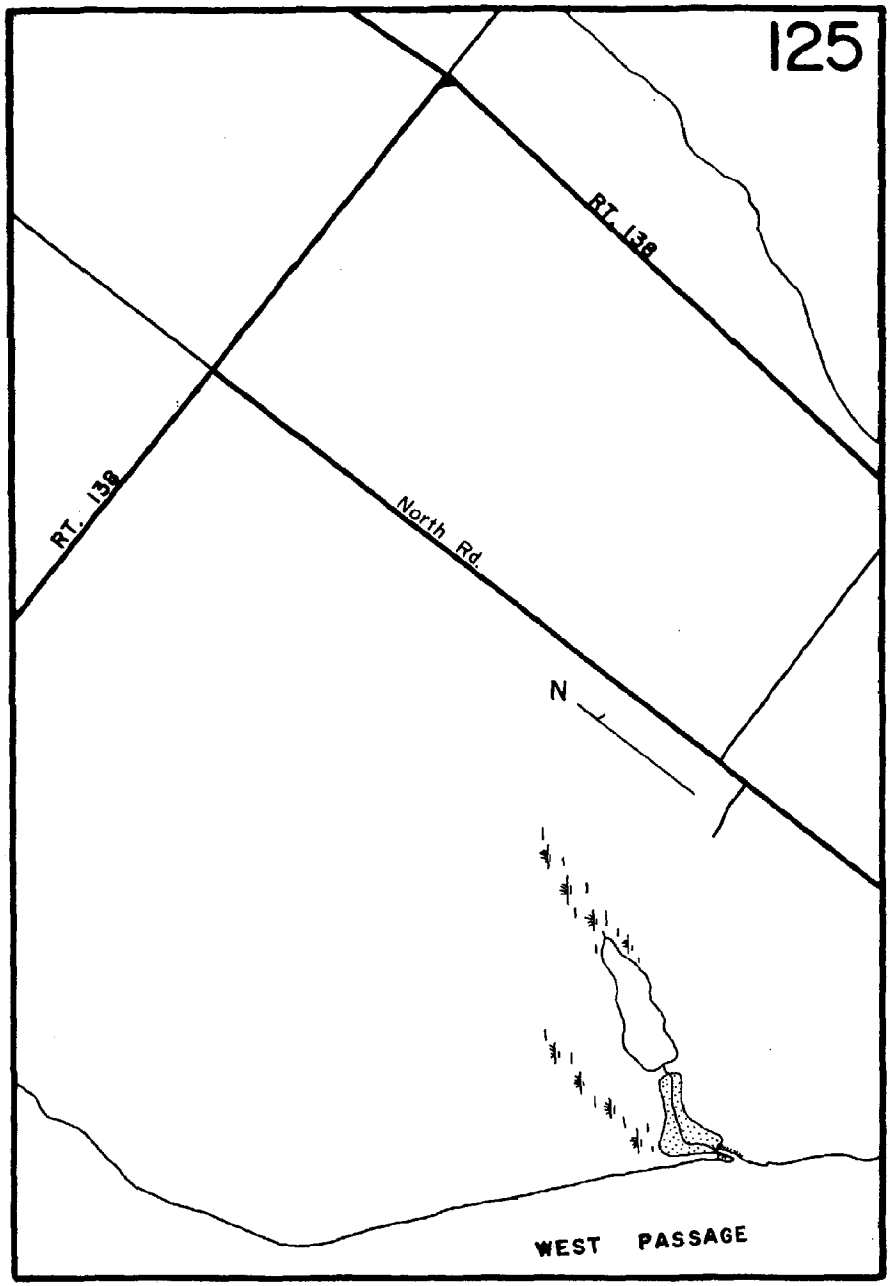

N
ARNOLD
POINT
RT. 114
Willow Ln.
120

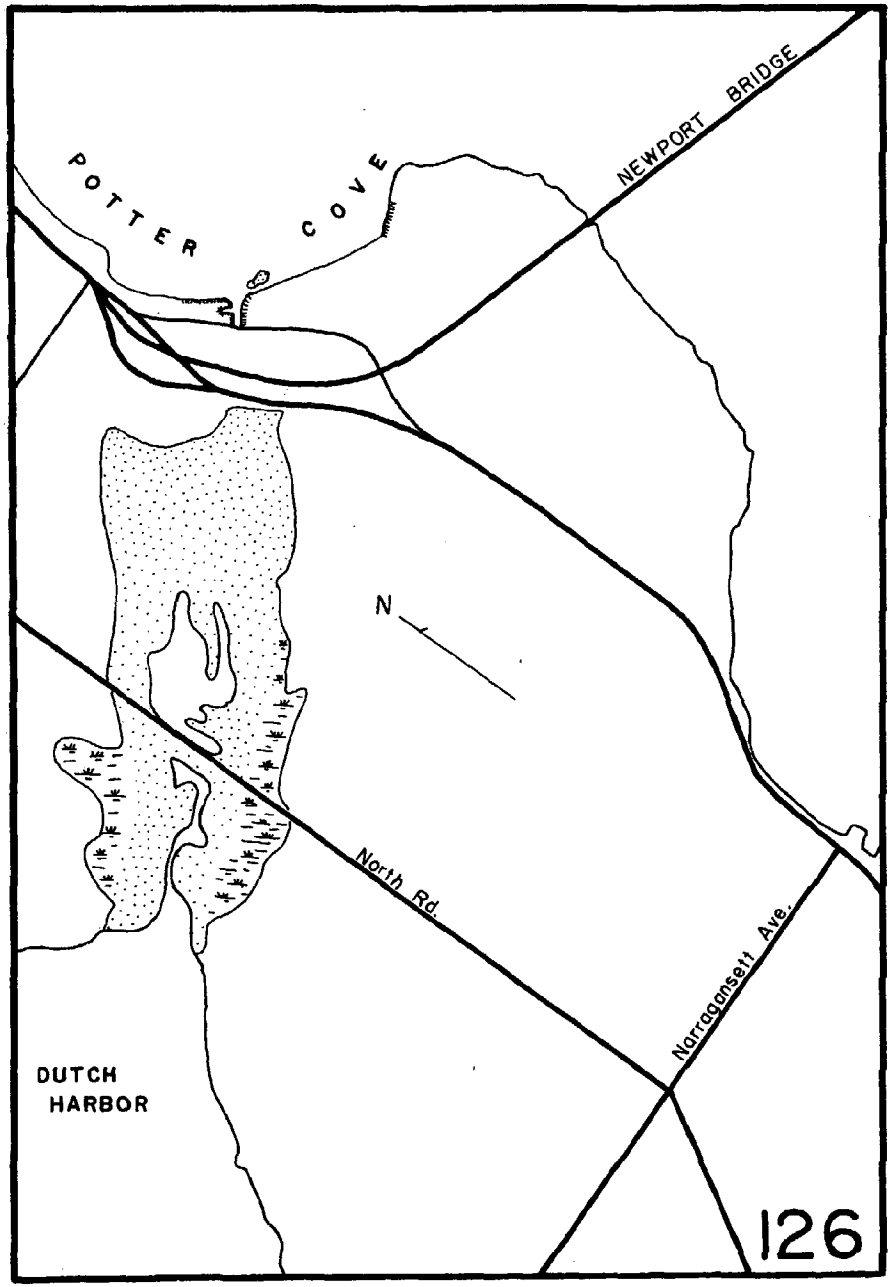

121
N
CONANICUT
POINT
Summit Ave.

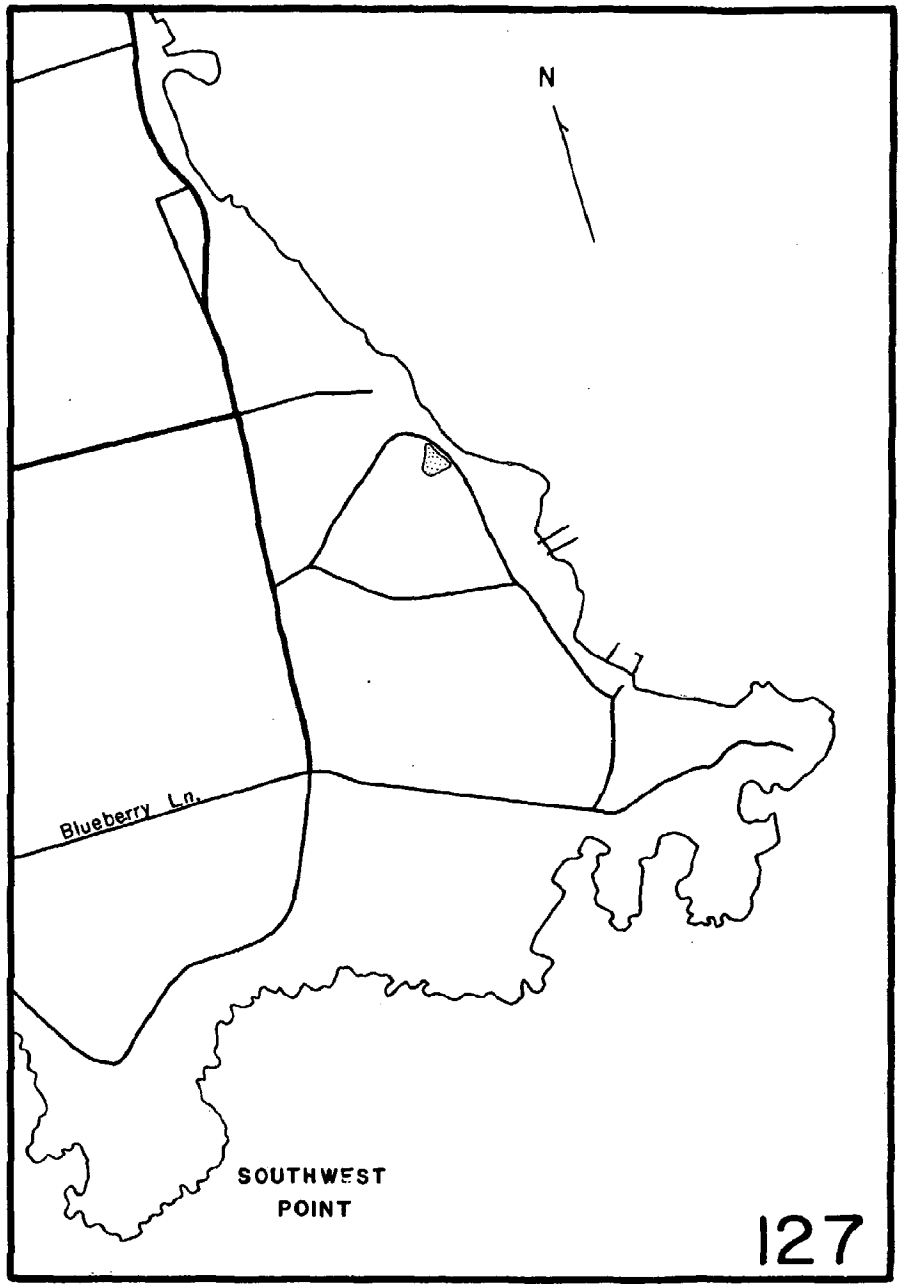

N
East Shore Rd.
North Rd.
SAND
POINT
