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Muscongus Bay, Marine Wildlife Inventory and Evaluation

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MUSCONGUS BAY, MARINE WILDLIFE INVENTORY AND EVALUATION

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Muscongus Bay, Marine Wildlife Inventory and Evaluation

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PREFACE

In 1981, a publication entitled Casco Bay Coastal Resource Inventory (Hutchinson and Ferrero, 1981) reported on the marine wildlife populations in Casco Bay, Maine, and assessed potential impacts on them resulting from oil spills. The study was funded jointly by the Maine Departments of Inland Fisheries and Wildlife (IF&W), Marine Resources (DMR), and Environmental Protection (DEP). The purpose was to develop a basic resource inventory for use in mitigating the effects of oil spills. Upon completion of that study, Casco Bay became the only section of the Maine Coast, and probably the only substantial section of the entire Atlantic Coast, for which exists a complete, seasonal inventory and cataloging of its wildlife populations and habitats.

Casco Bay had been chosen for that initial study due to Portland Harbor being Maine's largest petroleum handling port. Sebsequently, 2 additional regions have been studied: Sheepscot Bay (Hutchinson and Lovett, 1983) and Muscongus Bay which is discussed in this report. All 3 studies were funded cooperatively by the 3 state agencies and all had the objective of obtaining comprehensive information on the region's marine wildlife and habitats. With the completion of the Muscongus Bay study, such information now exists for the section of Maine coast between Scarborough and Rockland.

This report details the inventory and evaluation of the marine wildlife resources in Muscongus Bay and describes a method of assessing losses to the resource from oil pollution. This detailed information on the distribution and abundance of the area's wildlife will aid in its proper management. In the event of an oil spill, this information will also aid in providing an efficient and effective response to the situation.

ACKNOWLEDGMENT

The authors wish to thank the many individuals who contributed their time, knowledge and energies towards the completion of this study. Special acknowledgment is due Andy Stinson of Lincoln Air, Lincoln, Maine, who served as pilot for the aerial surveys. His skill and knowledge provided for the safe and efficient completion of a hazardous task. Our gratitude is extended to Paul Adamus for his interest and contributions to many aspects of the project. Stephen Kress is thanked for providing his field data from the Muscongus Bay Islands. Susan Woodward of IF&W is deeply thanked, particularly for her assistance in the aerial surveys. Patrick Corr, Howard E. Spencer, Lee Perry, and Frederick Hurley, all with IF&W, are thanked for their support and encouragement throughout the study. Additional thanks are due Betty Jackson and Geneva Gordon, of the same department, for their patient secretarial and editorial skills.

Information regarding the shorebirds of Muscongus Bay was collected and compiled by Paul Adamus, Augusta, ME. His comprehensive report, covering much more than could be included in this report, is on file with IF&W. Technical advice pertaining to some of the illustrative material was provided by RPI Inc. of Columbia, SC. The study was funded through the Maine Department of IF&W, Federal Aid to Wildlife Restoration, Project W-62-R and through DEP's Bureau of Oil and Hazardous Material Control.

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INTRODUCTION

Purpose and Objectives

Muscongus Bay, in common with all coastal Maine, is a highly productive biological environment, providing valuable habitat for and supporting a great variety of marine birds and mammals. More than 150 species of marine-related birds (Palmer 1949, Packard 1960, TRIGOM-PARC 1974) and 26 species of marine mammals (USF&WS 1980) have been reported to occur in or near its waters. The marine-related birds are a diverse group that include seabirds, shorebirds, wading birds, waterfowl, and raptors. The common thread binding them all is their traditional association with the marine environment at some time during their annual cycle. The wading birds and osprey (see Appendix A for scientific names) occur as nesters during the summer months. Seabirds nest on the islands during summer - and some are also found during migration and winter. Waterfowl primarily migrate and winter on Maine's coast but the eider also nests there. Shorebirds, although present year round, use the marine environment mainly during migration.

The marine birds of coastal Maine show a great diversity in abundance and distribution, both geographically and seasonally. Inventory information documenting this on a statewide basis is limited. It's only available for the island nesting seabirds (Korschgen 1979), mid-winter populations of waterfowl (Spencer, et al 1982), nesting heron colonies (Tyler 1977, Gibbs and Woodward 1984) and eagle nesting sites (unpubl. files, Me. Dept. IF&W). Additional information exists through people with local knowledge of specific areas. Unfortunately, the value of that data is often severely limited by its being only partial in scope. The inaccessibility of most offshore islands, ledges and headlands contributes to that limitation.

Therefore, comprehensive data specific to Muscongus Bay's marine bird resource was not available prior to this study.

The harbor seal (Phoca vitulina) is the only common, year-round resident and breeding species of marine mammal in Muscongus Bay. The other species are infrequent visitors. Information is available regarding the distribution and abundance of marine mammals in Maine (Richardson 1973, 1976, Katona 1977, Gilbert and Stein 1981), however, it's even less extensive than that available for marine birds.

Muscongus Bay appears pristine and natural, owing largely to its many uninhabited islands, its miles of undeveloped shoreline, and its relative lack of industrial areas. In many regards, it truely is as pristine a part of coastline as can be found in Maine. Nevertheless, it's not entirely free from the pressures and threats of development and pollution. It lies between 2 major oil handling ports, Portland Harbor and Penobscot Bay, and lies just inshore of a busy, coastal tanker route. The area has, on occasion, seen oil spills. The most drastic occurred in 1963 when the tanker NORTHERN GULF went aground off Portland and spilled one million gallons of crude oil. Carried for 80 miles by wind and wave, the oil came ashore along 400 miles of coast in the Friendship-Bristol area of Muscongus Bay. Another major spill occurred in 1980 when the tanker CHRISTIAN REINAUER lost 100,000 gallons of petroleum products just east of Port Clyde.

The overall picture that emerges of Muscongus Bay is of a complex, viable marine ecosystem adjacent to major petroleum handling ports. The common assumption in today's world is that the two systems are incompatable: that the presence of the latter will necessarily lead to the degradation of the former. This may be true, particularly if both the industry and the biological resources are managed carelessly. However, a basic assumption

must be made that with responsible operation of the petroleum industry and with adequate knowledge and responsible management of the wildlife resource, the 2 systems can coexist and adverse effects can be minimized or even prevented.

DEP has the primary State responsibility regarding oil spills in Maine. DEP is most concerned with oil spill prevention, cleanup and mitigation of damages. IF&W has the responsibility of supplying DEP with the data and advice pertaining to the protection of wildlife. With the need for information on which to base sound decisions, IF&W undertook this study. The purpose was to provide basic data on the seasonal abundance and distribution of marine wildlife in Muscongus Bay and to incorporate the information in a plan to responsibly manage the wildlife resources, particularly in the event of oil spills. The objectives of the study were as follows:

1) To provide a seasonal inventory of the marine birds and seal populations in Muscongus Bay.
2) To determine important habitats of marine birds and seals in Muscongus Bay.
3) To develop an evaluation system and establish protection priorities for the marine wildlife resources in Muscongus Bay.
4) To establish a workable mechanism for readily assessing and documenting damages to marine birds and seals in Muscongus Bay resulting from an oil spill.

Study Area

The area of the study (Fig. 1) included all the tidal waters, adjacent shorelines, and islands of Muscongus Bay. The physical boundaries

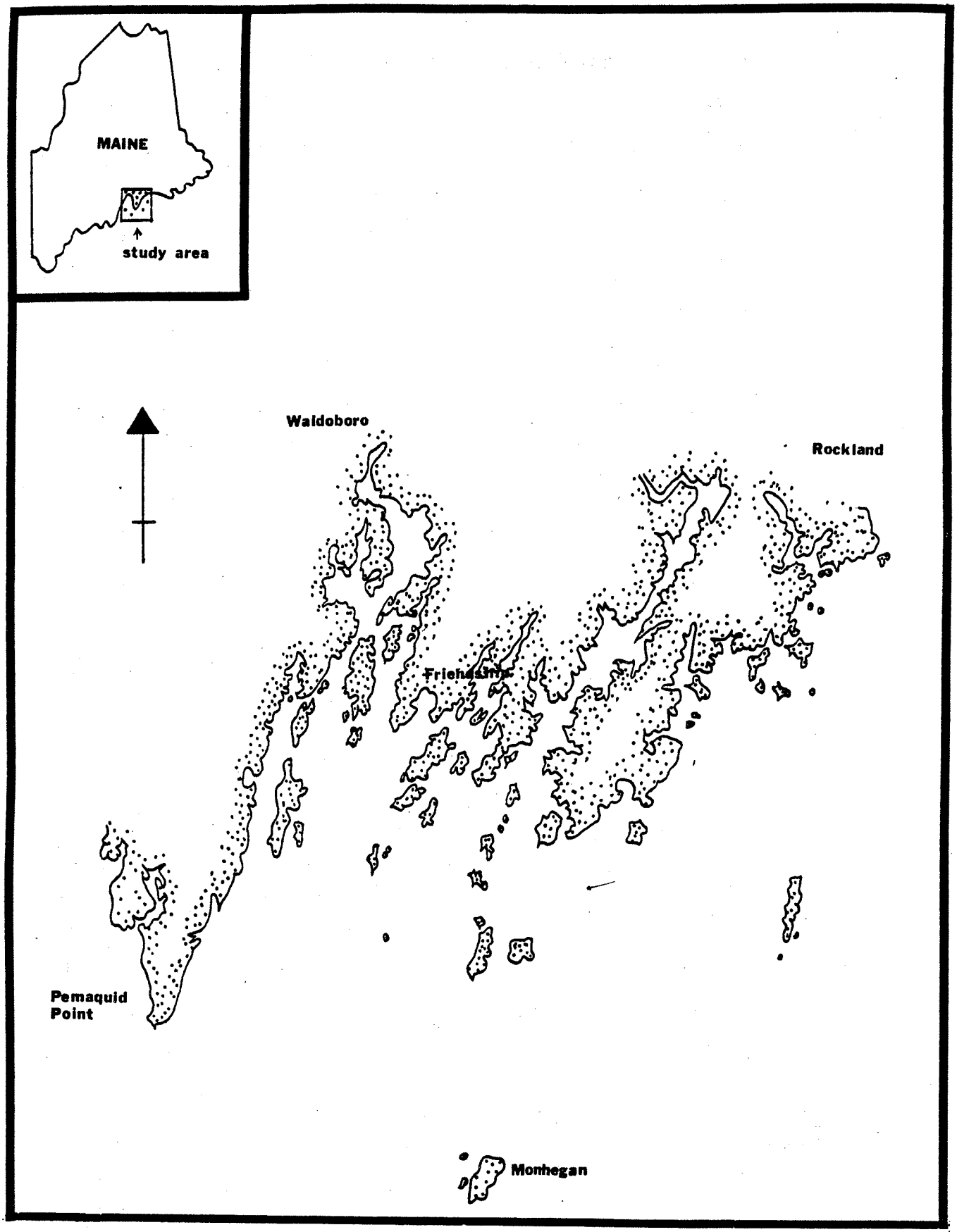


Fig. 1. Muscongus Bay Marine Wildlife Survey study area.

are defined as the coastal area between Pemaquid Point and Owls Head as shown on U.S.C. & G.S. Chart 13301. The straight line distance between those 2 points is about 20 miles. However, if the actual shoreline of all the bays, headlands and major islands are measured, the distance is greater than 300 miles. The study area encompasses more than 300 square miles and contains about 250 islands, including Monhegan and Metinic. Four major tidal rivers, the Medomak, Meduncook, St. George and Weskeag, are also included. The intertidal area includes about 500 acres of salt marsh and 5,500 acres of mud flats.

Methodology

Eleven complete aerial surveys were made of the Muscongus Bay study area between October 6, 1982 and September 28, 1983. The survey flights included most tidal stages (Table 1). The surveys were flown in a Cessna 337 at an altitude of approximately 500 ft. and a speed of about 100 mi/hr. A preplanned flight route, designed to afford complete coverage of the study area, was repeated on each survey. The route started on the Medomak River at Waldoboro, ended at Owls Head and encompassed all tidal waters, including the off-shore islands. The average time required to complete the flight was 5.3 hours.

A tape recording was made during each flight. All sightings of marine birds and seals were recorded as to species or a specific group, their estimated numbers, and their exact location. Upon return to the office, each observation was coded, tabulated, mapped on a USCG marine chart, series 13301, and entered into computer files.

Table 1. Date and Tidal Stage of Aerial Surveys.

Flight #	Date	Mid-survey Tidal Stage
1	October 6	High
2	November 9	Low
3	December 13	Mid-tide
4	January 14	High
5	February 15	High
6	March 18	High
7	April 6	Low
8	May 16	High
9	June 20	Low
10	August 25	High
11	September 28	Low

Additional observations, made from the ground, included periodic counts of birds as ground-truthing for the aerial surveys and, between May 18 and June 20, 1983, the searching of more than 200 islands for nesting marine birds. During the island searches, the survey crew consisted of 3 biologists working from a 17 ft. Boston Whaler. Each island was circled by boat and visually evaluated. If any indication was given, either through the sighting of birds or by the nature of the habitat, that the island might be used for nesting by any of the marine birds, the crew members landed and searched the island. All islands, found with nesting birds, were inventoried using a combination of direct nest counts and visual estimates. Complete nest counts were made in most cormorant colonies for all species on most small islands. On islands too large or too densely vegetated for complete counts of individual nests, total numbers of each species were visually estimated and partial nest counts were made on the island. Estimates of the number of nesting pairs were then derived. Proportions of great black-backed gulls to herring gulls were visually estimated from gulls circling the island to provide relative

numbers of nesting pairs of each species.

A separate, ground survey was conducted for shorebirds, due to their being difficult to observe from the air. More than 80 locations, comprising about 25 percent of the total area of tidal flats in the study area, were regularly visited between spring and fall migration. A thorough search of the literatures, regarding shorebirds in Muscongus Bay, was also conducted.

All sightings of seals, made from the boat or ground, were also recorded as to location and estimated numbers. The information from all the ground surveys was compiled and mapped similarly to the aerial survey data.

Tha aerial and ground data, when completed for the 12 month cycle, were evaluated on a seasonal basis. For the purpose of this study, 5 seasons were considered. The seasons and their approximate dates are as follows:

1.	Fall Migration	September 1 to November 30
2.	Winter	December 1 to February 15
3.	Spring Migration	February 16 to April 30
4.	Nesting	May 1 to June 30
5.	Post-nesting	July 1 to August 31

The seasons roughly correspond to the seasonal rhythms exhibited by Maine's marine birds and seals. The seasonal dates were determined from the literature (Palmer 1949, TRIGOM-PARC 1974, Korschgen 1979, USF&WS 1980) and from patterns of population stability and change seen during this and previous studies (Hutchinson and Ferrero 1981, Hutchinson and Lovett 1983). The dates are not absolute, but are only guides. Overlap naturally occurs from one season to the next. By compiling and analyzing the data on a seasonal basis, a conceptual framework is provided which allows for a better understanding of the resource and the development of a more refined management strategy.

The survey data, when coded and mapped, delineated marine bird and seal concentration areas. The numbers of each species were summed by area, seasonally. A relative seasonal rating, based on the species summations, was calculated for each area. This rating was then used to rank the concentration areas by relative importance. This information was incorporated into an oil spill response plan and into a method of assessing losses.

RESOURCE INVENTORY

Marine Birds

Population Assessment. The diverse species composition, seasonal distribution, and abundance of marine birds in Muscongus Bay presents a complex and dynamic situation. The Maine coast sits on the boundary of 2 distinct biological regions: the boreal or Canadian zone to the north and the northern temperate or Austral zone to the south (Shelford 1963). Muscongus Bay, therefore, in common with other sections of the Maine coast, lies near the southern limit for many northern species and near the northern limit for many southern species. This results in a wide variety and an unusual aggregation of marine birds. More than 150 species of marine-related birds have been reported from Maine's coastal waters and could occur in or near Muscongus Bay (Packard 1960, TRIGOM-PARC 1974, Pierson and Pierson 1981). All are potentially susceptible to oil spills. Slightly more than 100 of these have been reported from the Muscongus Bay study area (Adamus, pers.comm.). These are listed in Appendix A. Their seasonal occurrence and relative abundance have been discussed in a number of reports (TRIGOM-PARC 1974, USF&WS 1980, Pierson and Pierson 1981) and will not be repeated here.

The ground and aerial surveys of this study indicate that about 50 species account for over 99 percent of the total marine bird population in Muscongus Bay (Table 2). These species fall within 7 groups: the loons and grebes, the cormorants, the wading birds, the waterfowl, the raptors, the shorebirds, and the true seabirds. The other species occur so infrequently, unpredictably, and in such low numbers that they were not directly included in the analysis and discussion of this study. However, they are indirectly included since the locations used by them appear to coincide with areas identified in this report for the more common species. It should then suffice for the users of this report to know that the less-common species

Table 2. Primary Marine Bird Species of Muscongus Bay.