122

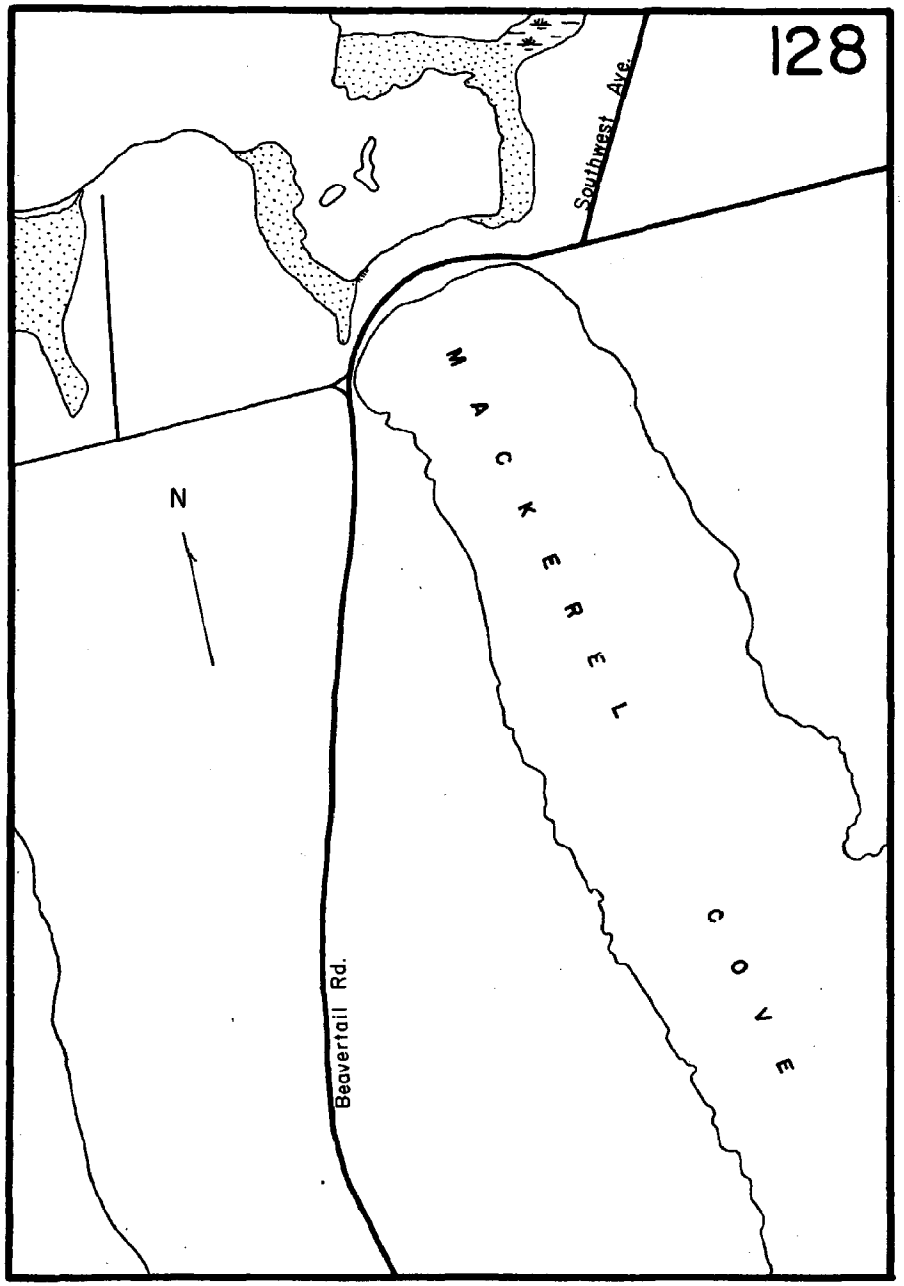

CRANSTON COVE
East Shore Rd.
North Rd.
Seaside Drive
N
123

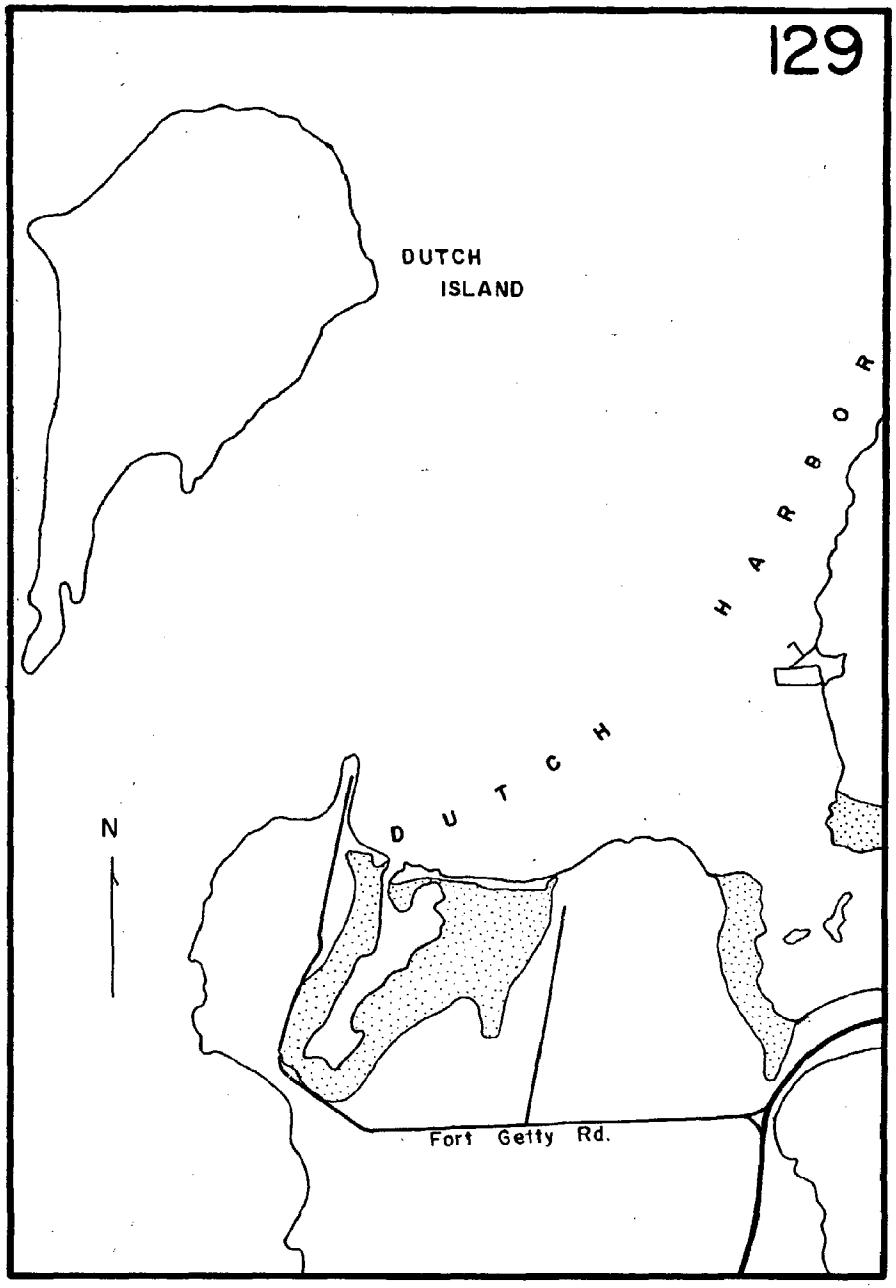

RT. 138
East Shore Rd.
North Rd.
RT. 138
N
WEST PASSAGE
124

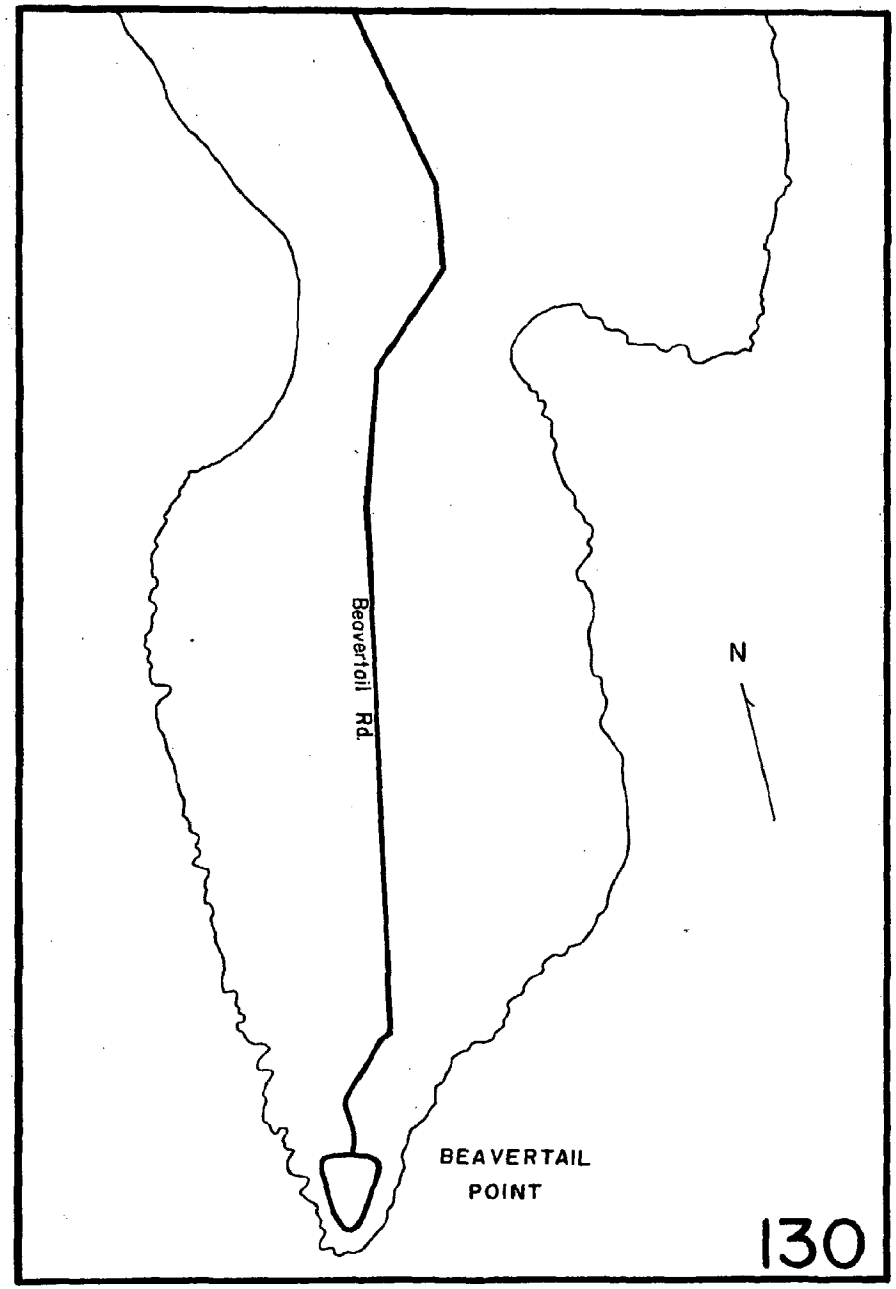