Group	Species
Loon/Grebe	Common loon
	Horned grebe
Cormorant	Double crested cormorant
	Great cormorant
Wading Birds	Great blue heron
	Snowy egret
	Black-crowned night heron
Waterfowl	Canada goose
	Brant
	Black duck
	Mallard
	Blue-winged teal
	Green-winged teal
	Greater scaup
	Common goldeneye
	Bufflehead
	Old squaw
	Common eider
	Black scoter
	White-winged scoter
	Surf scoter
	Red-breasted merganser
Raptors	Bald eagle
	Osprey
Shorebirds	Semipalmated plover
	Black-bellied plover
	Ruddy turnstone
	Semipalmated sandpiper
	Spotted sandpiper
	Purple sandpiper
	Short-billed dowitcher
	Sanderling
	Greater yellowlegs
	Lesser yellowlegs
	Least sandpiper
	Dunlin
	Northern phalarope
Seabirds	Herring gull
	Great black-backed gull
	Ring-billed gull
	Bonaparte's gull
	Laughing gull
	Black-legged kittiwake

Table 2. Primary Marine Bird Species of Muscongus Bay, cont'd.

Group	Species
Seabirds, cont'd.	Common tern Arctic tern Roseate tern Black guillemot Atlantic puffin Leach's storm petrel Gannet

do occur and could be involved in an oil spill.

The seasonal abundance of marine birds in Muscongus Bay, based on 11 aerial surveys, is illustrated in Figure 2. Population estimates varied seasonally from a low of 6,700 birds in winter to a high of 24,000 in late summer. Two peaks occurred, one during the August-September population maximum and a smaller one during spring migration, peaking in April. The large, late summer peak is caused by 3 things, a molt migration of eiders, a late summer migration of shorebirds, and the regular fall migration of other marine birds.

The seasonal composition of the marine bird population is illustrated in Figure 3. Waterfowl predominate during all seasons.

The search of the islands resulted in 66 being identified as nesting sites for marine birds. A total nesting population of 12,689 pairs was estimated. Fourteen species nested on the islands (Table 3) with eiders, estimated at 6,131 pairs on 37 islands, being the most abundant.

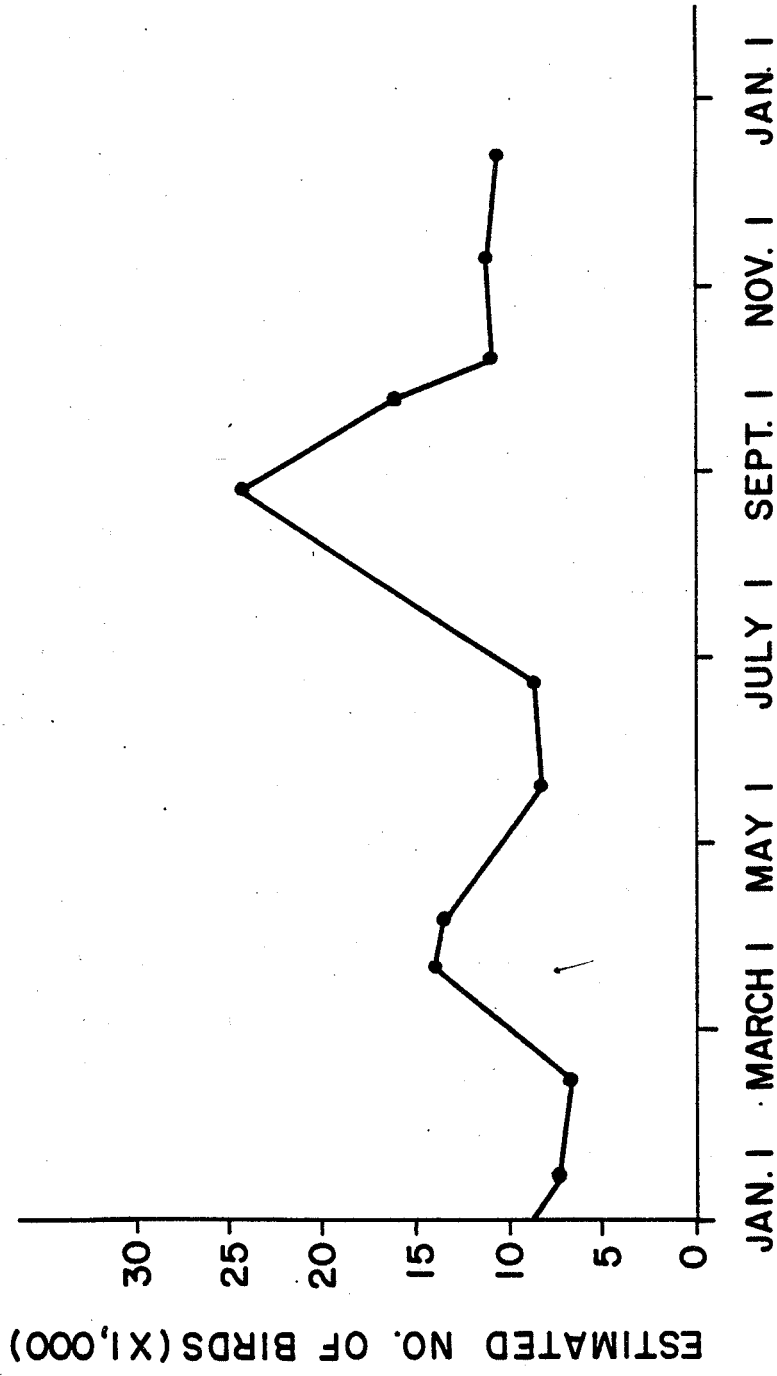


Fig. 2. Observed changes in estimated numbers of marine birds in Muscongus Bay.

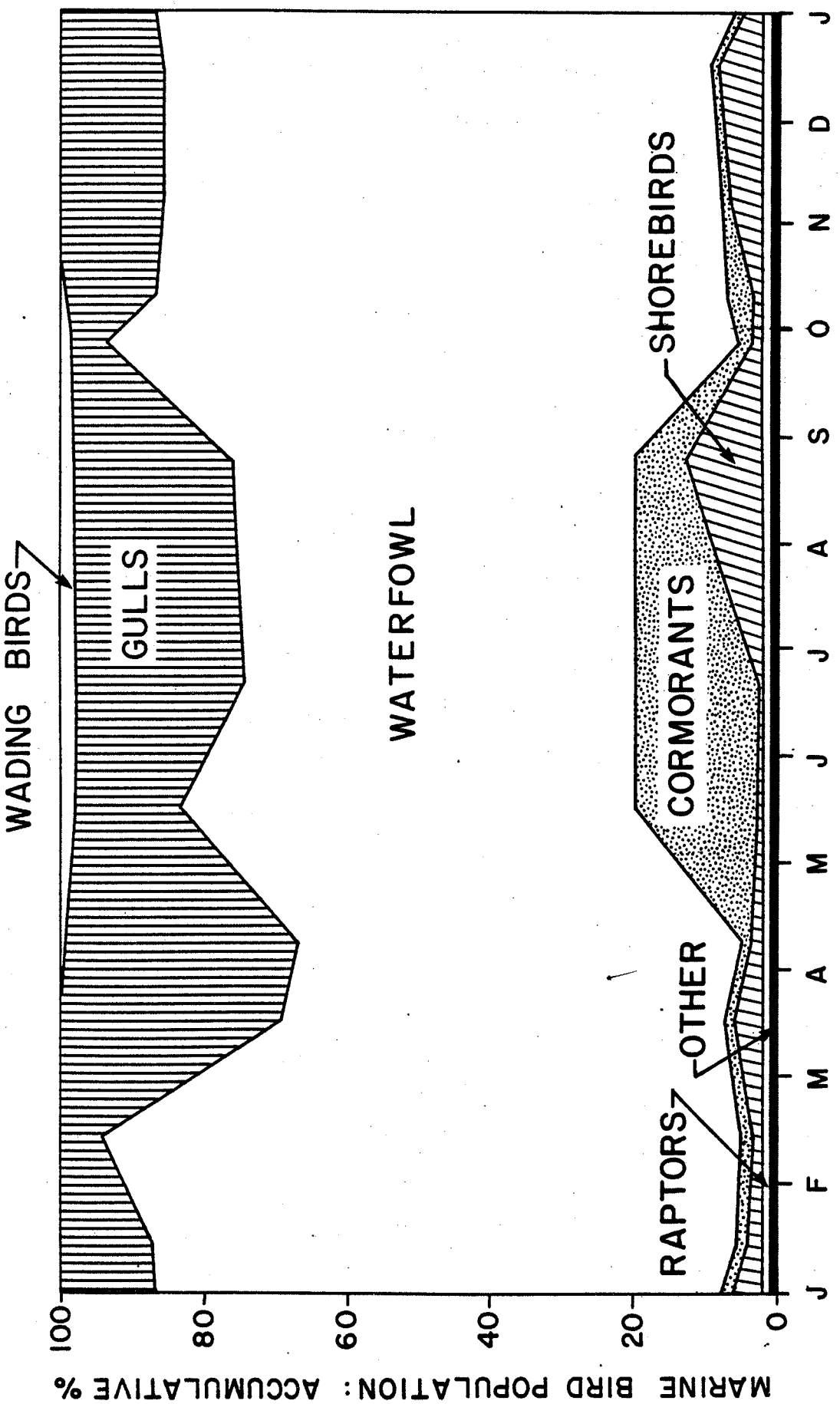


Fig. 3. Seasonal changes in the species composition of Muscongus Bay's marine bird population.

Table 3. Nesting Marine Birds of Muscongus Bay.

Species	Number of Colonies	Est. Number of Nesting Pairs
Common eider	37	6,131
Herring gull	23	1,028
Great black-backed gull	26	556
Laughing gull	2	11
Double-crested cormorant	15	3,138
Arctic tern	2	155
Common tern	4	934
Roseate tern	1	50
Leach's petrel	3	125
Black guillemot	18	315
Atlantic puffin	1	10
Great blue heron	2	188
Black-crowned night heron	1	6
Osprey	-	42
Total		12,689

The information throughout this report must be interpreted with the knowledge that the population estimates, although made by trained biologists, are only estimates and that the absolute values could be significantly different. Trained observers commonly underestimate during aerial surveys by as much as 50 percent. This fact was clearly demonstrated during the nesting season when the aerial inventory estimate was 8,200 birds, while ground inventory of the nesting islands during the same period estimated over 12,000 nesting pairs, meaning a minimum population of 24,000 birds in the study area. Therefore, if the same error holds, a population of 40-50,000 marine birds could be present in Muscongus Bay in August when 24,000 were estimated. It is interesting to note that similar relationships were found during the Casco Bay and Sheepscot Surveys.

Additional caution is required in interpretation since the information in this report is from one year only and therefore gives no measure of the variation to be expected annually. However, recent studies done to verify the information from Casco Bay (Me. Dept. Inland Fisheries & Wildlife unpubl.), indicated that although some variation occurs,a strong pattern of consistency

exists regarding species composition, numbers and areas of use. By understanding the strengths as well as the limitations of this data and by interpreting the information accordingly, the user of this report will find the population estimates to be adequate for the stated objectives.

Areas of Importance. The geographic distribution of marine birds in Muscongus Bay is not random. It is directly related to the distribution of habitat suited to the specific needs of the various species. A major objective of this study was to locate the sites in Muscongus Bay which are used intensively by marine birds. Based on the 11 aerial inventories, 134 such unique locations were identified. The areas were determined by mapping, seasonally, the aerial observations. Results of the island searches were also used. Unique areas were separated and their boundaries defined using 3 criteria: 1) the location of the birds; 2) seasonal use patterns; and 3) physical-geographic features. The 134 concentration areas are mapped and listed in Appendix B and the marine birds found within each area are given by season in Appendix C.

The concentration areas are identified as separate units so that they can be individually addressed in the event of an oil spill or for other, specific management reasons. In total, the 134 areas contain more than 95 percent of the marine birds observed throughout the study, yet represents less than 35 percent of the total study area. The important point is that a large percentage of the resource is found on a small percentage of the study area. Knowledge of this pattern of distribution allows for the efficient allocation of time, manpower and equipment in the event of an oil spill. This approach is further refined and developed in the section entitled Resource Evaluation.

The islands used by the colonial nesting, marine birds hold special interest for 3 reasons; first, because they are such distinct areas of con-

centration; second, because they are used traditionally year to year; and third, because they are the production sites for Maine's breeding marine bird population. Due to this, they warrant full and special consideration in the event of an oil spill. Of the 250 islands and ledges, within the study area, 66 were found to be used by nesting marine birds. Fourteen species were found, with a total, estimated, nesting population of 12,689 pairs (Table 3). Eiders were the most numerous. The puffins, petrels, laughing gulls,3 species of terns and black-crowned night herons are noteworthy. Table 4 lists the nesting colony sites and gives the estimated nesting population for each.

All of the nesting islands fall within 1 of the 134 identified concentration areas. Each colony site is indicated on the appropriate map in Appendix B. The nesting population data, from the island searches, was included with the aerial survey data for analysis in the section entitled Protection Priorities.

Seals

Two species of seals regularly occur on the Maine coast: the harbor seal and the grey seal (Halichoerus grypus). The harbor seal is the most common and the only seal of recent record in Muscongus Bay. It was the only seal found during this study. Little information exists on the behavior, biology or migratory patterns of the harbor seal in the Northeast. The information provided from this study is useful for estimating a minimum population size for the study area and, most importantly, for identifying areas utilized by "hauled-out" seals. Much further work is necessary before a full understanding of the harbor seal in Muscongus Bay is available.

Seals were seen hauled-out on 48 different ledges (Table 5 and maps in Appendix B). For the 82 seal observations recorded in this study, herd size ranged from 1 to 200 and averaged 36. Three of the aerial surveys were

Table 4. Muscongus Bay's Nesting Marine Bird Population, Listed by Nesting Site (1983).

Location		Species	Estimated Number Breeding Pairs
BRISTOL			
65-185	Louds Island	osprey	1
65-186	Thief Island	osprey	1
65-188	Jones Garden Island	herring gull	10
		great black-backed gull	14
		cormorant	135
65-189	Killick Stone Island [1]	common tern	25
		laughing gull	6
		eider	6
65-192	Wreck Island Ledge	herring gull	10
65-194	Wreck Island	osprey	3
		eider	450
		herring gull	150
		great blue heron	20
		black guillemot	2
65-197	Bar Island	eider	2
65-198	Ross Island	eider	300
		herring gull	75
		great black-backed gull	50
		cormorant	932
		black guillemot	4
65-200	Haddock Island	eider	225
		herring gull	75
		great black-backed gull	25
		osprey	2
		great blue heron	14
65-201	Western Egg Rock	cormorant	194
		eider	100
		great black-backed gull	100
65-302	New Harbor Dry Ledge	cormorant	23
		herring gull	14
		great black-backed gull	6
		black guillemot	1
BREMEN			
65-038	Bremen Long Island	osprey	2
------	Marker NE of 65-038	osprey	1
65-154	Oar Island	osprey	1
65-159	Long Island Ledge	eider	2
65-165	Hog Island	osprey	2
65-172	Crotch Island	eider	8
		great black-backed gull	1
65-173	Crotch Island	eider	3
65-179	Jim's Island	eider	5
		osprey	1

Table 4, cont'd.

FRIENDSHIP			
63-701	Harbor Island	eider	500
63-702	Hall Island	eider	10
63-705	Crane Island	eider	300
		osprey	1
		herring gull	12
63-707	Franklin Island[1]	eider	1,300
		osprey	1
		herring gull	100
		black guillemot	2
		black-crowned night heron	6
63-731	Ram Island	osprey	1
63-765	Little Cranberry Is.	osprey	1
63-771	Otter Island	osprey	1
63-774	Long Ledge	cormorant	25
		great black-backed gull	5
ST. GEORGE			
63-540	Slin's Island	osprey	1
63-543	Elwell Island	osprey	1
63-547	Eagle Island	osprey	1
63-546	Clark Island	osprey	2
63-554	Whitehead Island	osprey	1
63-569	High Island	osprey	1
63-578	Gunning Rocks	eider	50
		herring gull	11
		great black-backed gull	15
		cormorant	187
		black guillemot	1
63-579	The Brothers	eider	250
		herring gull	5
		great black-backed gull	5
		black guillemot	1
63-581	The Brothers	eider	250
		herring gull	10
		great black-backed gull	30
63-582	Hay Ledge	eider	150
		cormorant	220
		great black-backed gull	40
63-637	Seal Island	eider	50
		cormorant	1
		herring gull	168
63-640	Yellow Ridge Island	cormorant	134
		herring gull	1
63-791	Caldwell Island	osprey	1
63-792	Goose Rocks	eider	1
63-795	Eagle Island	eider	1
		osprey	1

Table 4, cont'd.

63-797	Teel Island	osprey	3
63-799	Ram Island	eider	1
63-800	Seavey Island	eider	1
63-802	Bar Island	eider	125
		herring gull	30
63-805	McGee Island	osprey	2
63-811	Thompson Island	osprey	1
63-820	Shag Ledge	eider	50
		great black-backed gull	2
		herring gull	5
		black guillemot	4
63-821	Shag Ledge	cormorant	203
		eider	8
		great black-backed gull	10
		black guillemot	4
63-825	Benner Island	osprey	1
63-833	Hart Island	eider	300
		herring gull	45
		great black-backed gull	5
63-836	Gunning Rocks	cormorant	82
		herring gull	3
		great black-backed gull	14
		eider	2
		black guillemot	1
63-839	Old Hump Ledge[1]	eider	10
		great black-backed gull	8
		herring gull	5
		Leach's petrel	4
		black guillemot	1
63-840	Allen Island[1]	osprey	1
63-860	Eastern Egg Rock	puffin	10
		black guillemot	75
		common tern	904
		artic tern	50
		roseate tern	50
		laughing gull	3
		eider	50
		Leach's petrel	100
63-873	Little Egg Rock	cormorant	47
		eider	5
		herring gull	9
		great black-backed gull	3
		black guillemot	35
63-875	Shark Island	eider	35
		great black-backed gull	15
		herring gull	15
		cormorant	365
		black guillemot	10

Table 4, cont'd.

MONHEGAN PLT.[2]			
65-310	Duck Rocks	great black-backed gull	5
65-313	Eastern Duck Rocks	cormorant	20
		eider	25
		great black-backed gull	37
		herring gull	45
		black guillemot	6
65-314	Smuttynose	great black-backed gull	1
65-316	Inner Duck Rocks	eider	25
		great black-backed gull	9
		herring gull	16
		black guillemot	12
SOUTH THOMASTON			
63-371	Comb's Island Ledge	common tern	4
63-409	Eben Island	osprey	1
63-415	Tommy Island	eider	25
		herring gull	40
		great black-backed gull	10
		black guillemot	7
63-420	Garden Island	black guillemot	10
		cormorant	150
		eider	141
		herring gull	29
		great black-backed gull	20
MATINICUS ISLE PLT.			
63-584	Metinic Island	eider	300
		herring gull	250
		great black-backed gull	100
		black guillemot	150
		artic tern	100
		common tern	1
63-585	Metinic Green Island	eider	1,000
		great black-backed gull	20
		cormorant	440
63-588	Hog Island	eider	125
		great black-backed gull	20
		black guillemot	1

1. Data partially from S. Kress, personal communication.

2. Monhegan Plt. islands were not inventoried in 1983. The data is from Korschgen (1979).

Table 5. Seal Haul-out Sites[1]

Area No.	Area Name	Number of Sightings	Maximum No. Seals Seen	Map No.	Maine Islands Reg. No.
1	Webber Dry Ledge	4	180	1	65-199
2	Halftide Ledge	1	8	6	65-203
3	Havener Ledge	1	20	13	65-059
4	Long Island Ledges	2	76	6	65-158
5	Middle Ledges	1	35	6	65-170
6	Cow Island Ledges	5	123	6	65-174
7	Jim's Island	1	26	6	65-177
8	Coomb's Ledge	1	15	6	65-181
9	Indian Island Ledge	1	25	6	65-183
10	Little Cranberry Island	1	1	11	63-770
11	Wreck Island Ledges	1	70	7	65-191
12	Franklin Island Ledge	2	80	11	63-707
13	Little franklin Ledge	5	60	7	63-708
14	Western Egg Rock	3	60	7	65-201
15	Seal Ledges	3	200	18	63-XXX
16	Eastern Duck Rocks	3	75	18	63-313
17	Shark Island Ledge	4	50	10	63-876
18	Little Egg Rock	1	20	10	63-873
19	Old Woman Ledge	2	35	10	63-881
20	Seal Ledges	2	50	10	63-870
21	Old Hump Ledge	1	3	11	63-838
22	Long Ledge	2	25	11	63-774
23	Thompson Island Ledge	1	60	11	63-811
24	Nubbins	2	10	12	63-725
25	Back River Ledge	1	35	13	65-078
26	Pleasant Point Ledge	1	40	15	63-785
27	Gay Island Ledge	1	35	15	63-787
28	Little Caldwell Island	2	40	16	63-793
29	Stone Island Ledge	1	10	16	63-XXX
30	Teel Island Ledge	1	40	16	63-797
31	Hart Island Ledges	2	6	16	63-832
32	Gunning Rocks Shools	2	25	16	63-836
33	Shay Ledges	1	3	16	63-821
34	Hay Ledge	1	80	19	63-582
35	Mosquito Island Ledge	1	90	19	63-577
36	Hart Ledge	1	5	20	63-575
37	Ram Island Ledge	1	10	25	63-544
38	Elwell Ledge	1	8	28	63-416
39	Clark Island Ledge	2	10	25	63-546
40	Whitehead Island Ledge	1	15	25	63-XXX
41	Seavey Ledges	1	2	25	63-556
42	Norton Island Ledges	2	65	25	63-555
43	Wheeler Big Rock	3	60	26	63-583
44	Metinic Island Ledge	1	60	26	63-584
45	Metinic Green Is. Ledge	2	75	26	63-585
46	Hog Island Ledge	1	25	26	63-588
47	Yellow Ridge Is. Ledge	1	12	27	63-640
48	Southeast Breaker	1	25	26	63-XXX

1. Based on 11 aerial surveys and 1 ground survey.

made during low tides when maximum numbers of seals are visible, hauled-out on the intertidal ledges. For the 3 surveys, an average of 890 seals were estimated and an average herd size of 49.4 was calculated (Table 6). The 3, low-tide surveys, accounted for 65% of all sightings (53 of 83) and for 87% of the total number of seals observed in this study.

Six locations were identified as very important haul-out sites for seals in the study area. They are Webber Dry Ledge near New Harbor, Cow Island Ledges in Bremen, Little Franklin Ledge and Shark Island Ledge in the outer bay, and Seal Ledge and Eastern Duck Rock in Monhegan. Together, these 6 sites accounted for nearly half of all the seals observed in this study. Such a high level of use of a relatively small percentage of the available habitat is evidence of strong site preferences and is the basis for the priority rating and impact appraisal scheme developed in the subsequent sections of this report.

Table 6. Estimated Number of Seals from 3, Low-tide, Aerial Surveys.

Flight Number	Date	Estimated No. of Seals
2	November 9	964
7	April 6	1,183
9	June 20	523

RESOURCE EVALUATION

A major objective of this study was to develop an evaluation system for the wildlife resources of Muscongus Bay that would allow the assignment of relative priorities for use in responding to oil spills. Many options are open as to the approach and the criteria for use in setting such priorities. Studies by Bourne (1967) Aldrich (1970) and Joensen and Hansen (1977) stress the significant effects that oil spills can have when they occur coincidental to concentrations of marine wildlife. Therefore, the evaluation system developed in this study is based on the identification of locations used by marine birds and seals and the rating of each area according to the relative number of animals occurring therein. Priorities for action can then be established based on the relative rank of individual areas. The specific judgements and decisions as to exact type of action, and the specific sequence of events to follow in the event of an oil spill, must be made, on-the-spot, by trained biologists, utilizing the information from this report and an on-the-scene appraisal.

Marine Birds. A rating for each season was calculated for each of the 134 areas identified through the aerial inventories. An area's rating was derived by calculating for each species the percentage of its total population (in Muscongus Bay) that was found within that area. The sum of the percentages for all species found in the area for that season is the area's rating. The calculation of the winter rating for Area 73, The Medomack River, is given in Table 7 as an example.

Table 7. Winter Rating for Area 73, The Medomack River.

Species	Estimated Number of Birds[1]		Percent in the Medomack River
	Medomack R.	Muscongus Bay	
Old squaw	46	2,035	2.26
Herring gull	41	2,795	1.47
Goldeneye/bufflehead	580	4,840	11.98
Scaup	6	20	30.00
Black duck	141	1,081	13.04
Merganser	5	65	7.69
Unid. waterfowl	25	89	23.59
Bald eagle	1	2	50.00
		Total percent (rating) =	144.54

1. The estimated numbers of birds are totals from 3 aerial surveys during the winter season.

The totals for both the area and Muscongus Bay are combined sums for the 3 aerial surveys flown in the winter season. The calculated rating of the area's seasonal importance reflects both the number of birds and the species diversity within the area. The rating can be used to compare the importance of the areas, on a relative basis, within each season.

The 134 concentration areas were ordered by their ranking (for each season) and each area was assigned to 1 of 5 priority categories: High; Medium-high; Medium; Medium-low and Low. The areas with the highest ratings were assigned to the "High Priority" category and assignments progressed through the ordered list with the lowest ranking areas in the "Low Priority" group. The division points between categories were selected so that each included approximately 20 percent of the total marine bird population. The higher ranking areas hold their positions due to having relatively large numbers of the various species. This results in the "High Priority" category accounting for a large percentage of the birds in a small percentage of the areas. Conversly, for the lower priorities, a progressively increasing number of areas is necessary to account for an equal number of birds. This is illustrated in Table 8 which gives, seasonally, the percentage of Muscongus Bay's total marine bird population included in the "High" and

"Medium-high" priority areas. The information shows that, on average, one-quarter of all the marine birds in Muscongus Bay can be accounted for on less than 5 percent of the concentration areas. The rule of "diminishing returns" comes into play as each lower priority is considered. Table 9 lists the High Priority Areas by season.

Table 8. Percentages of Muscongus Bay's Marine Bird Population and Concentration Areas Included in the Two Highest Priority Categories, by Season.

	High Priority		Medium-high Priority	
Season	% of Population	% of Areas	% of Population	% of Areas
Winter	19	7	24	10
Spring	23	6	17	6
Nesting	32	4	12	4
Post-nesting	22	2	16	4
Fall	29	4	25	10

The theoretical approach, in the event of an oil spill, would be to initiate action at the highest ranking area, then at the next highest and so-on, progressively, until the lowest ranking area is reached. It is doubtful that an actual spill would affect the entire bay, so not all concentration areas would be involved. In the event of a spill, the first step should be to identify the extent of the potentially effected region. Then, by referring to the maps and keys in Appendixes B and C, concentration areas within that region and their relative ranking and species composition can be determined. Based on those factors, a step-by-step course of action can be planned and implemented.

Table 9. High Priority Marine Bird Areas in Muscongus Bay, Listed by Season.

Season	Area Number	Area Name	Map Number
Spring	14	Medomack River, N.	
	18	Bremen Long Island	
	19	Hog Island	
	30	Wreck Island	
	48	Old Woman Ledge	
	114	St. George River, N.	
	115	Weskeag River	
	125	Metinic Island	
Nesting	30	Wreck Island	
	39	Eastern Egg Rock	
	53	Franklin Island	
	101	The Brothers	
	125	Metinic Island	
	127	Metinic Green Island	
Post-nesting	39	Eastern Egg Rock	
	96	Old Cilley Ledge	
	114	St. George River, N.	
Fall	15	Broad Cove	
	39	Eastern Egg Rock	
	40	Monhegan	
	46	Little Egg Rock	
	73	Medomack River	
	114	St. George River, N.	
Winter	24	Loud's Island, East	
	27	Jones Garden Island	
	34	Harbor Island	
	49	Allen Island	
	54	Long Ledge	
	69	Hungry Island	
	73	Medomack River	
	101	The Brothers	
	114	St. George River, N.	
	115	Weskeag River	

Seals. The general approach to evaluating and ranking the areas used as haul-out sites by seals was similar to that previously described for marine birds. However, due to no definite seasonal patterns of use, the rankings do not change seasonally. Also, the divisions between the 5 priority categories were derived slightly differently. The priorities for haul-out sites were based on both the number of aerial surveys recording seals on an area

as well as the percentage of Muscongus Bay's total seal population recorded there. This modification was done to account for areas used infrequently but by large numbers of seals or for areas used frequently by a few seals.

The haul-out areas are listed by their priority ranking in Table 10 and are mapped in Appendix B. The 3 areas listed as "High" priority accounted for nearly one-third of all the seals observed during this study, clearly proving their ranking. The use of this information, in the event of an oil spill, would be the same as described in the marine bird section.

Table 10. Seal Haul-out Sites Ordered by Priority Ranking.

Priority	Area Number	Area Name	Map Number
High	1	Webber Dry Ledge	1
	13	Little Franklin Ledge	7
	15	Seal Ledges	18
Medium-high	6	Cow Island Ledges	6
	16	Eastern Duck Rocks	18
	17	Shark Island Ledge	10
Medium	12	Franklin Island Ledge	11
	14	Western Egg Rock	7
	19	Old Woman Ledge	10
	20	Seal Ledge	10
	28	Little Coldwell Island	16
	42	Norton Island Ledge	25
	43	Wheeler Big Rock	26
	45	Metinic Green Island Ledge	26
Medium-low	4	Long Island Ledges	6
	5	Middle Ledges	6
	7	Jim's Island	7
	9	Indian Island Ledge	6
	11	Wreck Island Ledge	7
	22	Long Ledge	11
	23	Thompson Island Ledge	11
	24	Nubbins	12
	25	Back River Ledge	13
	26	Pleasant Point Ledge	15
	27	Gay Island Ledge	15
	30	Teel Island Ledge	16
	32	Gunning Rocks Shoals	16
	34	Hay Ledge	19
	35	Mosquito Island Ledge	19
	44	Metinic Island Ledge	26
	46	Hog Island Ledge	26
	48	Southeast Breaker	26
Low	2	Halftide Ledge	6
	3	Havener Ledge	13
	8	Coomb's Ledge	6
	10	Little Cranberry Island	11
	18	Little Egg Rock	10
	21	Old Hump Ledge	11
	29	Stone Island Ledge	16
	31	Hart Island Ledges	16
	33	Shag Ledges	16
	36	Hart Ledge	20
	37	Ram Island Ledge	25
	38	Elwell Ledge	28
	39	Clark Island Ledge	25
	40	Whitehead Island Ledge	25
	41	Seavey Ledges	25
	47	Yellow Ridge Island Ledge	27

RESOURCE IMPACT ASSESSMENT

The third major objective of this study was to establish a workable mechanism for readily assessing and documenting all damages to marine wildlife in Muscongus Bay resulting from an oil spill and to recommend a method of determining the monetary value of the wildlife losses. The state-of-the-art of damage assessment is currently quite rudimentary. There is no complete agreement as to any particular method of choice. The most common and simplest is to keep records of the number of oiled birds found and to assign a dollar value to each. The disadvantage to that approach is that only an unknown portion of the total number of oiled birds is found and that actual damages far surpass that which is exhibited through the acute problem of severely oiled birds.

Using the information on concentration areas that is provided in this study, it is now possible to assess the losses of wildlife habitat as well as to account for the oiled birds. We recommend a 5-step process to assess and document damages. The methodology is as follows:

1) Immediately upon notification of a spill, the estimated number and location of the marine birds and seals is determined via an aerial survey of the potentially effected region. The aerial survey data, plus the mapped and tabulated information from this report serves as a baseline information for immediate mitigation procedures and for eventual damage assessments.
2) Overflights should be conducted periodically throughout the spill period to monitor spill size, location, and movement to document its involvement with the wildlife concentration areas.

3) The monitoring flights should continue through completion of the clean-up operation or through the end of the spill's obvious effects. This is to document the time and spatial extent of the spill's effects. The involvement of the spill with marine bird and seal concentration areas should be documented as fully as possible.

4) As part of the spill monitoring program, the nature of the impacts of the spill on the concentration areas should be determined. This may best be done from the ground or a boat. For each area, information should be recorded as to any contact of the oil with wildlife, any contact of the oil with the substrate of vegetation and the degree of the coating. Records should be maintained as to the species in the area, their total numbers, and the number of birds or seals effected and the extent of their involvement.

5) Based on the information compiled in the previous 4 steps, plus records compiled from wildlife cleaning operations and other sources of data pertaining to the spill, 2 summaries should be compiled: First, a compilation of the wildlife directly effected by the spill; and second, a summary for each wildlife area affected by the spill documenting the nature and extent of the effect. Included for each area should be an estimate of the percent of the area's value to wildlife that was lost due to the spill or clean-up. This should reflect both the acreage affected and the qualitative severity of the loss. An estimate should also be made as to the length of time required for each area to return to its pre-spill value

for wildlife. These estimates are used for determining the monetary value of the losses. All observations should be documented and explicit notes and maps should be kept for each area.

This completes the descriptive assessment of the effects on the marine wildlife resources. The next step is to place a monetary value on the losses. This is usually accomplished by placing a dollar value on each bird or seal. This is difficult, since wild animals carry no true market value. Approximations have been made based on the money spent by hunters to harvest animals. Perhaps a closer value could be determined by the prices paid by zoos, game farms and commercial breeders for their stocks. The U.S.F.& W.S. is developing its Habitat Evaluation Procedures for assigning a dollar value to wildlife resources. This value is determined by calculating the cost of intensive wildlife management on a piece of land needed to compensate for losses occurring on another piece. The Procedures hold promise for assessing damages from oil spills, but until they are refined for use in marine environments, the "Dollar value/bird" method remains. This approach is not perfect, but at present, the best.

A 4-step procedure is recommended for determining the monetary value of losses to the wildlife resources.