125
RT. 138
RT. 138
North Rd.
N
WEST PASSAGE

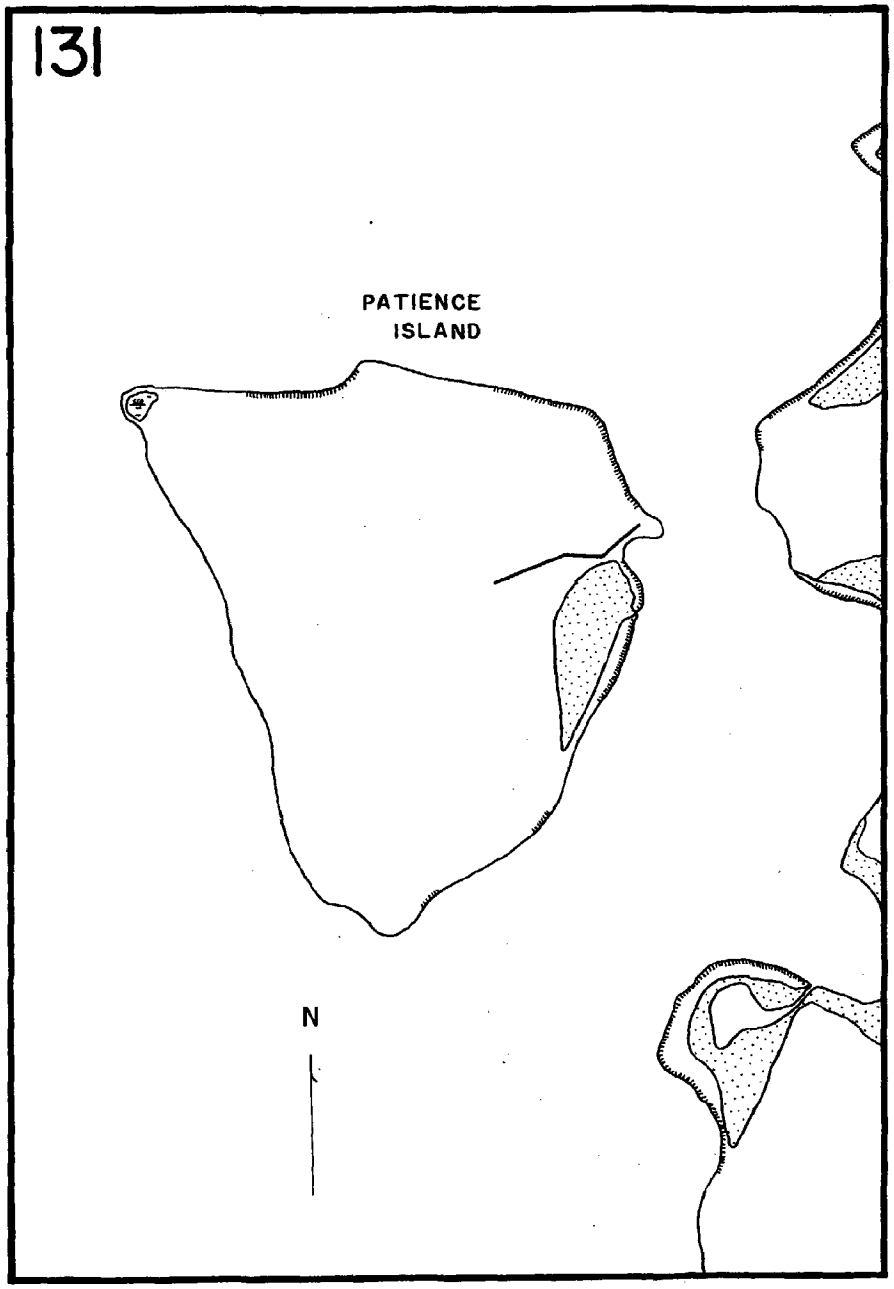

POTTER COVE
NEWPORT BRIDGE
N
North Rd.
Narragansett Ave.
DUTCH HARBOR
126

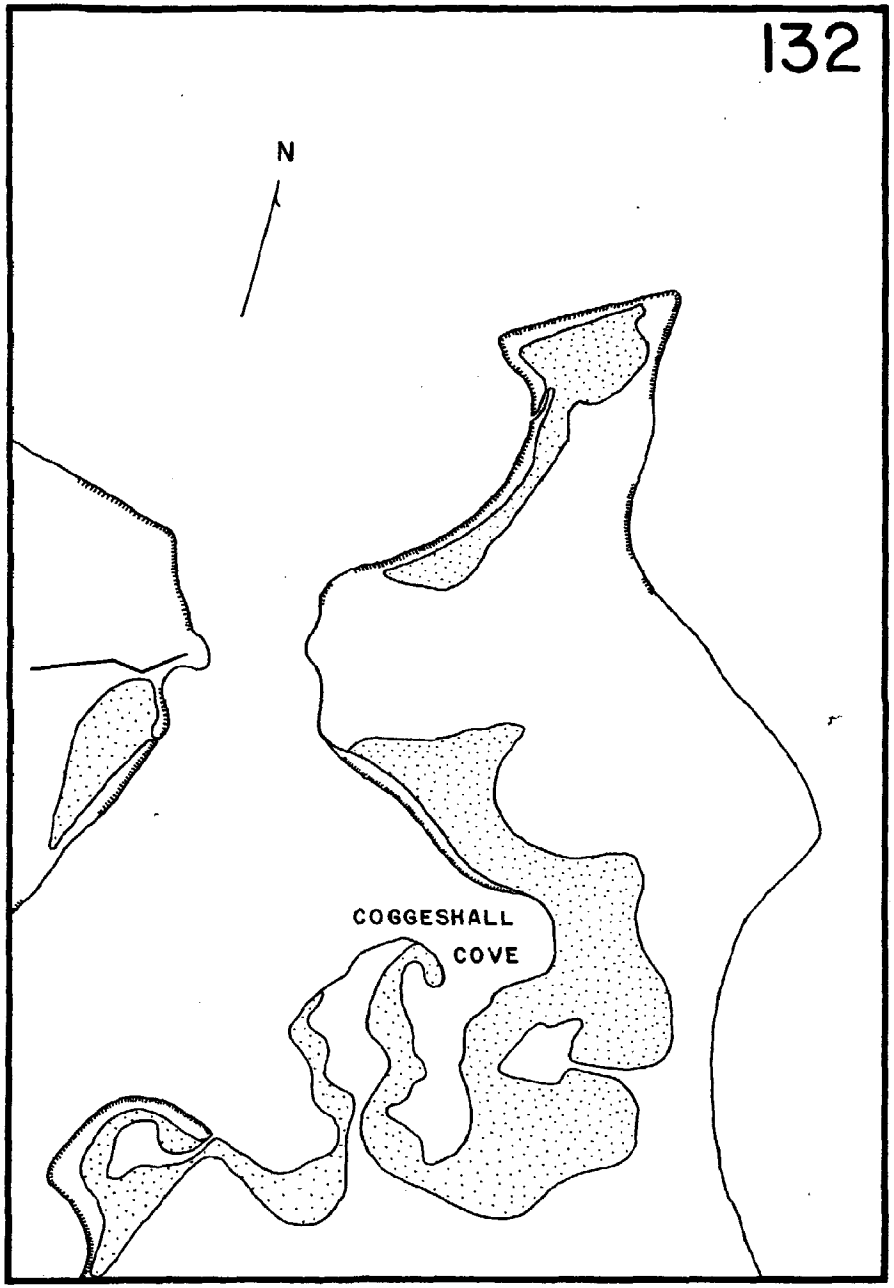

N
Blueberry Ln.
SOUTHWEST POINT
127

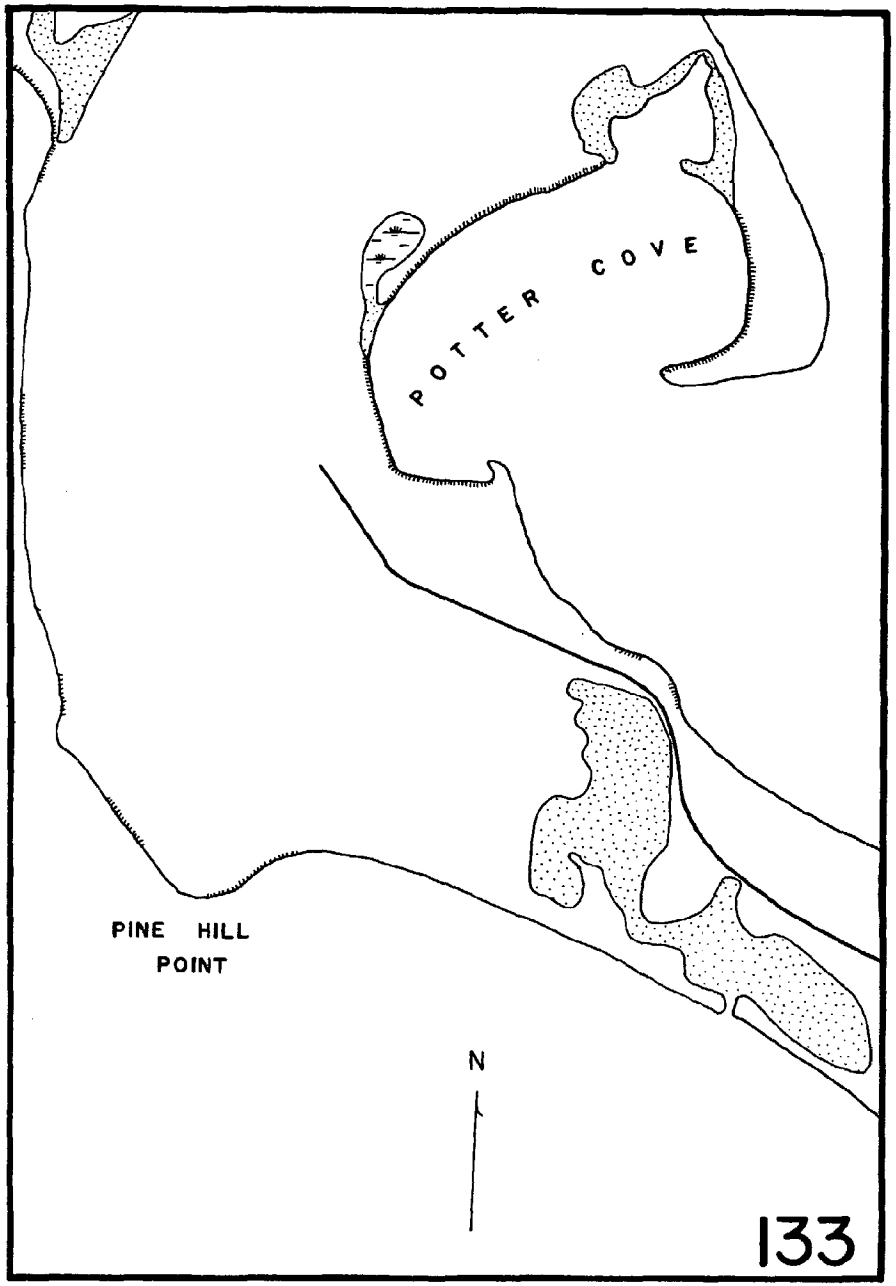

128
Southwest Ave.
MACKEREL COVE
N
Beavertail Rd.

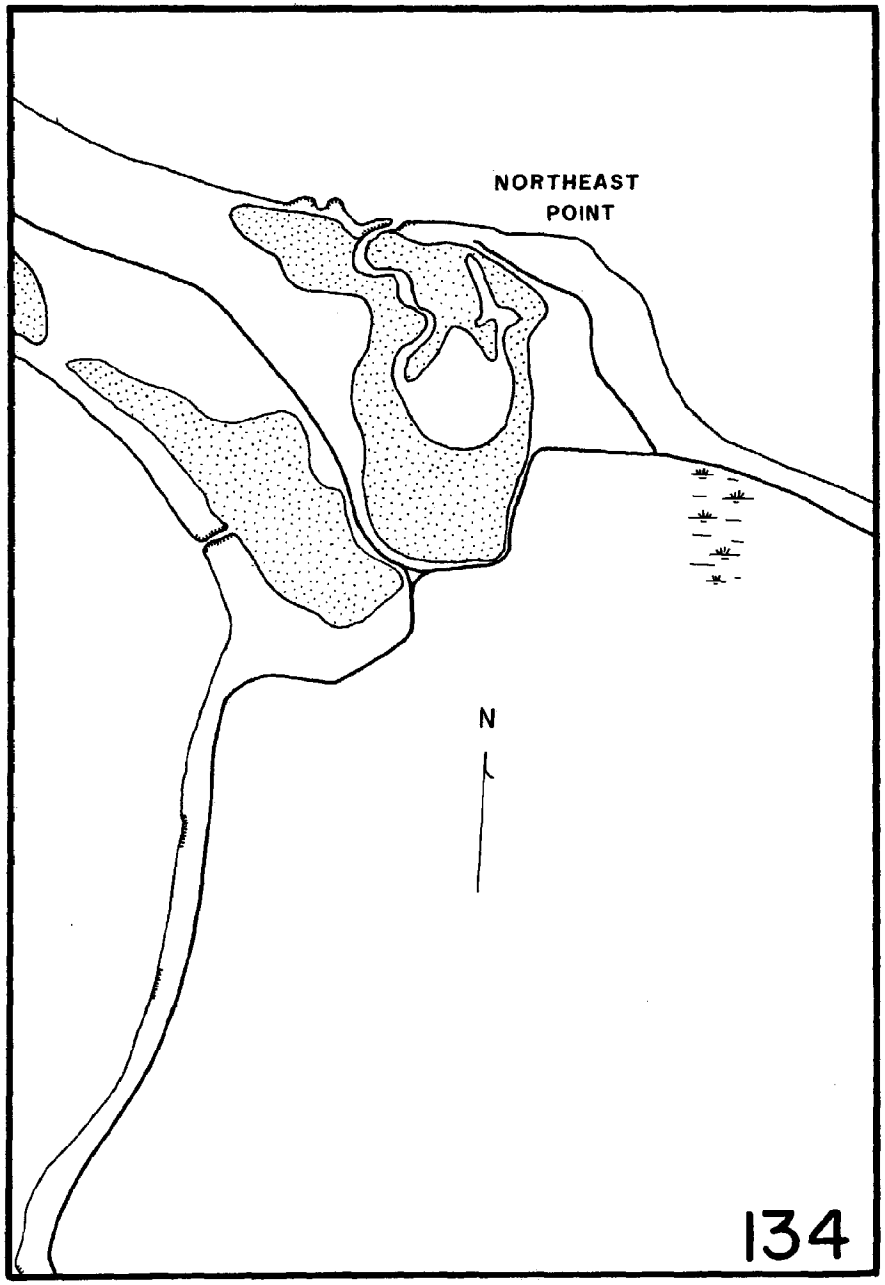

129
DUTCH ISLAND
DUTCH HARBOR
N
Fort Getty Rd.

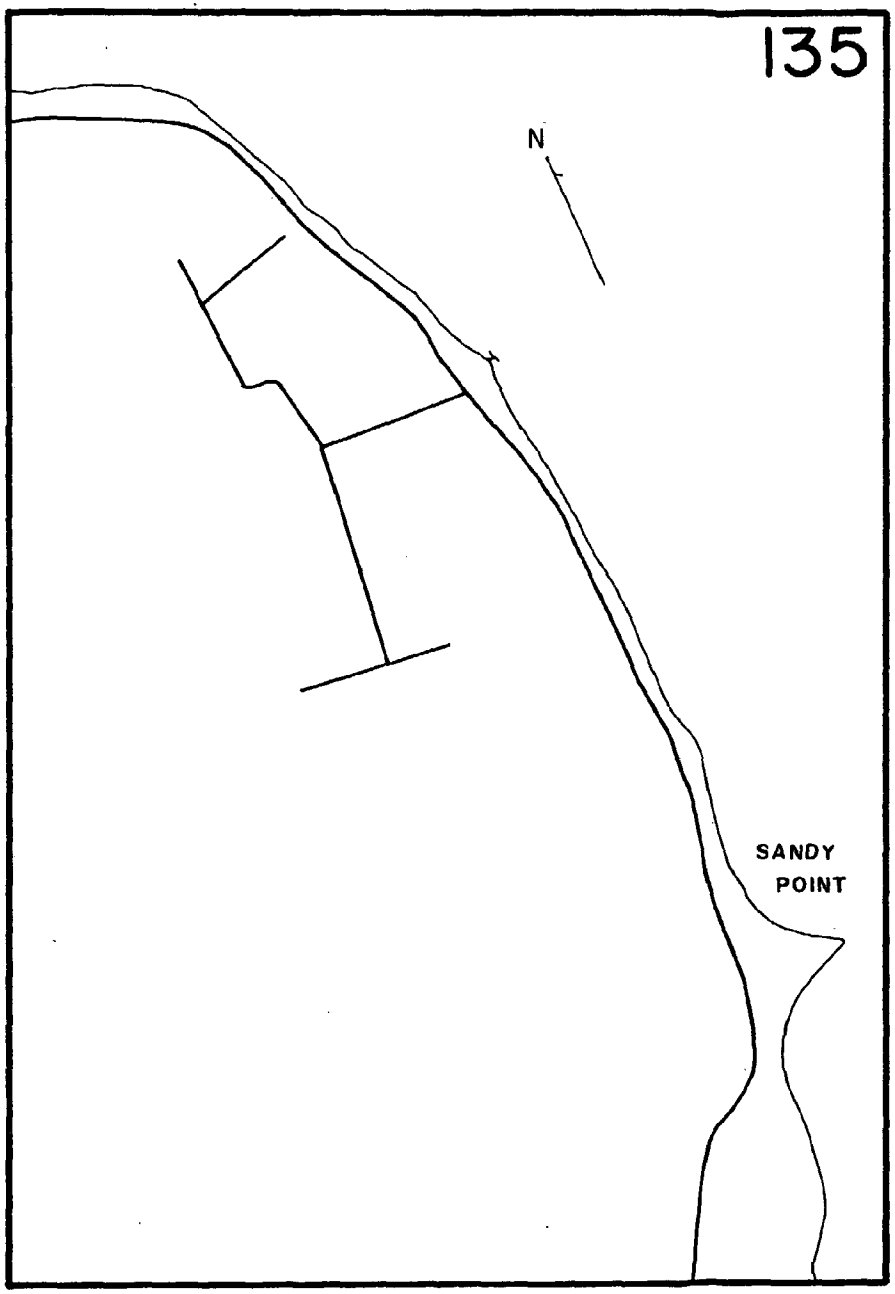