1) Using the best and most current information available, assign a dollar value per seal and bird.
2) Based on the assigned dollar value and the number of oiled birds and seals summarized in step 5 of the "assessment procedure", calculate a total value for the known <u>direct losses</u>.

3) Calculate the indirect losses from habitat degradation separately for seals and birds. The calculation is based on the number of concentration areas effected, the percent of the wildlife value lost in each, the length of time of the impact and the percent of Muscongus Bay's marine bird or seal population supported by each area. An example of this procedure follows.

A hypothetical oil spill occurs off New Harbor during the fall season. Figure 2 indicates that approximately 10,000 marine birds are located in Muscongus Bay in the fall. With a hypothetical value of $100.00 assigned per bird, the total marine bird resource is estimated at $1,000,000.00. Step 2 of the "assessment procedure" determines that marine bird areas #2, 3, 5, 6, and 9 were effected to varying degrees (Maps 1 and 2, Appendix B). The percentage of the bay's total population of marine birds supported, in the fall, by each of these 5 areas is given in Table 11 (Table 12 for seals) and is used to determine each area's relative, monetary value based on a total of $1,000,000.00 for the whole bay. This value is then adjusted, if necessary, to reflect the percent of each area's value to wildlife that was lost as determined in step 5 of the assessment procedures. The adjusted values are then summed to arrive at the monetary value of the indirect losses. If 2 or more seasons are involved, a monetary value is calculated for each and totaled. Also, if seal areas are effected, a similar monetary determination is made and combined with the marine bird value to give a

total for indirect losses. This example is illustrated by the following calculations.

Example 1. Monetary Loss from Habitat Degradation from a Hypothetical Oil Spill in Muscongus Bay.

Area	% of Total Resource	$ Value of Area's Resource	% of Area Value Lost To Wildlife	Adjusted $ Value Lost
2	1.7	17,000	100	17,000
3	0.5	5,000	100	5,000
5	0.7	7,000	100	7,000
6	2.1	21,000	50	10,500
9	0.1	1,000	25	250
			Total, indirect monetary loss =	$39,750

4) The direct costs, calculated in step 2, are combined with the indirect costs, determined in step 3, to arrive at an overall monetary value of wildlife losses. This money should be paid to the Maine Department of Inland Fisheries and Wildlife for the purpose of managing the State's marine wildlife resource.

Table 11. Percent of Muscongus Bay's Marine Bird Population Supported, Seasonally, by 134 Concentration Areas.

Area No.	Area Name	Population Percent by Season				
		Fall	Winter	Spring	Nest	Post Breed
1	Pemaquid Neck	2.0	3.0	0.3	0.1	0.2
2	New Harbor Dry Ledges	1.7	1.1	1.3	0.1	0.5
3	Little Island	0.5	0.7	0.0	0.0	0.1
4	New Harbor	0.2	0.8	0.0	0.3	0.0
5	Long Cove	0.7	2.1	0.5	0.0	0.2
6	Haddock Island	2.1	0.9	1.3	1.7	0.3
7	Webber Sunken Ledge	0.2	0.0	0.4	0.7	0.1
8	Webber Dry Ledge	0.0	0.3	0.1	0.0	0.0
9	Bar Island W	0.1	0.6	0.1	0.5	0.0
10	Browns Head	0.4	4.5	0.4	0.0	2.1
11	Louds Island West	0.0	3.2	2.0	0.7	0.0
12	Poland Ledges	0.0	0.9	1.4	0.0	0.0
13	Round Pond	0.2	0.3	0.2	0.0	0.0
14	Medomack River N	0.3	0.0	1.3	0.1	2.6
15	Broad Cove	2.4	1.2	4.9	0.1	2.5
16	Greenland Cove	0.4	1.0	1.5	0.2	0.3
17	Hockomock Channel	0.2	0.8	0.6	0.1	0.1
18	Bremen Long Island	0.3	1.2	5.1	0.6	0.4
19	Hog Island	0.4	0.6	2.2	0.2	0.2
20	Crotch Islands	0.0	0.1	1.0	0.2	0.0
21	Coombs Ledge	0.1	0.2	0.0	0.0	0.0
22	Jims Island	0.1	0.9	1.0	0.1	0.3
23	Cow Island	0.4	0.4	0.5	0.0	0.0
24	Louds Island Fast	0.1	0.3	0.5	0.0	0.1
25	Killick Stone Island	0.1	0.0	0.2	0.2	0.1
26	Thief Island	0.0	0.1	0.2	0.0	0.0
27	Jones Garden Island	0.2	0.4	0.0	1.2	0.3
28	Marsh Island	0.2	1.1	0.2	0.5	0.0
29	Polins Ledges	0.2	0.1	0.8	0.0	0.1
30	Wreck Island	0.4	0.5	1.0	2.9	0.5
31	Wreck Island Ledges	0.6	0.4	0.3	0.2	0.3
32	Ross Island	0.2	1.4	1.2	5.3	0.4
33	Devils Elbow	0.4	0.3	0.0	0.1	0.0
34	Harbor Island	0.1	1.0	2.0	2.0	0.5
35	Crane Island	2.0	1.0	0.5	2.2	0.2
36	Western Egg Rock	3.1	0.6	1.4	5.8	0.3
37	Little Franklin Ledge	0.0	0.4	0.3	0.2	2.6
38	Midway Rocks	0.8	0.1	0.3	0.1	0.0
39	Eastern Egg Rock	4.1	0.8	1.6	4.2	0.3
40	Monhegan Island	14.6	1.0	0.3	0.3	1.1
41	Manana Island	0.4	0.0	0.1	0.8	0.7
42	Inner Duck rock	2.2	0.0	0.0	0.2	0.0
43	Duck Rocks	0.2	0.3	0.4	1.1	0.5
44	Shark Island	4.7	0.6	3.3	3.6	4.5
45	Little Egg Rock Shls.	1.0	0.4	1.2	0.0	0.0
46	Little Egg Rock	2.4	0.7	1.4	0.7	5.6
47	Old Man Ledge	0.0	0.1	0.8	1.3	0.0
48	Old Woman Ledge	6.8	3.9	3.8	0.3	4.8
49	Allen Island	1.2	0.9	0.1	0.2	1.7
50	Seal Ledges	1.1	0.0	0.0	0.0	0.0

Table 11, cont'd.

51	Old Hump Ledge	0.0	0.6	0.4	0.2	1.2
52	Benner Island	0.0	0.0	0.0	0.0	0.0
53	Franklin Island	0.1	0.3	0.6	5.6	0.0
54	Long Ledge	0.2	0.6	0.7	0.6	0.5
55	Thompson Island	0.1	0.6	0.9	0.4	0.1
56	Gangway Ledge	0.4	0.0	0.0	0.0	0.1
57	McGee-Barter Is.	0.0	0.2	0.2	0.2	0.1
58	Two Bush Island	0.0	0.1	0.0	0.3	0.4
59	Cranberry Island	0.1	1.1	1.9	0.1	0.2
60	Otter Island	0.2	0.5	0.3	0.2	0.3
61	Gay Island	0.0	1.2	0.6	0.1	0.1
62	Morse Island	0.5	0.8	1.0	0.4	0.2
63	Gull Rock	0.0	1.6	0.1	0.1	0.1
64	Friendship Long Island	0.1	0.0	0.2	0.0	0.0
65	Ames Cove	0.0	0.2	0.6	0.1	0.2
66	Hatchet Cove	0.4	0.4	0.9	0.1	0.4
67	Friendship	0.1	0.6	0.2	0.2	0.1
68	Meduncook River	1.0	2.9	0.7	0.3	1.5
69	Hungry Island	0.9	1.4	1.0	0.8	0.4
70	Jones Neck	0.2	0.3	0.3	0.0	0.0
71	Back River	0.2	0.7	0.1	0.0	0.1
72	Goose River	0.0	0.0	0.2	0.0	0.0
73	Medomack River	2.0	3.3	4.7	1.1	1.2
74	Maple Juice Cove	1.4	1.6	0.7	0.3	0.8
75	Pleasant Point	0.0	0.6	0.0	0.0	0.0
76	St. George River S.	0.0	0.6	0.0	0.1	0.0
77	Teel Cove	0.2	0.1	0.3	0.0	0.0
78	Davis Cove	0.0	0.0	0.1	0.0	0.1
79	Pleasant Point Gut	0.3	0.3	0.3	0.2	0.1
80	Turkey Cove	0.0	0.2	0.4	0.2	0.2
81	Deep Cove	0.0	0.0	0.1	0.0	0.0
82	Caldwell Island	0.0	0.3	0.1	0.1	0.3
83	Goose Rock	0.2	0.1	0.0	0.0	0.1
84	Stone-Seavey Island	0.0	0.1	0.5	0.1	0.0
85	Teel Island	0.0	0.0	0.1	0.1	0.0
86	Bar Island E	0.1	0.0	0.3	1.4	0.1
87	Hupper Island	0.0	0.2	0.4	0.4	0.1
88	Marshall Point	0.0	0.1	0.2	0.0	0.0
89	Inner Shag Ledge	0.1	0.1	0.1	0.0	0.0
90	Outer Shag Ledge	0.0	0.0	0.2	2.4	0.0
91	Hart Island	0.4	1.0	1.7	2.2	0.0
92	Gunning Rocks	1.1	0.5	1.0	2.2	1.4
93	Black Rock	0.0	0.1	0.1	0.4	0.0
94	Davis Island	0.0	0.1	0.1	0.4	0.0
95	Shag Ledges	0.6	0.1	0.7	1.8	1.3
96	Old Cilley Ledge	2.0	0.7	0.4	0.4	10.0
97	Dry Ledges	0.5	1.6	0.4	0.6	0.1
98	Burnt Island	3.1	3.2	0.9	0.5	2.8
99	Eastern Duck Rocks	1.2	0.0	0.8	1.0	0.4

Table 11, cont'd.

100	Seal Ledges - Monhegan	0.1	0.1	0.0	0.0	0.0
101	The Brothers	0.5	0.3	0.5	4.0	0.1
102	Hay Ledge	1.1	0.3	0.6	1.4	4.0
103	Mosquito Island	0.9	1.4	0.9	0.9	1.0
104	Mosquito Harbor	0.0	0.4	0.4	0.3	1.7
105	Mosquito Head	0.5	0.7	0.5	0.1	0.0
106	Hart Ledge	0.5	1.0	0.5	0.0	0.1
107	Southern Island	0.2	0.7	1.5	0.0	0.0
108	Tenants Harbor	0.3	0.4	0.3	0.1	1.3
109	Northern Island	0.0	0.2	0.0	0.2	0.0
110	Long Cove	0.4	0.7	0.2	0.1	0.2
111	Otis Cove	0.1	0.2	0.0	0.0	0.0
112	Watts Cove	0.3	0.6	1.6	0.5	1.6
113	Broad Cove Cushing	0.4	1.6	0.7	0.2	0.6
114	St. George River N	3.0	7.0	3.3	2.1	11.7
115	Weskeag River	1.5	3.8	1.4	2.7	0.7
116	Wheeler Bay	0.0	1.3	0.5	0.1	1.1
117	Seal Harbor	0.5	0.8	1.1	0.2	2.0
118	Clark Cove	0.2	0.1	0.1	0.0	0.2
119	Eagle Island	0.2	0.0	0.1	0.0	0.0
120	Norton-Whthd.	1.3	1.5	1.3	0.3	0.0
121	High Island	0.0	0.2	0.2	0.2	0.0
122	Seavey Ledges	0.6	0.2	0.1	0.7	0.0
123	Norton Island Ledges	1.0	0.3	0.6	0.5	0.9
124	Wheeler Big Rock	0.2	0.3	0.0	0.6	0.0
125	Metinic Island	1.7	1.7	5.2	9.5	6.2
126	Hog Island Nubble	0.8	0.3	0.4	0.5	3.1
127	Metinic Green Island	2.7	1.8	1.1	5.6	2.9
128	Yellow Ridge Island	0.8	0.6	0.2	1.8	0.0
129	Seal Island	0.2	0.3	0.9	0.8	1.7
130	Elwell Point	0.7	0.8	0.3	0.5	0.6
131	Garden Island	0.5	0.5	0.9	2.0	0.4
132	Green Island Ledge	0.1	0.0	0.1	0.0	0.0
133	Tommy Island	0.6	0.1	1.4	0.5	0.2
134	Eben Island	0.1	0.0	0.2	0.1	0.1

Table 12. Percent of Muscongus Bay's Seal Population Supported by 48 Haul-out Sites.

Area Number	Area Name	Population Percent
1	Webber Dry Ledge	12.4
2	Halftide Ledge	0.3
3	Havener Ledge	0.7
4	Long Island Ledge	2.5
5	Middle Ledges	1.2
6	Cow Island Ledge	6.6
7	Jim's Island	0.9
8	Coombs Ledge	0.5
9	Indian Island Ledge	0.9
10	Little Cranberry Island	0.1
11	Wreck Island Ledges	2.3
12	Franklin Island Ledges	2.8
13	Little Franklin Ledge	6.2
14	Western Egg Rock	3.8
15	Seal Ledges	14.4
16	Eastern Duck Rocks	3.3
17	Shark Island Ledge	4.5
18	Little Egg Rock	0.7
19	Old Woman Ledge	1.8
20	Seal Ledges	2.0
21	Old Hump Ledge	0.1
22	Long Ledge	0.1
23	Thompson Island Ledge	2.0
24	Nubbins	0.5
25	Back River Ledge	1.2
26	Pleasant Point Ledge	1.3
27	Gay Island Ledge	1.2
28	Little Coldwell Island	1.5
29	Stone Island Ledge	0.3
30	Teel Island Ledge	1.3
31	Hart Island Ledges	0.1
32	Gunning Rocks Shoals	0.9
33	Shay Ledge	0.1
34	Hay Ledge	3.2
35	Mosquito Island Ledge	3.0
36	Hart Ledge	0.2
37	Ram Island Ledge	0.3
38	Elwell Ledge	0.3
39	Clark Island Ledge	0.4
40	Whitehead Island Ledge	0.5
41	Seavey Ledge	0.1
42	Norton Island Ledge	2.3
43	Wheeler Big Rock	3.1
44	Metinic Island Ledge	2.0
45	Metinic Green Island Ledge	3.3
46	Hay Island Ledge	0.8
47	Yellow Ridge Island Ledge	0.6
48	Southeast Breaker	0.8

CONCLUSIONS AND RECOMMENDATIONS

The Muscongus Bay region provides a diverse array of marine habitats which support a large and varied community of marine birds and seals. The species composition and abundance varies both seasonally and geographically. This results in a unique aggregation of species.

A total of 134 individual locations were found to be used consistently by the marine birds and seals within the bay. These concentration areas accounted for more than 95% of the wildlife occurring in the area yet comprised only a third of Muscongus Bay's total area. Comprehensive knowledge of their location, or even existence, did not exist prior to this study and exists now for only two other sections of the Maine coast: Casco Bay and Sheepscot Bay. These concentration areas warrant special consideration and management to ensure the perpetuation of the State's wildlife resource. Knowledge of them forms the basis for understanding the resource and responding to it in the event of oil pollution or other threats to the habitats.

These populations are a unique and valuable resource to the people of Maine and management efforts to ensure their presence is justified. The information provided through this study is an initial and important step towards the responsible management of the resource. Similar information is needed for the remainder of the coast. Our specific recommendation is that similar studies be done for other sections of the coast with the goal of completing the entire coast by 1986. Information now exists for the area from Cape Elizabeth to Owls Head and spans the years from 1980 to 1983. Verification surveys have shown that the information from 1980 is still accurate so could be used in concert with data from other regions from later years. The shorter the time span for complete, coastwide coverage, the better, naturally. Areas requiring particular attention are Penobscot Bay, Piscataqua River and Cobscook Bay.

REFERENCES

A. D. Little, Inc. 1976. A systems study of oil pollution abatement and control for Portland inner and outer harbor, Casco Bay, Maine. Maine Dept. Environ. Prot., Augusta, ME. 215pp

Albers, P. H. 1978. The effects of petroleum of different stages of incubation in bird eggs. Bull. Environ. Contam. Toxicol. 19:624-630.

Albers, P. H. and C. S. Szaro. 1978. Effects of no. 2 fuel oil on common eider eggs. Mar. Pollut. Bull. 9"138-139.

Aldrich, J. W. 1970. Review of the problem of birds contaminated by oil and their rehabilitation. U. S. Fish Wildl. Serv., Resour. Publ. 87. 23pp.

Biderman, J. O. and W. H. Drury. 1980. The effects of low levels of oil on aquatic birds. U. S. Fish Wildl. Serv., Biol. Serv. Program FWS/OBS-80/16. 5pp.

Bourne, W. R. P. 1967. The Torrey Canyon disaster. Seabird Bull. 3:4-11.

Bourne, W. R. P. 1968. Oil pollution and bird populations. pp. 99-121 in J. D. Carthy and D. R. Arthur, eds. The biological effects of oil pollution on littoral communities. Suppl. to field studies. Vol 2. Br. Petrol. Ind., London.