Beavertail Rd.
N
BEAVERTAIL
POINT
130

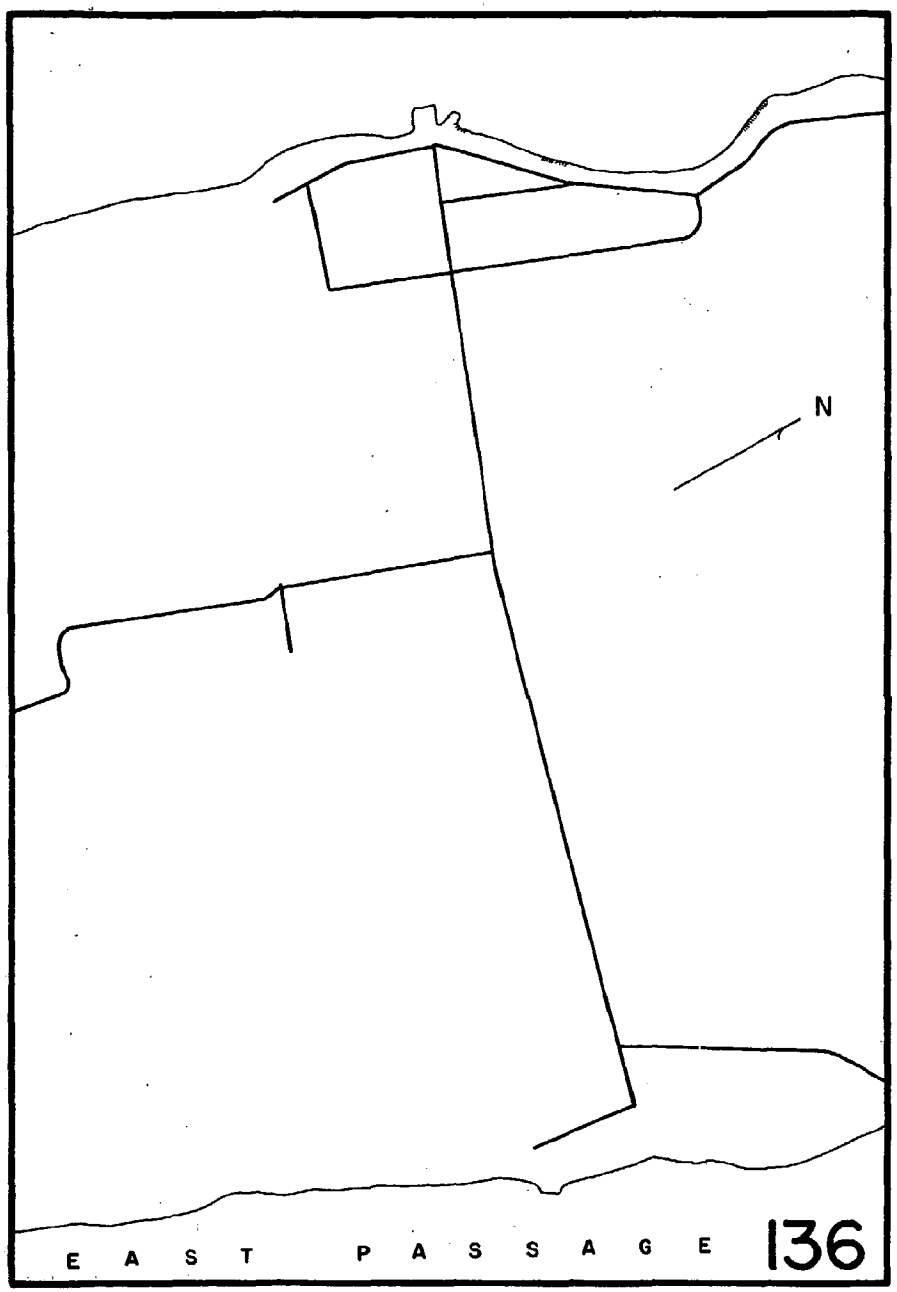

131
PATIENCE
ISLAND
N

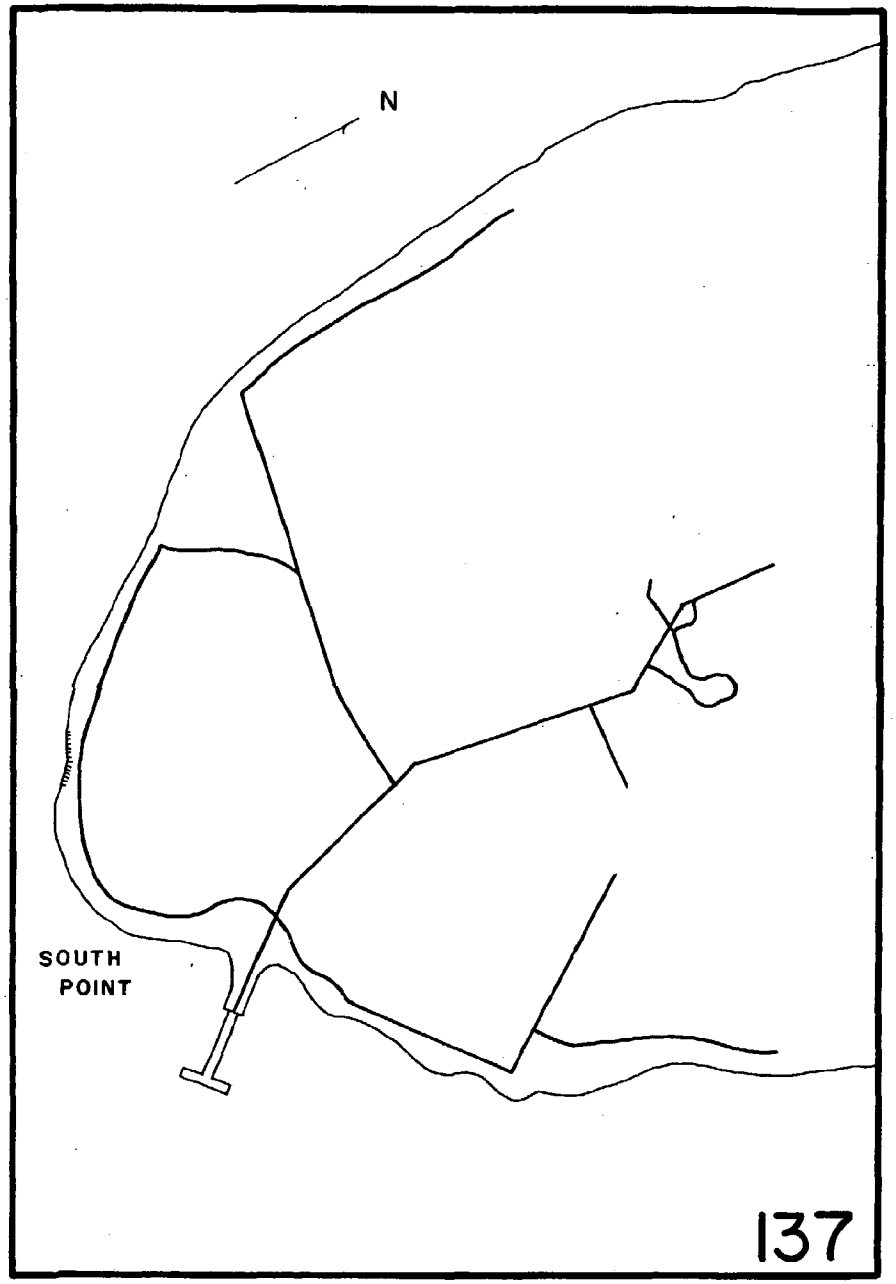

132
N
COGGESHALL
COVE

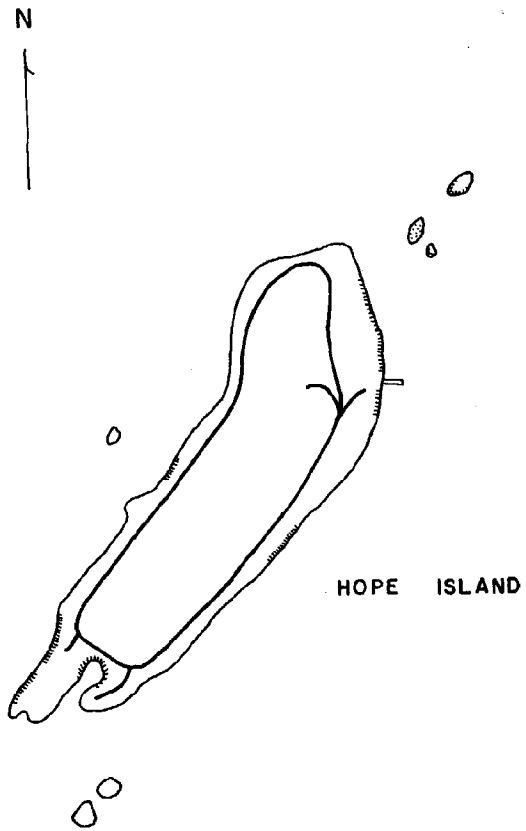

POTTER COVE
PINE HILL
POINT
N
133


NORTHEAST
POINT
N
134

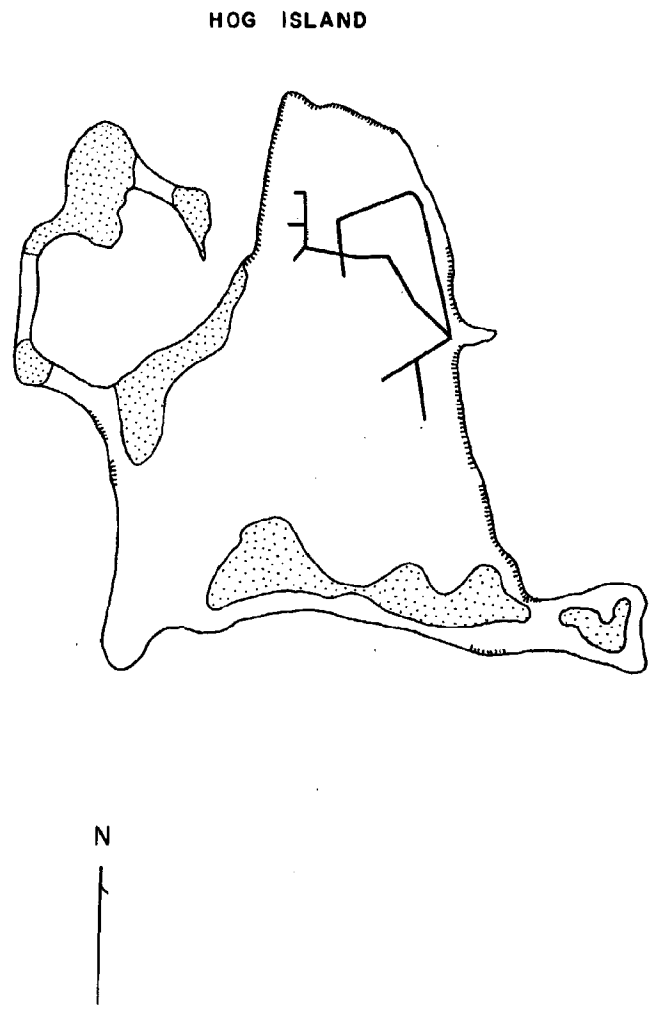

135
N
SANDY
POINT


N
E A S T P A S S A G E
136


N
SOUTH
POINT
137



138



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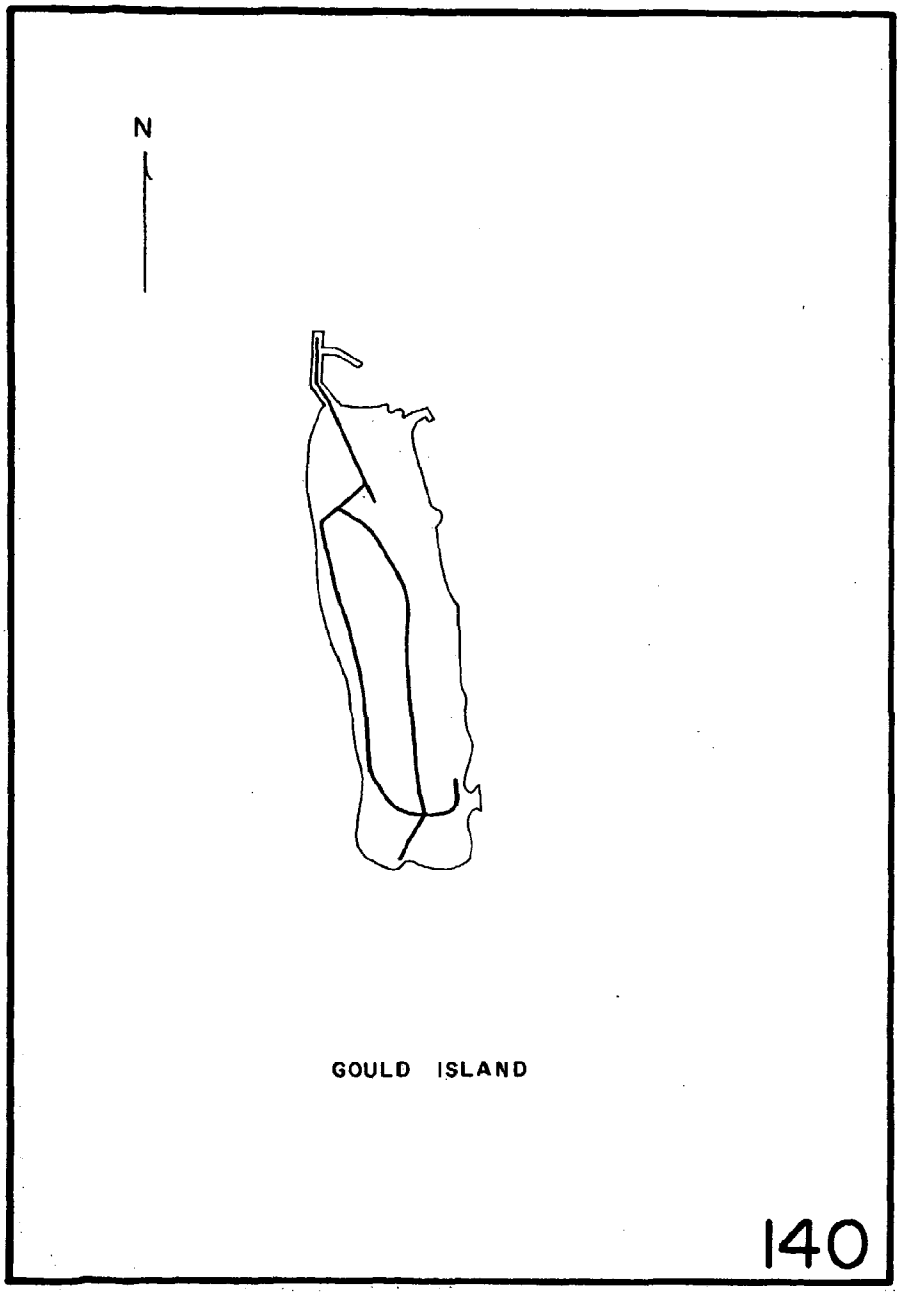