Bourne, W. R. P. 1976. Seabirds and pollution. pp. 403-494 in R. Johnston, ed. Marine Pollution. Academic Press, New York.

Cox, G. V. and E. B. Cowell. 1979. Mitigating oil spill damage - ecologically responsible clean-up techniques. pp 121-128 in G. A. Swanson, ed. The Mitigation Symposium. U. S. For. Ser. Gen. Tech. Rep. RM-65. Fort Collins, CO.

Crocker, A. D., J. Cronshaw and W. N. Holmes. 1974. The effects of a crude oil on intestinal absorption in ducklings (Anas platyrhynchos). Environ. Pollut. 7(3):165-177.

Eastin, W. C. and D. J. Hoffman. 1979. Biological effects of petroleum on aquatic birds. pp 561-582 in C. C. Bates, ed. The Proceedings of the conference on assessment of ecological impacts of oil spills. Am. Inst. Biol. Sci., Arlington, VA.

Energy Resource Co., Inc. 1978. An ecological characterization of Maine's coast north and east of Cape Elizabeth. Off. Biol. Serv., U. S. Fish Wildl. Serv., Newton Corner, MA.

Englehardt, F. R. 1979. Petroleum hydrocarbons in Arctic ringed seals, Phoca hispida, following experimental oil exposure. pp 614-629 in C. C. Bates, ed. The proceedings of the conference on assessment od ecological impacts of oil spills. Am. Inst. Biol. Sci., Arlington, VA.

Gilbert, J. R. and J. L. Stein. 1981. Harbor seal populations and marine mammal-fisheries interactions. Annual rept. to NMSF, U. S. Dept. Comm., Woods Hole, MA. 45pp.

Gibbs, J. and S. Woodward. 1984. Breeding colonies of great blue herons on Maine coastal islands. Report to: The Nature Conservancy, Brunswick, ME. 36pp.

Hartung, R. 1963. Ingestion of oil by waterfowl. Papers of Mich. Acad. Sci., Arts and Letters. 48:49-55.

Hartung, R. w965. Some effects of oiling on reproduction of ducks. J. Wildl. Manage. 29(4):872-874.

Hartung, R. and G. S. Hunt. 1966. Toxicity of some oils to waterfowl. J. Wildl. Manage. 30(3):564-570.

Hoffman, D. J. 1978. Embryotoxic effects of crude oil in mallard ducks and chicks. Toxicol. and Appl. Pharmacol. 46:183-190.

Hoffman, D. J. 1979. Embryotoxic and teratogenic effects of crude oil on mallard embryos on day one of development. Bull. Environ. Contam. Toxicol. 22:632-637.

Hutchinson, A. E. 1977. An appraisal of the fisheries and wildlife resources of the Knox County Coastal Planning Unit. Report to: Me. State Planning Office, Augusta. 21pp.

Hutchinson, A. E. and R. C. Ferrero. 1981. An assessment of the impacts of oil pollution on the marine wildlife of Casco Bay, Maine. ME Dept. of Env. Prot., Augusta, ME. 163pp.

Hutchinson, A. E. and S. J. Lovett. 1983. Marine Wildlife Inventory of Sheepscot Bay, Maine. Dept. Inland Fisheries & Wildlife, Augusta, ME. 147pp.

Joensen, A. H. and E. B. Hansen. 1977. Oil pollution and seabirds in Denmark. Danish Rev. Game Biol. 10(5):1-31.

Katona, H. E.Winn, and W. W. Steiner. 1977. Marine mammals. Pages XIV-1 to 169 in Center for Natural Areas., A Summary of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras. Bureau of Land Management, New York.

Korschgen, C. E. 1979. Coastal waterbird colonies:Maine. U. S. Fish Wildl. Ser., Biol. Ser. Prog., FWS/OBS-79/09. 83pp.

Leighton, F. A., D. B. Peakall and R. G. Butler. 1983. Heinz-body hemolytic anemia from ingestion of crude oil: a primary toxic effect in marine birds. Science 220:871-873.

Maine Dept. Environ. Protect. 1979. Statewide oil spill statistical report for 1979. Me. Dept. Environ, Protect. Unpubl. Report. Augusta, ME. 22pp.

Miller, D. S., D. B. Peakall and W. B. Kinter. 1978. Ingestion of crude oil:sublethal effects in herring gull chicks. Science 199:315-317.

Ohlendorf, H. M., R. W. Riseborough and K. Vermeer. 1978. Exposure of marine birds to environmental pollutants. U. S. Fish Wildl. Ser. Wildl. Res. Rep. 9. 40pp.

Packard, C. M. 1960. Check list and calendar graph. pp 58-67 in O. S. Pettingill ed. Enjoying Maine birds. Maine Aud. Soc., Falmouth, ME.

Palmer, R. S. 1949. Maine Birds. Bull. Mus. Comp. Zool., Harvard, Vol. 102. Cambridge, MA. 656pp.

Peakall, D. B., D. Hallet, D. S. Miller, R. G. Butler and W. B. Kinter. 1980. Effects if ingested crude oil on black guillemots: a combined field and laboratory study. AMBIO 9(1):28-30.

Pierson, E. C. and J. E. Pierson. 1981. A birder's guide to the coast of Maine. Down East Books, Camden, ME. 224pp.

Richardson, D. T. 1973. Feeding habits and population studies of Maine's harbor and gray seals. Unpubl. rept. on file, Dept. of Marine Resources, Augusta, ME. 44pp.

Richardson, D. T. 1975. Assessment of harbor and gray seal populations in Maine. Unpubl. rept. on file, Dept. Marine Resources, Augusta, ME. 48pp.

Shelford, V. E. 1963. The ecology of North America. University of Illinois Press, Urbana. 610pp.

Smith, T. -. and J. R. Geraci. 1975. The effect of contact and ingestion of crude oil on ringed-seals of the Beaufort Sea. Beaufort Sea Proj. Tech. Rept. No. 5. 67pp.

Spencer, H. E., P. O. Corr and A. E. Hutchinson. 1982. 1979-80 Migratory bird project report. Me. Dept. Inland Fish. Wildl., Wildl. Div. Leaflet Series 12(1):28pp. Augusta.

Spencer, H. E. and A. E. Hutchinson. 1974. An appraisal of the fisheries and wildlife resources of the Lincoln County Coastal Planning Unit. Report to: Me. State Planning Office, Augusta. 25pp.

Stickel, L. F. and M. P. Dieter. 1979. Ecological and physiological/toxicological effects of petroleum on aquatic birds. U. S. Fish Wildl. Ser., Biol. Ser. Prog., FWS/OBS-79/23. 14pp.

Szaro, R. C. and P. H. Albers. 1978. Petroleum:effects on mallard egg hatchability. J. Wildl. Manage. 42(2):404-406.

TRIGOM-PARC. 1974. A socio-economic and environmental inventory of the North Atlantic region, Vol. 1, Book 4. Rept. on file, Bur. Land Manage. New York City.

Tyler, H. R. 1977. Wading birds in Maine and their relevance to the Critical Areas Program. Unpubl. rept. on file, State Planning Office, Augusta, ME. 52pp.

U. S. Fish and Wildlife Service. 1980. An ecological characterization of coastal Maine (S.I. Fefer and P. A. Shettif ed.). U. S. Fish Wildl. Ser., Biol. Ser. Prog., FWS/OBS-80/29.

Vickery, P. D. 1978a. Annotated checklist of Maine birds. Unpubl. rept. on file, P. D. Vickery, Lincoln Center, ME.

Vickery, P. D. 1978b. Northeast-Maritime region. Am. Birds 32(2):174-480.

Appendix A

Common and scientific names of the marine birds of Muscongus Bay[1]

[1]List from P. Adamus. (See page of text)

Appendix A. Marine Birds of Muscongus Bay.

Common Name	Scientific Name
Common loon	Gavia immer
Red-throated loon	Gavia stellata
Pied-billed grebe	Podilymbus podiceps
Red-necked grebe	Podiceps grisegena
Horned grebe	Podiceps auritus
Northern fulmar	Fulmarus glacialis
Greater shearwater	Puffinus gravis
Sooty shearwater	Puffinus griseus
Cary's shearwater	Puffinus diomedea
Manx shearwater	Puffinus Puffinus
Leach's storm petrel	Oceanodroma leucorhoa
Wilson's storm petrel	Oceanites oceanicus
Gannet	Morus bassanus
Great cormorant	Phalacrocorax carbo
Double-crested cormorant	Phalacrocorax auritus
Great blue heron	Ardea herodias
Green heron	Butorides striatus
Little blue heron	Florida caerulea
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Cattle egret	Bubulcus ibis
Louisiana heron	Hydranassa tricolor
Yellow-crowned night heron	Nyctanassa violacea
Black-crowned night heron	Nycticorax nycticorax
Glossy ibis	Plegadis falcinellus
Canada goose	Branta canadensis
Brant	Branta bernicla brota
Snow goose	Chen caerulescens
Black duck	Anas rubripes
Mallard	Anas p. platyrhynchos
Blue-winged teal	Anas discors
Green-winged teal	Anas crecca carolinensis
Gadwall	Anas strepera
Pintail	Anas acuta
American wigeon	Anas americana
Ring-necked duck	Aythya collaris
Lesser scaup	Aythya affinis
Greater scaup	Aythya marila
Common goldeneye	Bucephala clangula
Barrow's goldeneye	Bucephala islandica
Bufflehead	Bucephala albeola
Old squaw	Clangula hyemalis
Harlequin	Histrionicus histrionicus
Common eider	Somateria mallissima
King eider	Somateria spectabilis
White-winged scoter	Melanitta deglandi
Surf scoter	Melanitta perspecillata

Appendix A. Marine Birds of Muscongus Bay (continued).

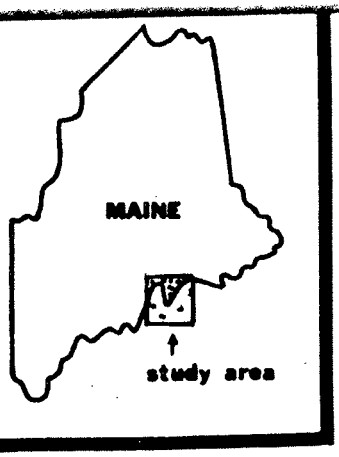
Common Name	Scientific Name
Black scoter	*Melanitta nigra*
Red-breasted merganser	*Mergus serrator*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*
Bald eagle	*Haliaeetus leucocephalus*
Osprey	*Panolion haliaetus*
Semipalmated plover	*Charadrius semipalmatus*
American oystercatoler	*Haematopus palliatus*
Piping plover	*Charadrius melodus*
Lesser golden plover	*Pluvialis dominica*
Black-bellied plover	*Pluvialis squatarola*
Ruddy turnstone	*Arenaria interpres*
Long-billed curlew	*Numeninus americanus*
Whimbrel	*Numenius phaeopus*
Spotted sandpiper	*Actitis macularia*
Solitary sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Greater yellowlegs	*Tringa melanoleucus*
Lesser yellowlegs	*Tringa flavipes*
Red knot	*Calidris canutus*
Purple sandpiper	*Calidris maritima*
Bairdis sandpiper	*Calidris bairdii*
Pectoral sandpiper	*Calidris melanotos*
White-rumped sandpiper	*Calidris fuscicollis*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Dunlin	*Calidris alpina*
Common snipe	*Capella gallinago*
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Stilt sandpiper	*Micropalama himantopus*
Semipalmated sandpiper	*Calidris pusillus*
Marbled godwit	*Limosa fedoa*
Hudsonian godwit	*Limosa haemastica*
Sanderling	*Calidris alba*
Red phalarope	*Phalaropus fulicarius*
Northern phalarope	*Lobipes lobatus*
Wilson's phalarope	*Steganopus tricolor*
Pomarine jaeger	*Stercorarius pomarinus*
Parasitic jaeger	*Stercorarius parasiticus*
Slua	*Catharacta skus*
Glaucous gull	*Larus hyperboreus*
Iceland gull	*Larus glaucoides*
Great black-backed gull	*Larus marinus*
Herring gull	*Larus argentatus*
Ring-billed gull	*Larus delawarensis*

Appendix A. Marine Birds of Muscongus Bay (continued).

Common Name	Scientific Name
Black-headed gull	*Larus ridibundus*
Laughling gull	*Larus atricilla*
Bonaparte's gull	*Larus philadelphia*
Little gull	*Larus minutus*
Black-legged kittiwake	*Rissa tridactyla*
Common tern	*Sterna hirunda*
Arctic tern	*Sterna paradisaea*
Roseate tern	*Sterna dougallii*
Caspian tern	*Sterna caspia*
Razorbill	*Alca torda*
Common murre	*Uria aalge*
Thick-billed murre	*Uria lomvia*
Dovekie	*Palutus alle*
Black guillemot	*Cepphus grylle*
Common puffin	*Fratercula artica*
Kingfisher	*Megaceryle alcyon*
Raven	*Corvus corax*
Crow	*Corvus branchyrynchos*
Sharp-tailed sparrow	*Ammospiza maritima*

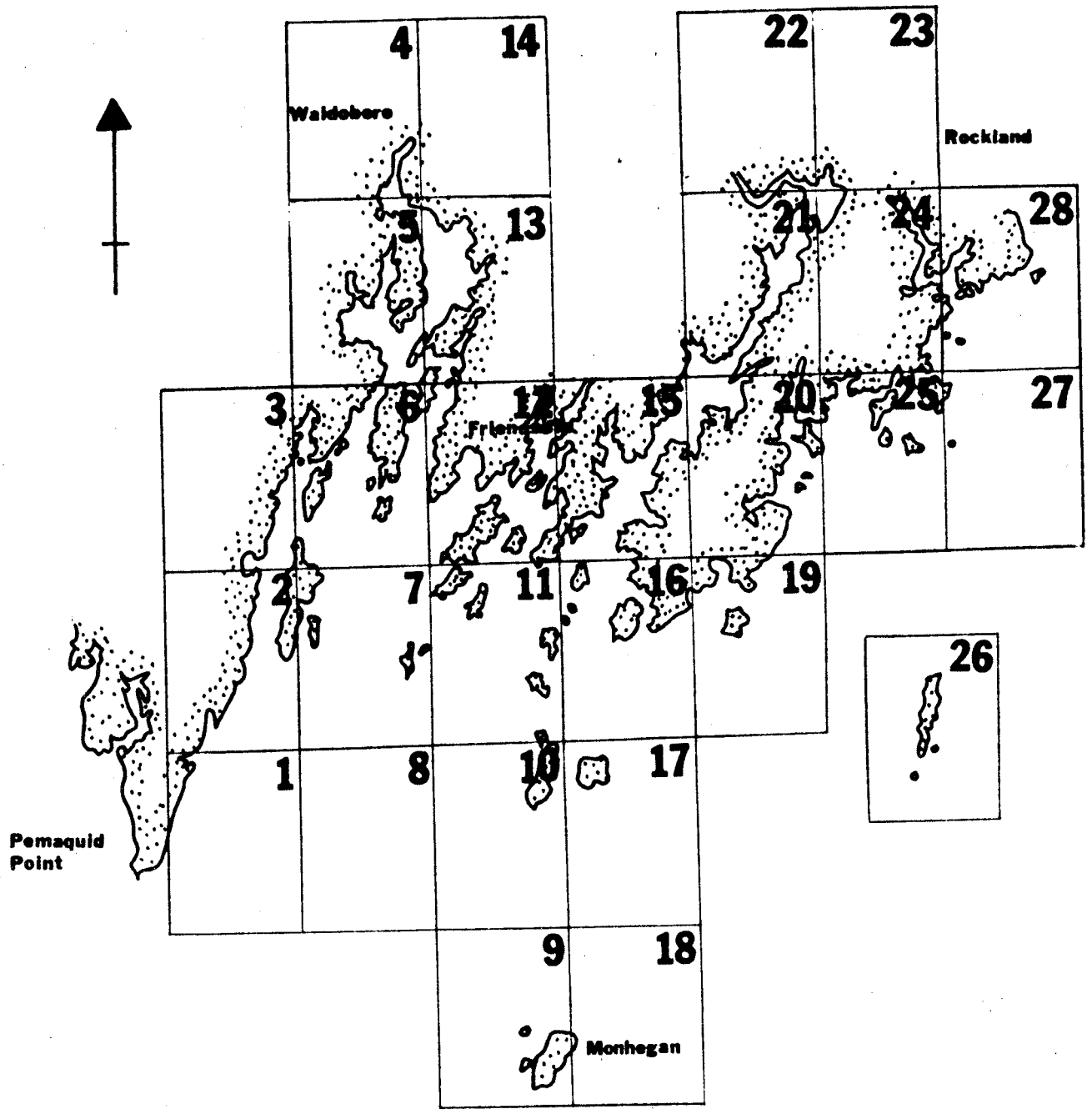
Appendix B

Maps and keys to seasonal rankings for marine bird and seal concentration areas.



MUSCONGUS BAY MARINE WILDLIFE SURVEY

KEY TO MAPS



LEGEND

MAP SYMBOLS:


Area of concentrated use by marine birds and/or seals

Marine bird area

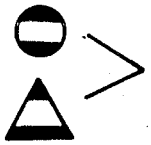
Seal area

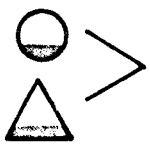
Marine bird nesting colony


Heron nesting colony


Osprey nest site

Ledges used as haul-out areas by seals


Areas of highest use by marine birds or seals (refer to appropriate map description table for seasonal rating)


Areas of medium-high use by marine birds or seals

DEFINITION OF SEASONS:

Spring	February 16 - April 30
Nesting	May 1 - June 30
Post-nesting	July 1 - August 31
Fall	September 1 - November 30
Winter	December 1 - February 15

AREA PRIORITY RATINGS BY SEASON

Key to Map 1

Marine Birds

1 Pemaquid Neck

Fall	Med-Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

2 New Harbor Dry Ledges

Fall	Medium
Winter	Med-Low
Spring	Med-Low
Nesting	Low
Post nesting	Med-Low

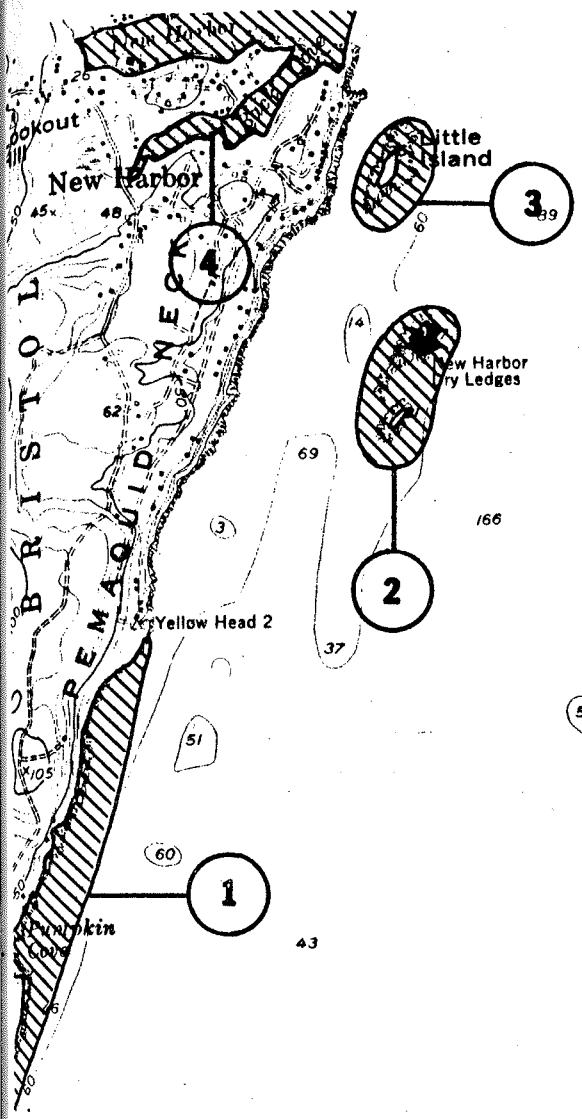
3 Little Island

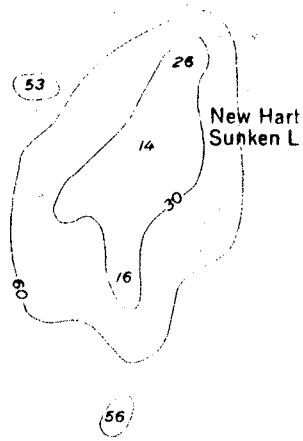
Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

4 New Harbor

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

MAP 1


New Harbor
Little Island
New Harbor Ledges
Yellow Head 2
Pumpkin Cove
BRISTOL CHANNEL
PEMAQUID
3
4
2
1


MUSCO
New Hart
Sunken L

AREA PRIORITY RATINGS BY SEASON

Key to Map 2

Marine Birds

4 New Harbor

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

5 Long Cove

Fall	Med-Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Low

6 Haddock Island

Fall	Medium
Winter	Med-Low
Spring	Med-Low
Nesting	Medium
Post nesting	Low

7 Webber Sunken Ledge

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

8 Webber Dry Ledge

Fall	Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Low

9 Bar Island W.

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

10 Browns Head

Fall	Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Low

11 Louds Island West

Fall	Low
Winter	Medium
Spring	Medium
Nesting	Low
Post nesting	Low

12 Poland Ledges

Fall	Low
Winter	Low
Spring	MED-HIGH
Nesting	Low
Post nesting	Low

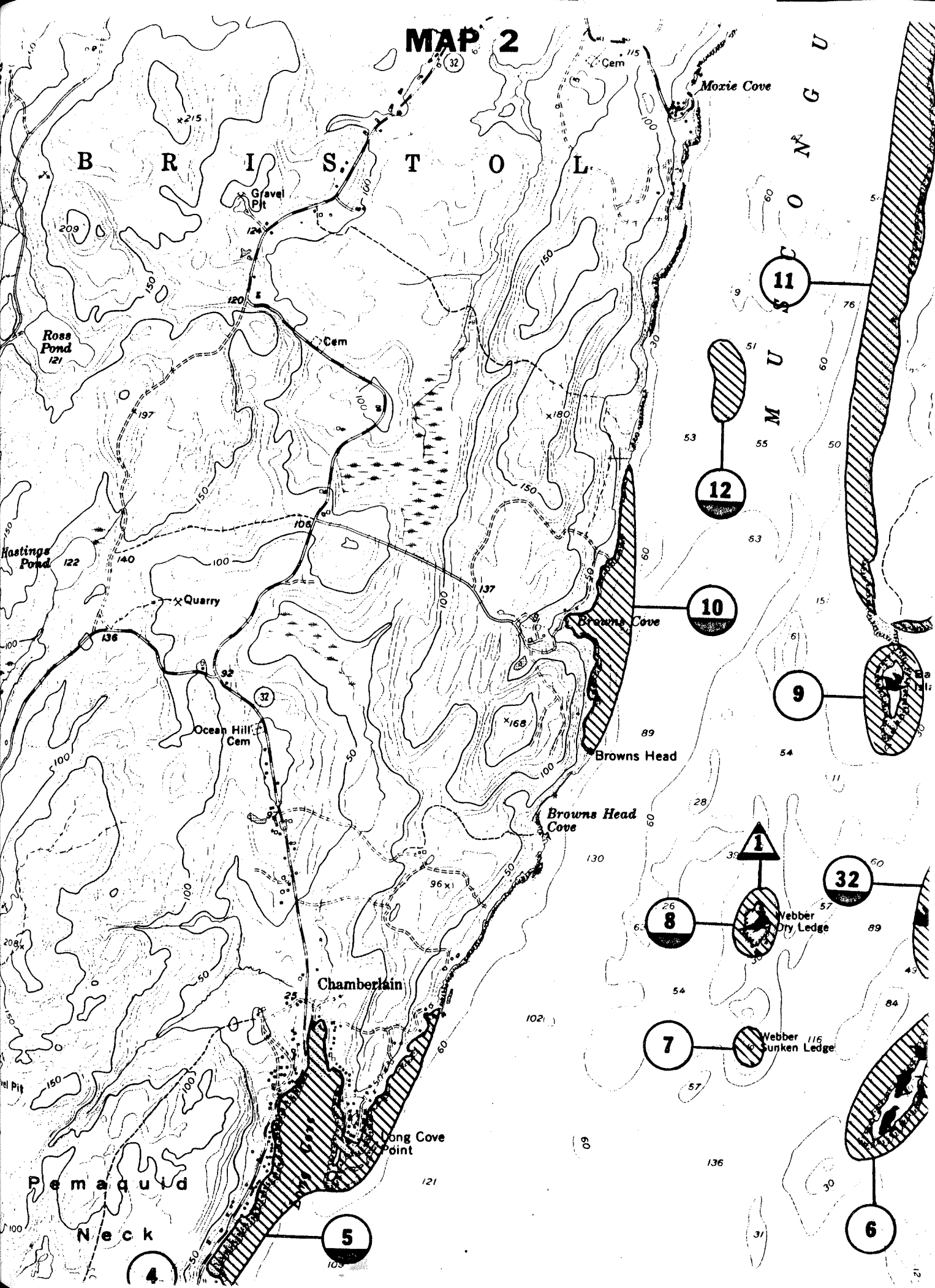
32 Ross Island

Fall	Low
Winter	Low
Spring	Medium
Nesting	MED-HIGH
Post nesting	Low

Seals

1 Webber Dry Ledge

All Seasons HIGH


MAP 2
B R I S T O L
M O N H E G A N
Moxie Cove
Gravel Pit
Ross Pond
Cem
Hastings Pond
Quarry
Ocean Hill Cem
Browns Cove
Browns Head
Browns Head Cove
Webber Dry Ledge
Webber Sunken Ledge
Chamberlain
Long Cove Point
Pemaquid Neck
11
12
10
9
1
32
8
7
6
5
4

AREA PRIORITY RATINGS BY SEASON

Key to Map 3

Marine Birds

11 Louds Island West

Fall	Low
Winter	Medium
Spring	Medium
Nesting	Low
Post nesting	Low

13 Round Pond

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

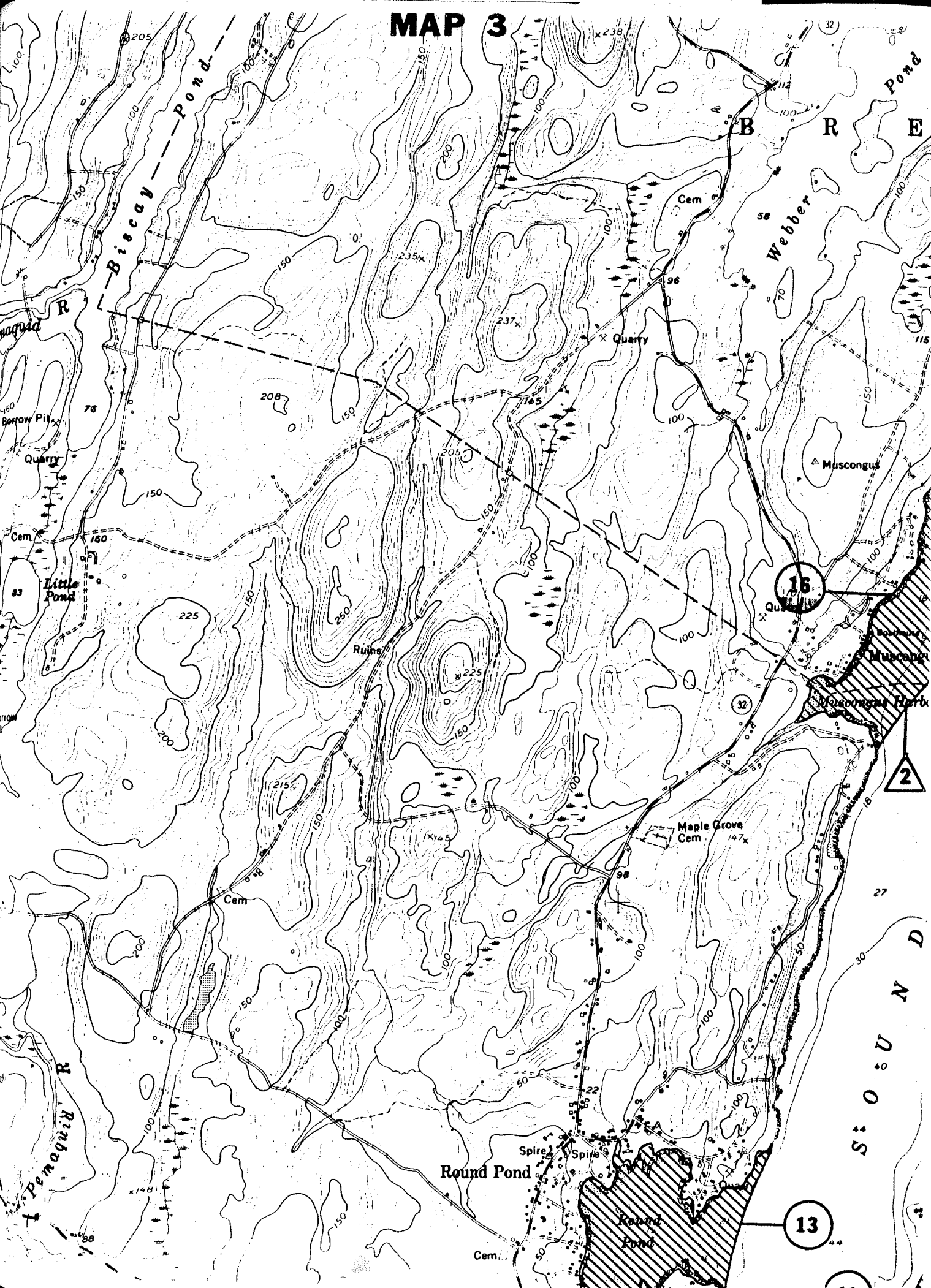
16 Greenland Cove

Fall	Med-Low
Winter	Medium
Spring	MED-HIGH
Nesting	Medium
Post nesting	Low

Seals

2 Halftide Ledge

All Seasons	Low


MAP 3
Biscay Pond
Webber Pond
Quarry
Borrow Pit
Cem
Little Pond
Ruins
Muscongus
Maple Grove Cem
Round Pond
Spire
Spire
Cem
Round Pond
16
2
13
SOUND

AREA PRIORITY RATINGS BY SEASON

Key to Map 4

Marine Birds

14 Medomack River N.

Fall	Med-Low
Winter	Low
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

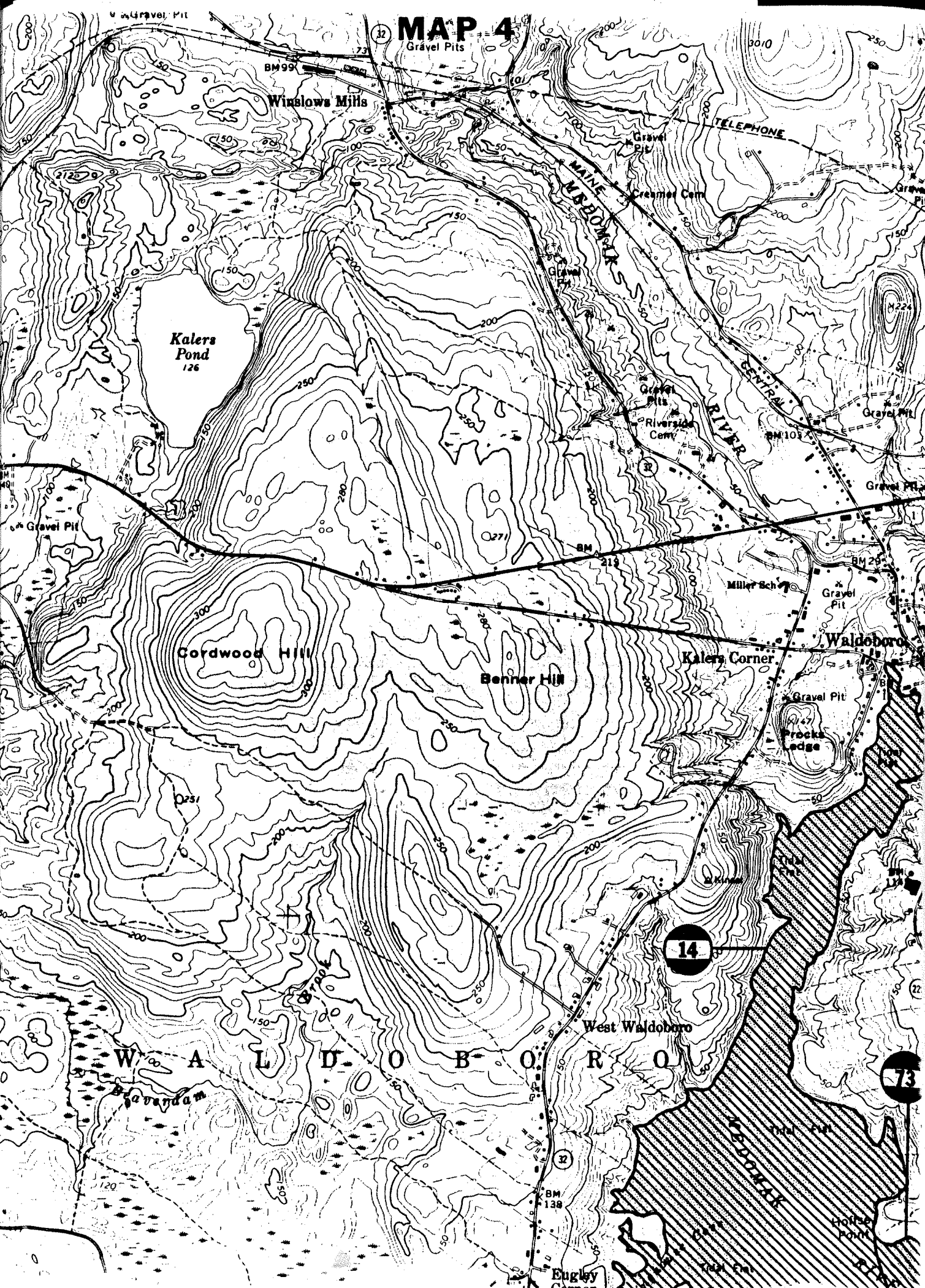
73 Medomack River

Fall	HIGH
Winter	HIGH
Spring	MED-HIGH
Nesting	HIGH
Post nesting	HIGH

Seals

3 Havener Ledge

All Seasons	Low


MAP 4
Gravel Pits
Winslows Mills
BM99
TELEPHONE
MAINE
MEDOMAK
Creamer Cem
Gravel Pit
Kalers Pond
126
CENTRAL
RIVER
Riverside Cem
BM 105
Gravel Pits
Gravel Pit
BM 219
Miller Sch
BM 29
Waldoboro
Kalers Corner
Cordwood Hill
Benner Hill
Gravel Pit
Procks Ledge
Tidal Flat
Tidal Flat
14
West Waldoboro
W A L D O B O R O
Bavendam
Brook
BM 138
MEDOMAK
Tidal Flat
Tidal Flat
Hollse Point
Eugley
73