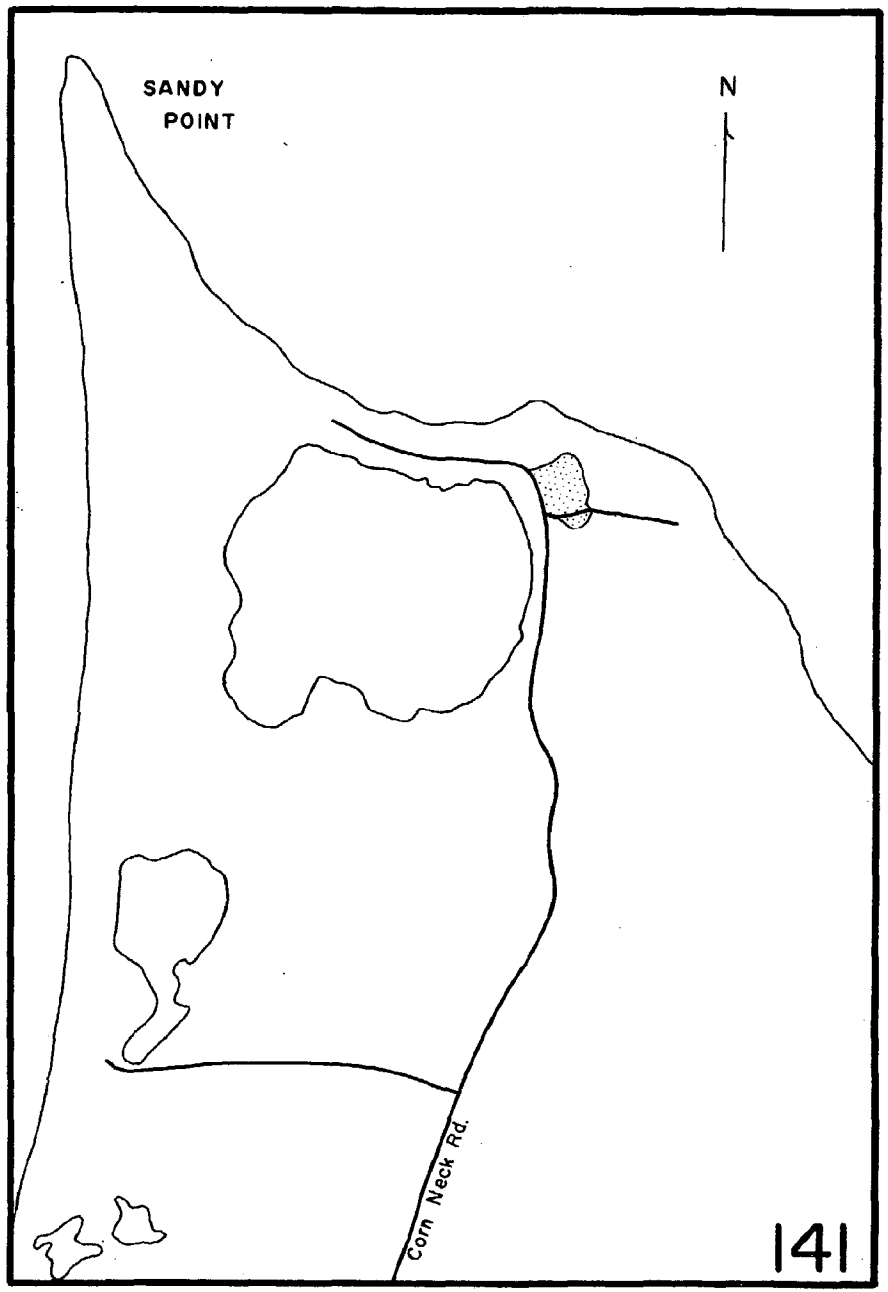
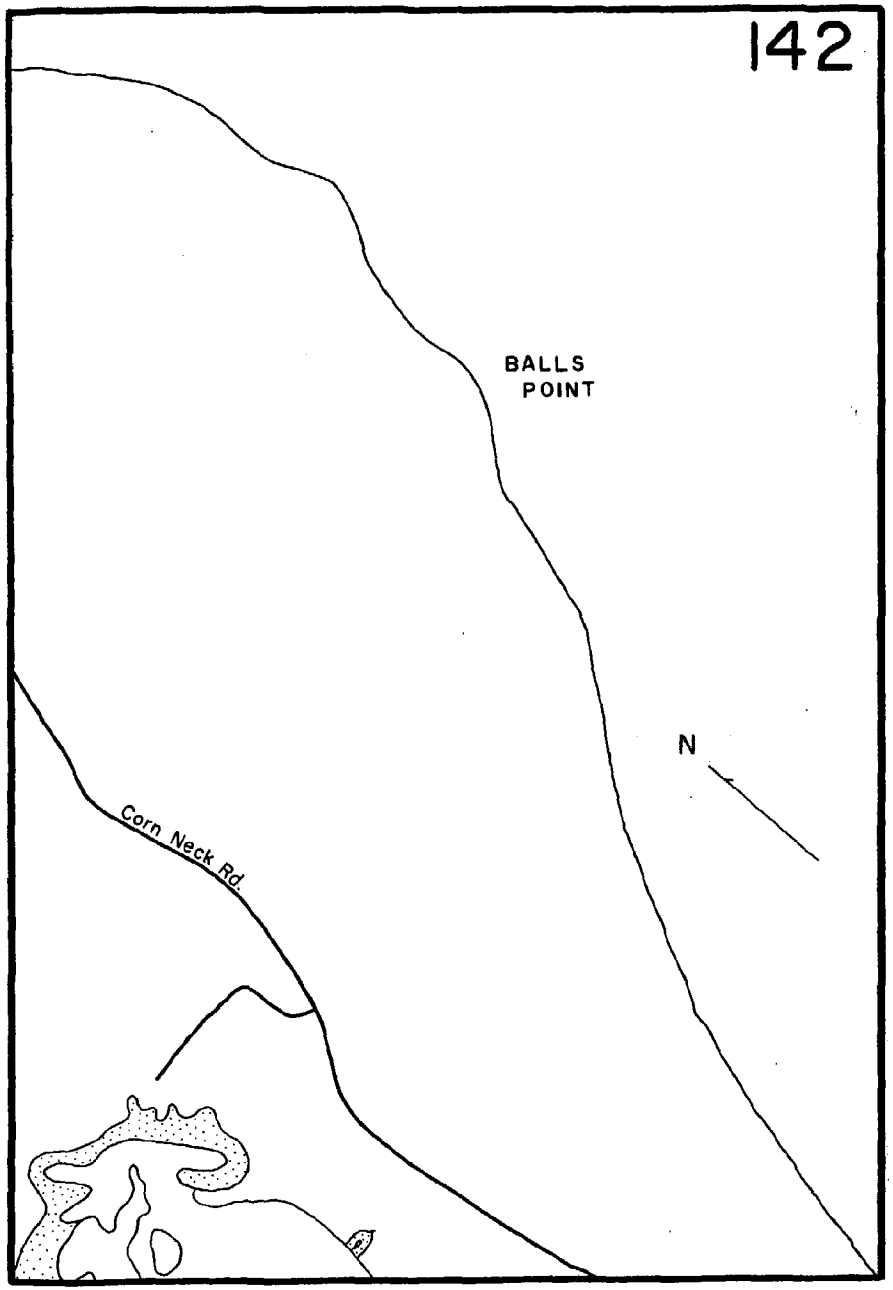
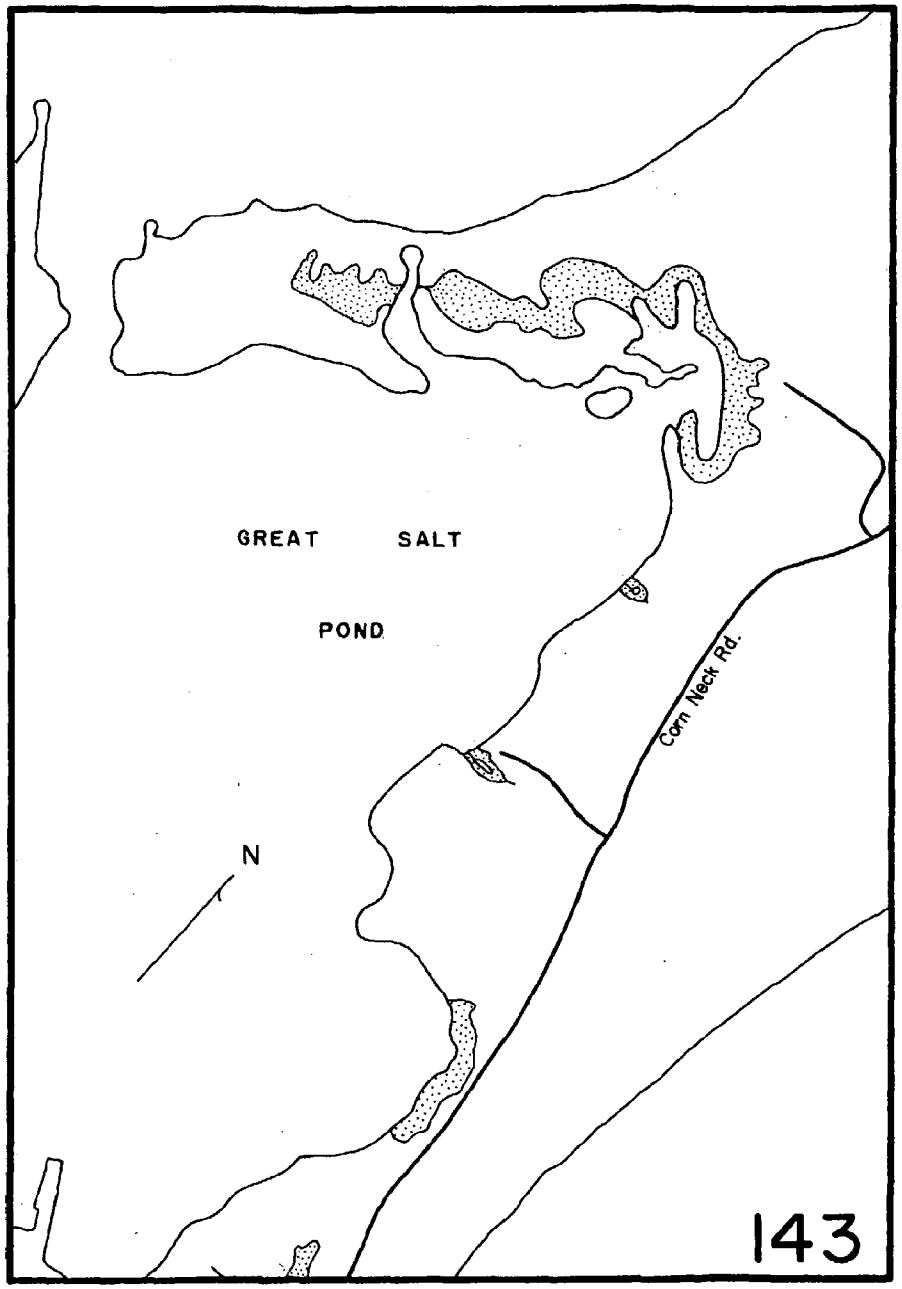
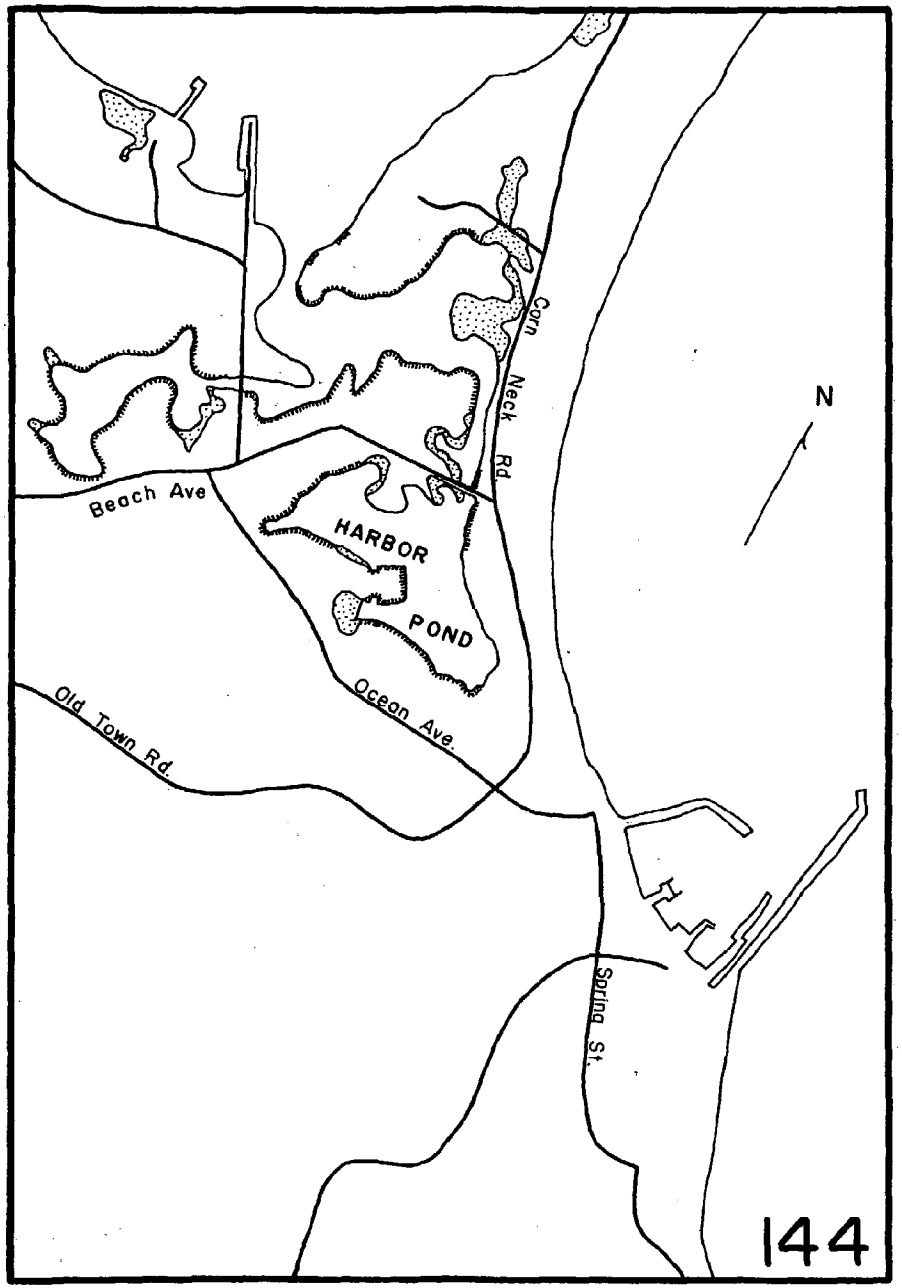
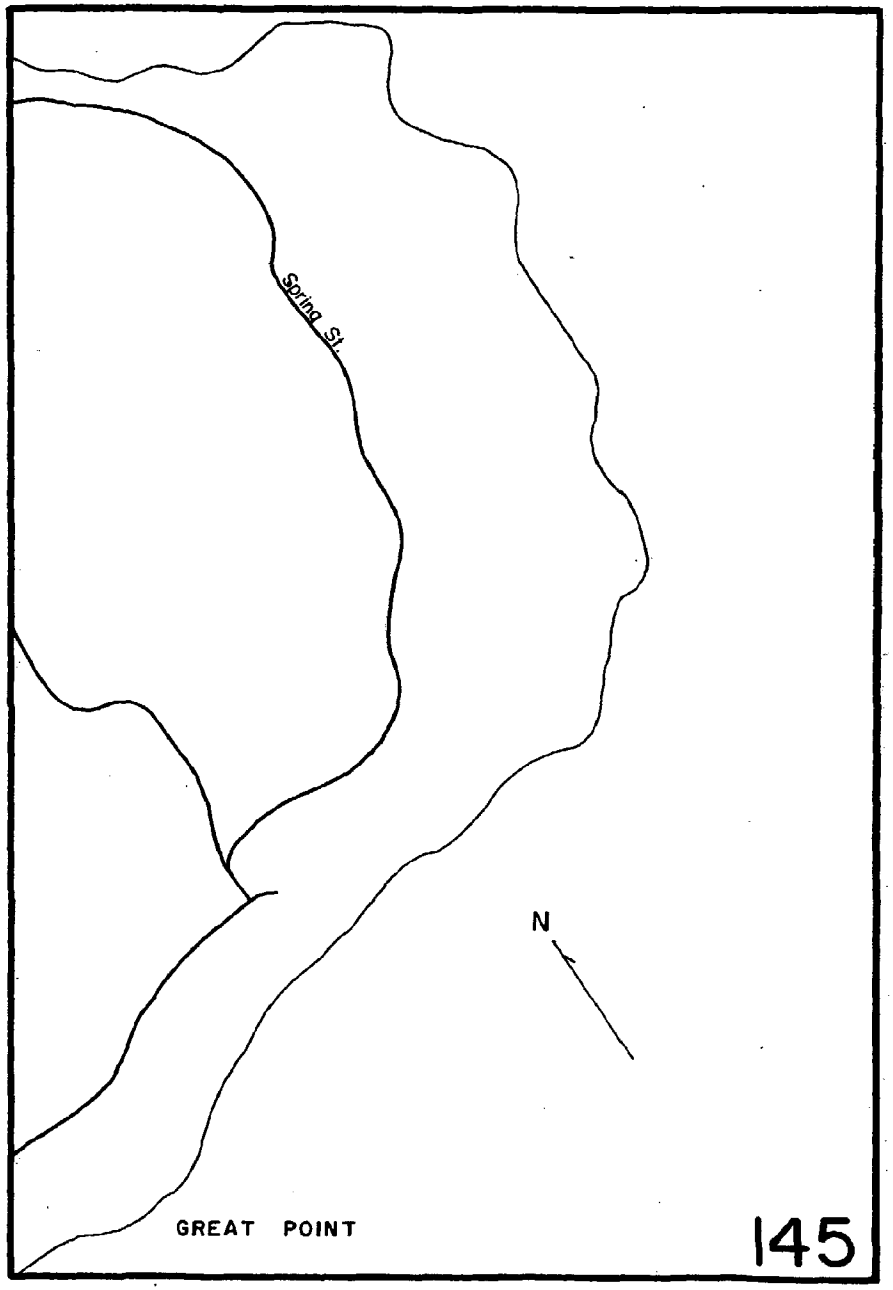