AREA PRIORITY RATINGS BY SEASON

Key to Map 5

Marine Birds

15 Broad Cove

Fall	HIGH
Winter	Medium
Spring	MED-HIGH
Nesting	HIGH
Post nesting	HIGH

17 Hockomock Channel

Fall	Low
Winter	MED-HIGH
Spring	Medium
Nesting	Low
Post nesting	Low

18 Bremen Long Island

Fall	Med-Low
Winter	Med-Low
Spring	HIGH
Nesting	Med-Low
Post nesting	Low

69 Hungry Island

Fall	MED-HIGH
Winter	HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

70 Jones Neck

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

73 Medomack River

Fall	HIGH
Winter	HIGH
Spring	MED-HIGH
Nesting	HIGH
Post nesting	HIGH

Seals

3 Havener Ledge
All Seasons — Low

4 Long Island Ledge
All Seasons — Med-Low

MAP 5

Gross Pd
Dutch Neck
Neck
Cem
St Pauls Chapel
Tidal Flat
Gross Neck
Gravel Pit
Broad Cove
Bremen Sch
Turners Corner
B R E M E N
Broad Cove
Johnson Island
Havener Point
The Narrows
Tidal Flat
Heath Point
Hardy Island
HEATH ROAD
Johnston Hill
Lookout Tower
Townhall
Hillside Cem
Evergreen Cem
Keene Neck
mock Channel
73
3
15
17
70
4
69
32

AREA PRIORITY RATINGS BY SEASON

Key to Map 6

Marine Birds

11 Louds Island West

Fall	Low
Winter	Medium
Spring	Medium
Nesting	Low
Post nesting	Low

16 Greenland Cove

Fall	Med-Low
Winter	Medium
Spring	MED-HIGH
Nesting	Medium
Post nesting	Low

17 Hockomock Channel

Fall	Low
Winter	MED-HIGH
Spring	Medium
Nesting	Low
Post nesting	Low

18 Bremen Long Island

Fall	Med-Low
Winter	Med-Low
Spring	HIGH
Nesting	Med-Low
Post nesting	Low

19 Hog Island

Fall	MED-HIGH
Winter	Medium
Spring	HIGH
Nesting	Med-Low
Post nesting	Low

20 Crotch Islands

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

21 Coombs Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

22 Jims Island

Fall	Med-Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

23 Cow Island

Fall	Medium
Winter	MED-HIGH
Spring	Medium
Nesting	Low
Post nesting	Med-Low

24 Louds Island East

Fall	Low
Winter	HIGH
Spring	Medium
Nesting	Low
Post nesting	Low

69 Hungry Island

Fall	MED-HIGH
Winter	HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

Seals

2 Halftide Ledge
All Seasons — Low

4 Long Island Ledge
All Seasons — Med-Low

5 Middle Ledges
All Seasons — Med-Low

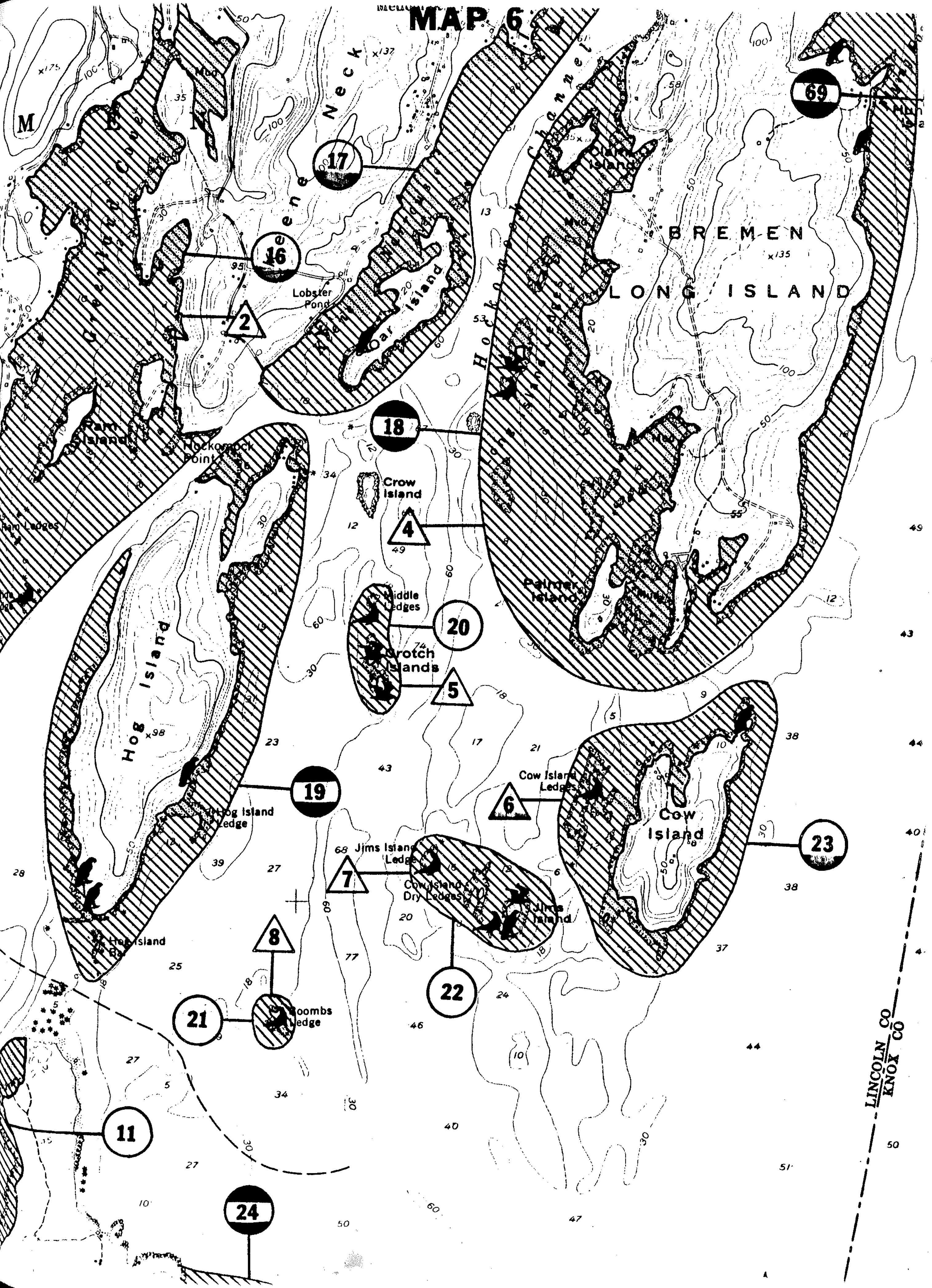
6 Cow Island Ledges
All Seasons — MED-HIGH

7 Jims Island
All Seasons — Med-Low

8 Coombs Ledge
All Seasons — Low

9 Indian Island Ledge
All Seasons — Med-Low

MAP 6



Neck
Lobster Pond
Oar Island
Hockomock Channel
BREMEN
LONG ISLAND
Ram Island
Hockomock Point
Ram Ledges
Crow Island
Palmer Island
Middle Ledges
Crotch Islands
Hog Island
Hog Island Ledge
Hog Island Bar
Cow Island Ledges
Cow Island
Jims Island Ledge
Cow Island Dry Ledges
Jims Island
Coombs Ledge
LINCOLN CO
KNOX CO

AREA PRIORITY RATINGS BY SEASON

Key to Map 7

Marine Birds

6 Haddock Island

Fall	Medium
Winter	Med-Low
Spring	Med-Low
Nesting	Medium
Post nesting	Low

24 Louds Island East

Fall	Low
Winter	HIGH
Spring	Medium
Nesting	Low
Post nesting	Low

25 Killick Stone Island

Fall	Low
Winter	Low
Spring	Low
Nesting	MED-HIGH
Post nesting	Low

26 Thief Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

27 Jones Garden Island

Fall	Medium
Winter	HIGH
Spring	Low
Nesting	Med-Low
Post nesting	Low

28 Marsh Island

Fall	Low
Winter	Medium
Spring	Low
Nesting	Low
Post nesting	Low

29 Polins Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

30 Wreck Island

Fall	Low
Winter	Med-Low
Spring	HIGH
Nesting	MED-HIGH
Post nesting	Medium

31 Wreck Island Ledges

Fall	Medium
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

32 Ross Island

Fall	Low
Winter	Low
Spring	Medium
Nesting	MED-HIGH
Post nesting	Low

33 Devils Elbow

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

34 Harbor Island

Fall	Low
Winter	HIGH
Spring	Med-Low
Nesting	Med-Low
Post nesting	Medium

35 Crane Island

Fall	Med-Low
Winter	Medium
Spring	Low
Nesting	Medium
Post nesting	Low

36 Western Egg Rock

Fall	MED-HIGH
Winter	Low
Spring	MED-HIGH
Nesting	MED-HIGH
Post nesting	Low

37 Little Franklin Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Med-Low

53 Franklin Island

Fall	Low
Winter	Low
Spring	Low
Nesting	HIGH
Post nesting	Low

59 Cranberry Island

Fall	Low
Winter	Medium
Spring	MED-HIGH
Nesting	Low
Post nesting	Low

Seals

9 Indian Island Ledge
All Seasons Med-Low

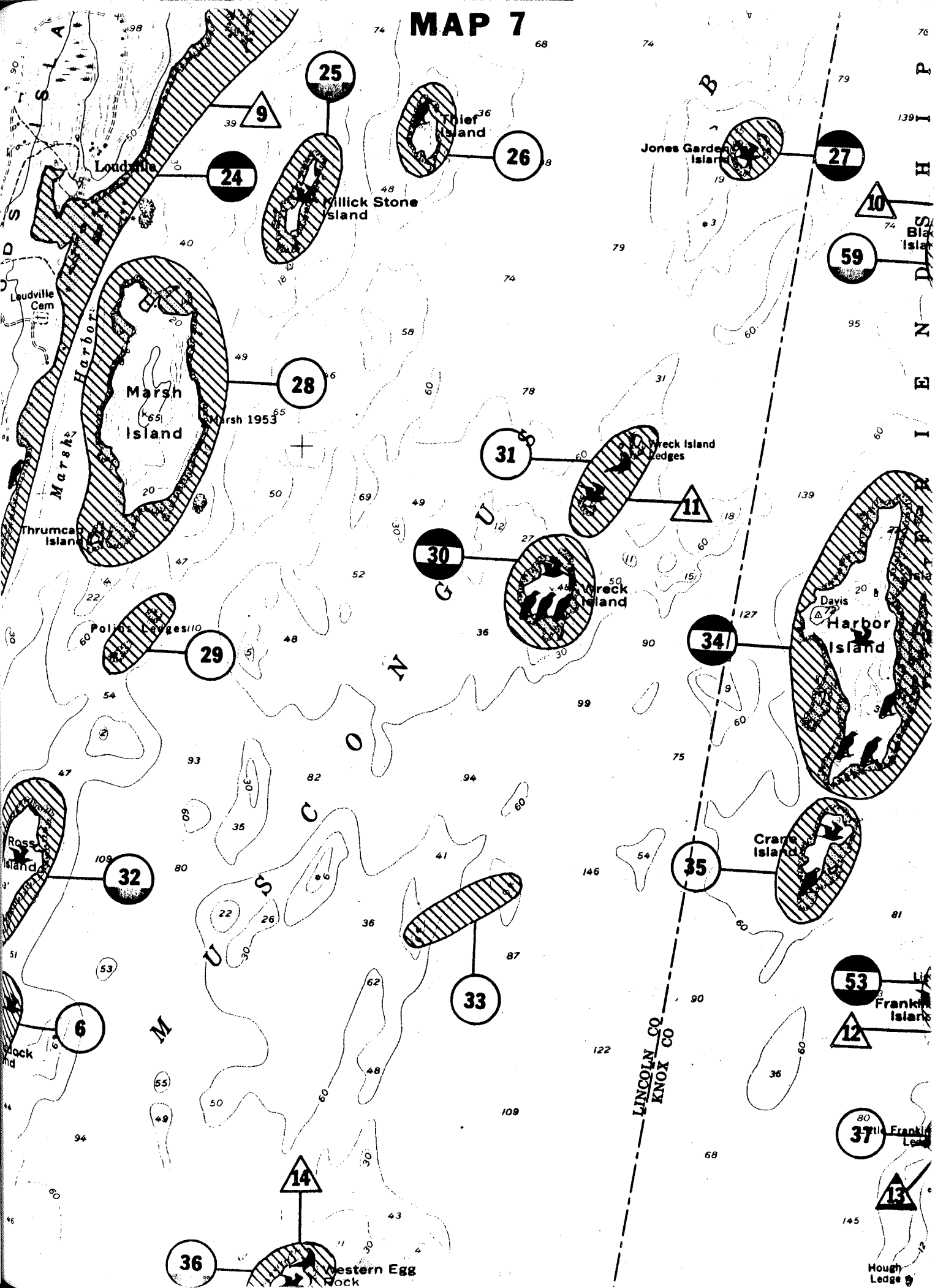
10 Little Cranberry Island
All Seasons Low

11 Wreck Island Ledges
All Seasons Med-Low

12 Franklin Island Ledge
All Seasons Medium

13 Little Franklin Ledge
All Seasons HIGH

14 Western Egg Rock
All Seasons Medium


MAP 7
Loudville
Killick Stone Island
Thief Island
Jones Garden Island
Loudville Cem
Harbor
Marsh Island
Marsh 1953
Marsh
Thrumcap Island
Wreck Island Ledges
Wreck Island
Polins Ledges
Davis Harbor Island
Ross Island
Crane Island
Western Egg Rock
Hough Ledge
LINCOLN CO
KNOX CO
PENOBSCOT BAY
MUSCONGUS
9
10
11
12
13
14
24
25
26
27
28
29
30
31
32
33
34
35
36
37
53
59
6