N
GOULD ISLAND
140

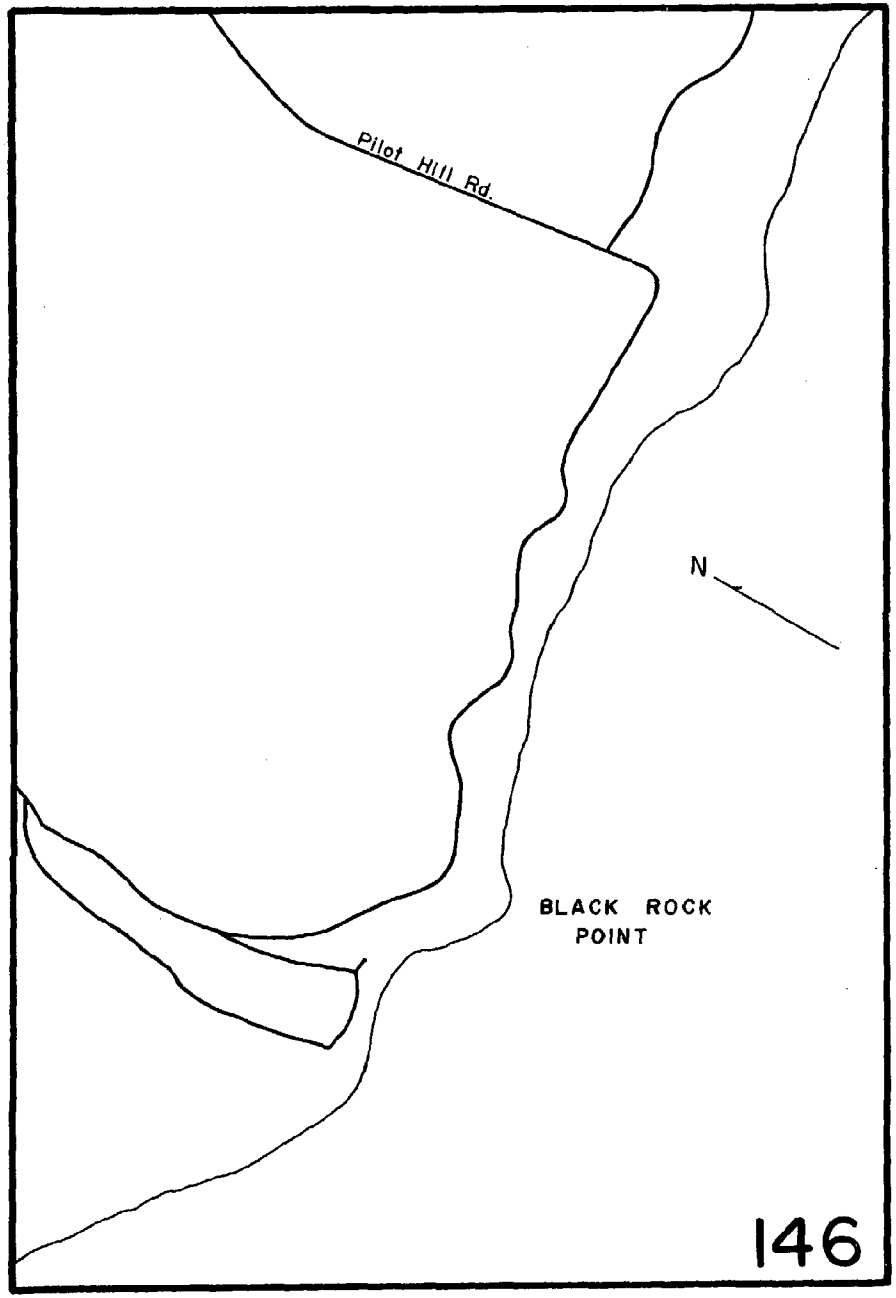

SANDY
POINT
N
Corn Neck Rd.
141

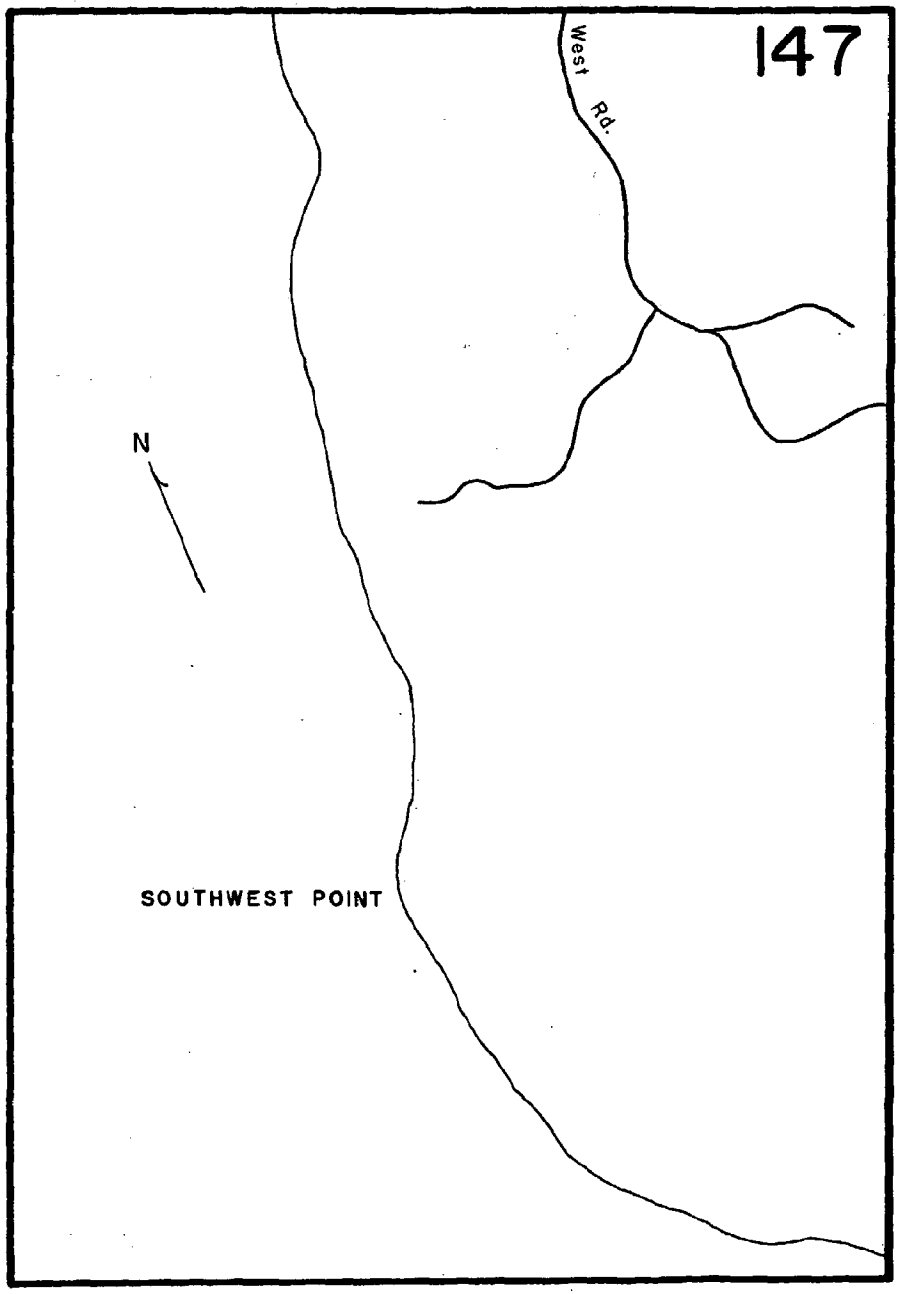

142
BALLS
POINT
N
Corn Neck Rd.

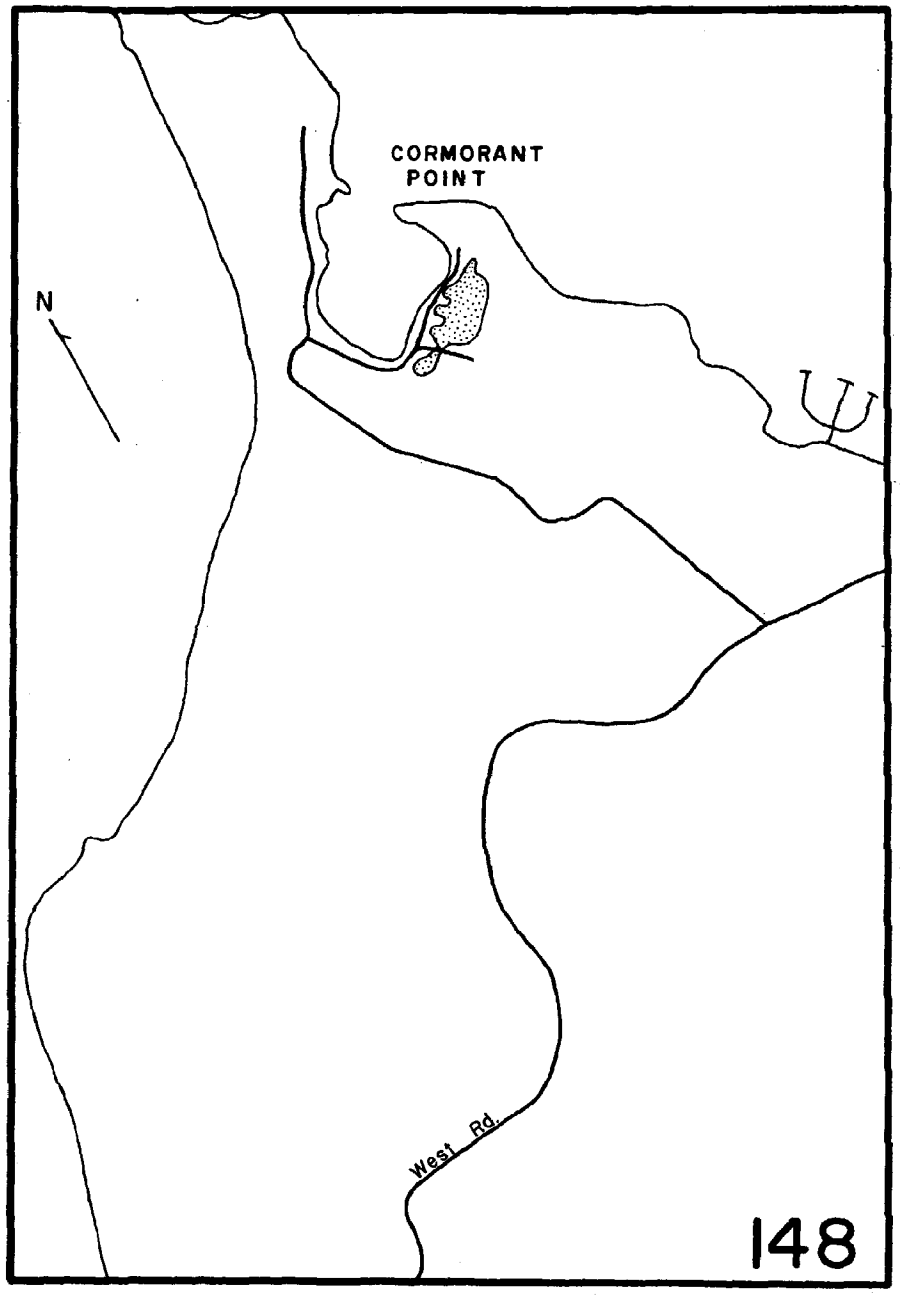

GREAT SALT
POND
N
Corn Neck Rd.
143


Beach Ave
HARBOR
POND
Corn Neck Rd.
Ocean Ave.
Old Town Rd.
Spring St.
N
144


Spring St.
N
GREAT POINT
145


Pilot Hill Rd.
N
BLACK ROCK
POINT
146


147
West Rd.
N
SOUTHWEST POINT


CORMORANT
POINT
N
West Rd.
148

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