AREA PRIORITY RATINGS BY SEASON

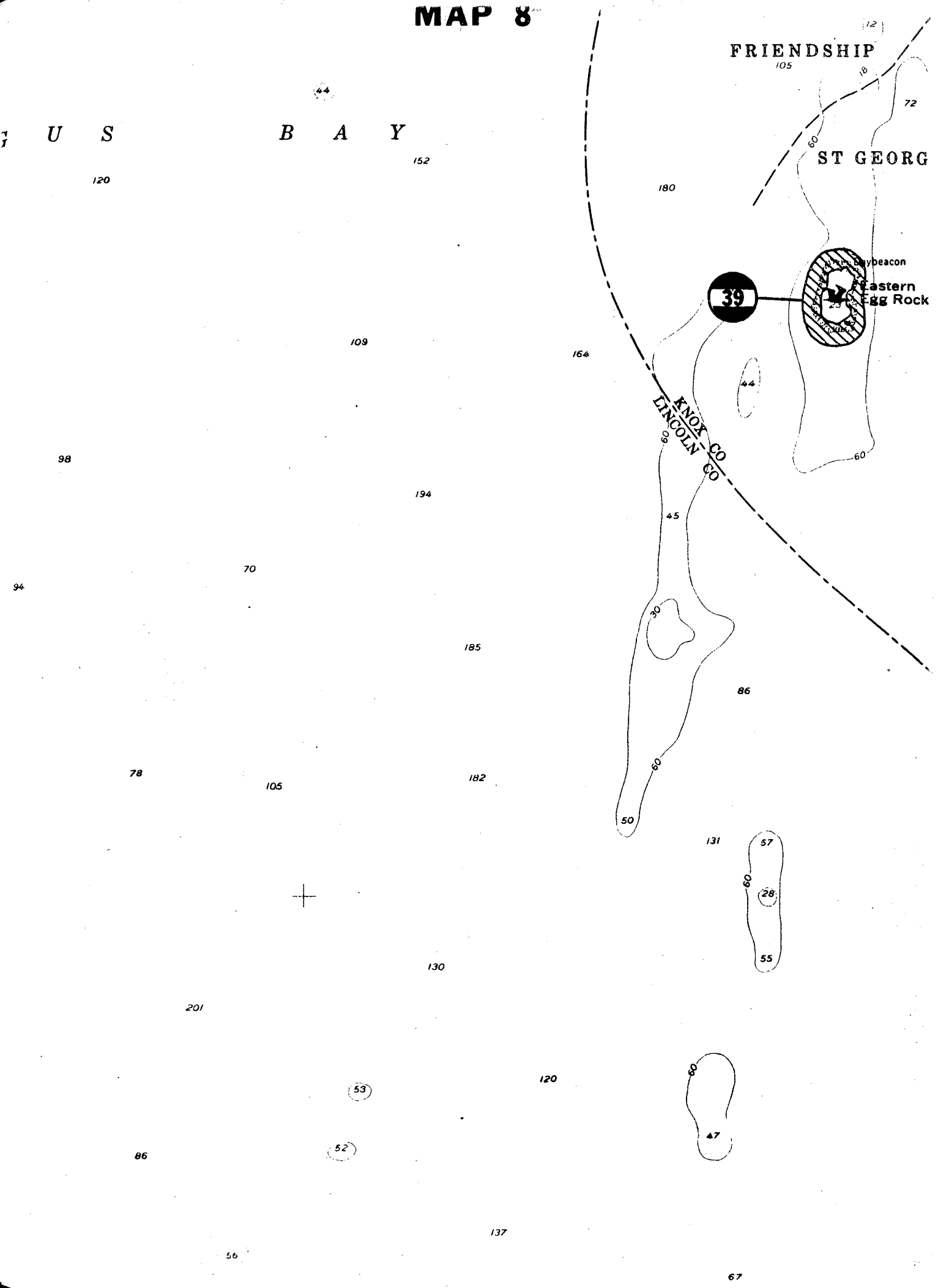
Key to Map 8

Marine Birds

39 Eastern Egg Rock

Fall	HIGH
Winter	Med-Low
Spring	Medium
Nesting	HIGH
Post nesting	HIGH

MAP 8


FRIENDSHIP
ST GEORG
39
Eastern
Egg Rock
KNOX CO
LINCOLN CO
BAY

AREA PRIORITY RATINGS BY SEASON

Key to Map 9

Marine Birds

40 Monhegan Island

Fall	HIGH
Winter	Medium
Spring	Low
Nesting	Low
Post nesting	Medium

41 Manana Island

Fall	Medium
Winter	Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

42 Inner Duck Rock

Fall	Medium
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

43 Duck Rocks

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

99 Eastern Duck Rocks

Fall	Med-Low
Winter	Low
Spring	Med-Low
Nesting	Med-Low
Post nesting	Medium

100 Seal Ledges/Monhegan

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

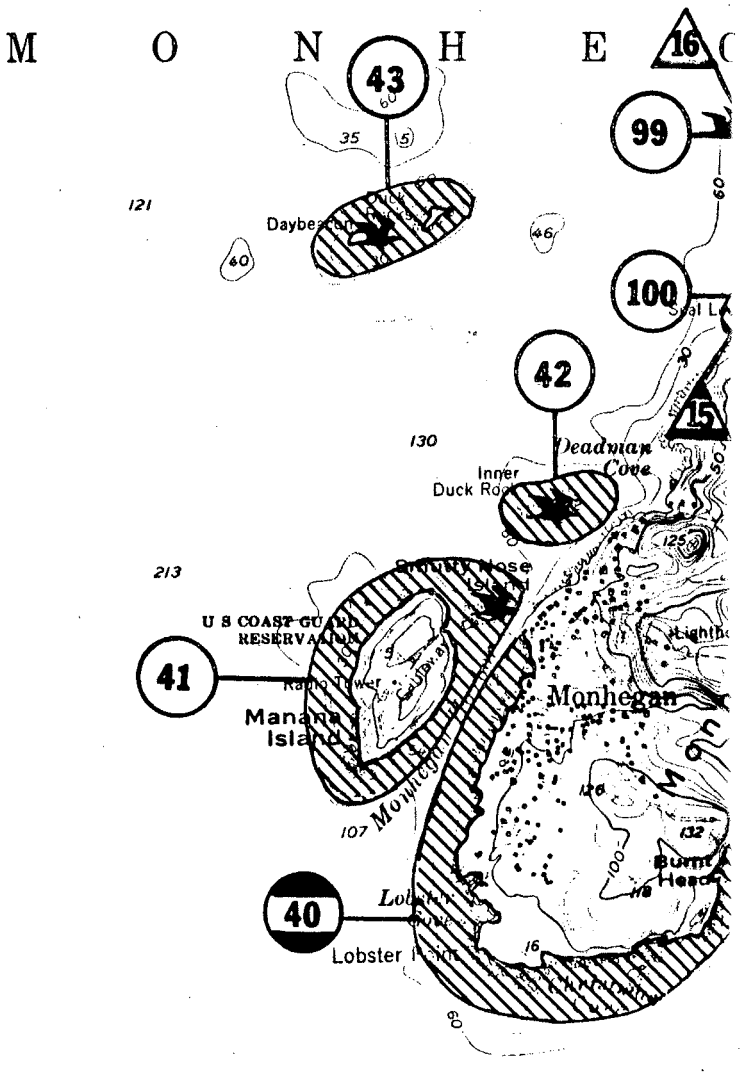
Seals

15 Seal Ledges/Monhegan
All Seasons — HIGH

16 Eastern Duck Rocks
All Seasons — MED-HIGH

MAP 9

A T L A N T I



AREA PRIORITY RATINGS BY SEASON

Key to Map 10

Marine Birds

44 Shark Island

Fall	MED-HIGH
Winter	Low
Spring	Medium
Nesting	Medium
Post nesting	Medium

45 Little Egg Rock Shoals

Fall	MED-HIGH
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

46 Little Egg Rock

Fall	HIGH
Winter	Low
Spring	Medium
Nesting	Medium
Post nesting	Medium

47 Old Man Ledge

Fall	Low
Winter	Low
Spring	Medium
Nesting	MED-HIGH
Post nesting	Low

48 Old Woman Ledge

Fall	MED-HIGH
Winter	MED-HIGH
Spring	HIGH
Nesting	Low
Post nesting	MED-HIGH

49 Allen Island

Fall	Low
Winter	HIGH
Spring	Low
Nesting	Low
Post nesting	Medium

50 Seal Ledges

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

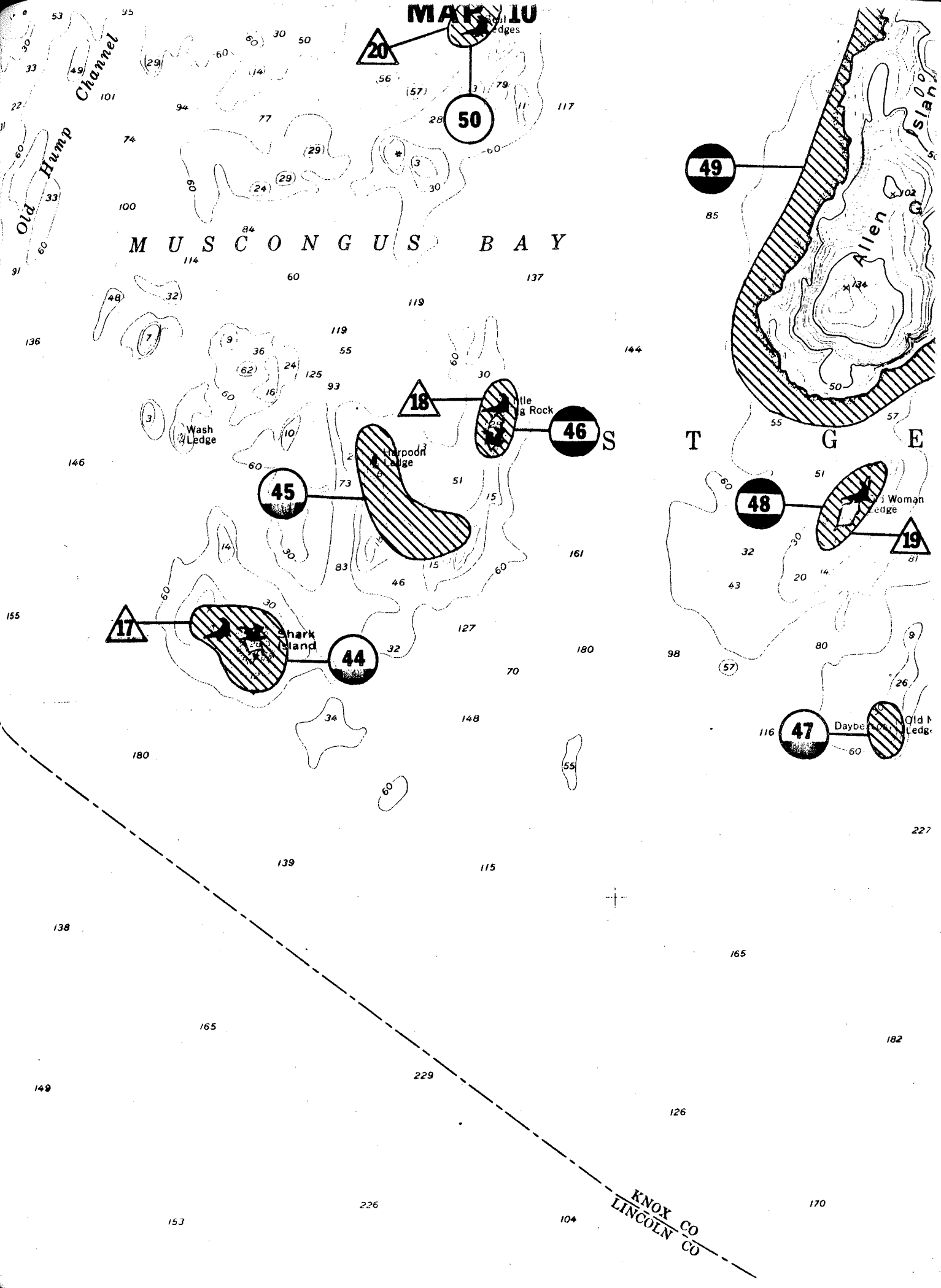
Seals

17 Shark Island Ledge
All Seasons — MED-HIGH

18 Little Egg Rock
All Seasons — Low

19 Old Woman Ledge
All Seasons — Medium

20 Seal Ledges
All Seasons — Medium


MUSCONGUS BAY
Old Hump
Channel
Wash Ledge
Harpoon Ledge
Shark Island
Allen
T G E
S
KNOX CO
LINCOLN CO
20
50
49
18
46
45
48
19
17
44
47

AREA PRIORITY RATINGS BY SEASON

Key to Map 11

Marine Birds

34 Harbor Island

Fall	Low
Winter	HIGH
Spring	Med-Low
Nesting	Med-Low
Post nesting	Medium

37 Little Franklin Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Med-Low

38 Midway Rocks

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

51 Old Hump Ledge

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Medium
Post nesting	Low

52 Benner Island

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

53 Franklin Island

Fall	Low
Winter	Low
Spring	Low
Nesting	HIGH
Post nesting	Low

54 Long Ledge

Fall	Low
Winter	HIGH
Spring	Medium
Nesting	Low
Post nesting	Med-Low

55 Thompson Island

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

56 Gangway Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

57 McGee/Barter Is.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

58 Two Bush Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Medium

59 Cranberry Island

Fall	Low
Winter	Medium
Spring	MED-HIGH
Nesting	Low
Post nesting	Low

60 Otter Island

Fall	Med-Low
Winter	Medium
Spring	Low
Nesting	Low
Post nesting	Low

Seals

10 Little Cranberry Island
All Seasons Low

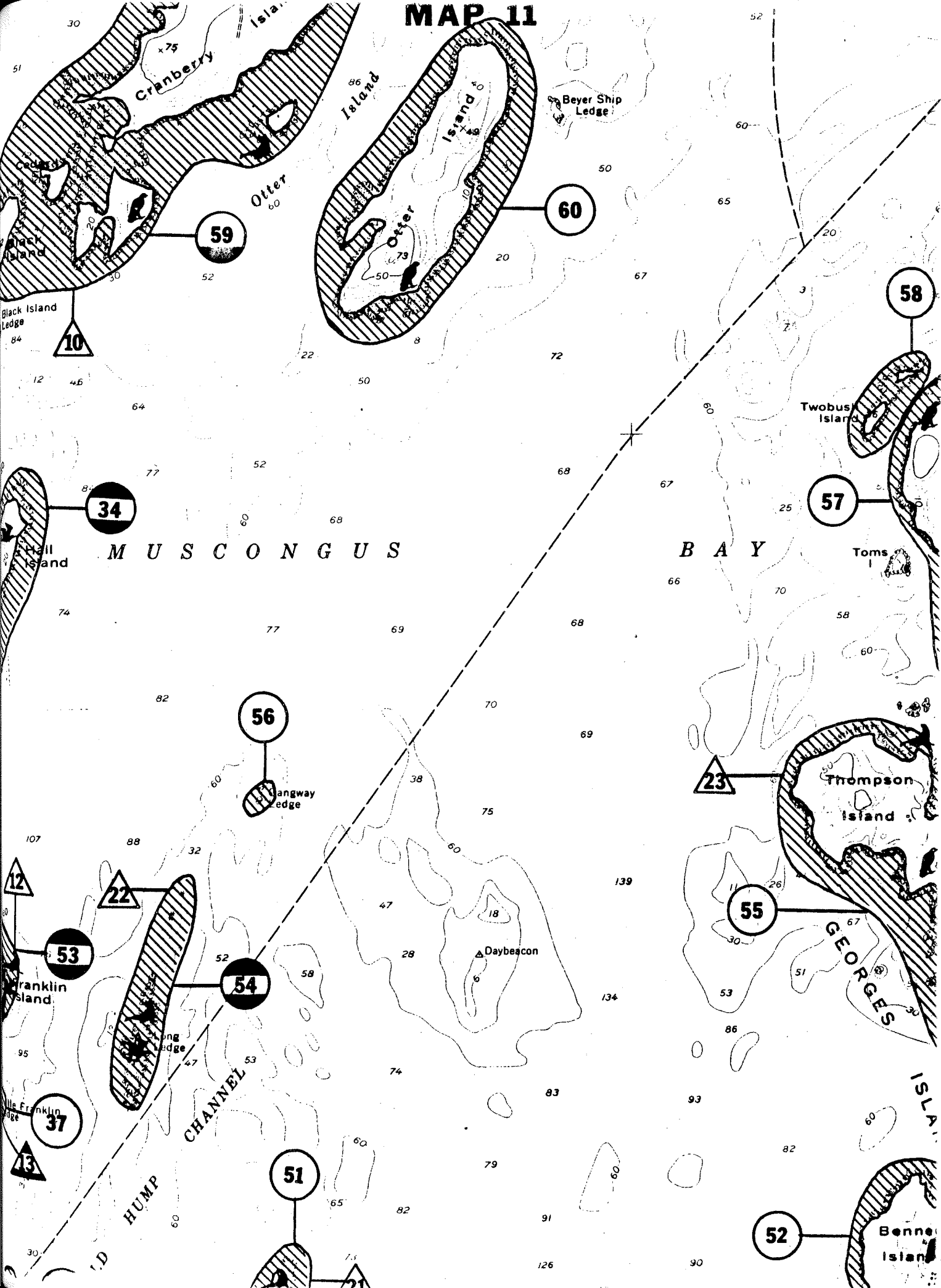
12 Franklin Island Ledge
All Seasons Medium

13 Little Franklin Ledge
All Seasons HIGH

21 Old Hump Ledge
All Seasons Low

22 Long Ledge
All Seasons Med-Low

23 Thompson Island Ledge
All Seasons Med-Low


MAP 11
Cranberry Island
Otter Island
Beyer Ship Ledge
Black Island
Black Island Ledge
Otter
59
60
10
58
Twobush Island
57
34
Hall Island
MUSCONGUS BAY
Toms
56
Langway Ledge
23
Thompson Island
12
22
53
Franklin Island
54
55
GEORGES
Daybeacon
Long Ledge
CHANNEL
37
13
HUMP
51
52
21

AREA PRIORITY RATINGS BY SEASON

Key to Map 12

Marine Birds

59 Cranberry Island

Fall	Low
Winter	Medium
Spring	MED-HIGH
Nesting	Low
Post nesting	Low

61 Gay Island

Fall	Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Low

62 Morse Island

Fall	Medium
Winter	MED-HIGH
Spring	Medium
Nesting	Low
Post nesting	Low

63 Gull Rock

Fall	Low
Winter	Medium
Spring	Low
Nesting	Low
Post nesting	Low

64 Friendship Long Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

65 Ames Cove

Fall	Low
Winter	Med-Low
Spring	MED-HIGH
Nesting	Low
Post nesting	Low

66 Hatchet Cove

Fall	Med-Low
Winter	MED-HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

67 Friendship

Fall	Med-Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

68 Meduncook River

Fall	MED-HIGH
Winter	MED-HIGH
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

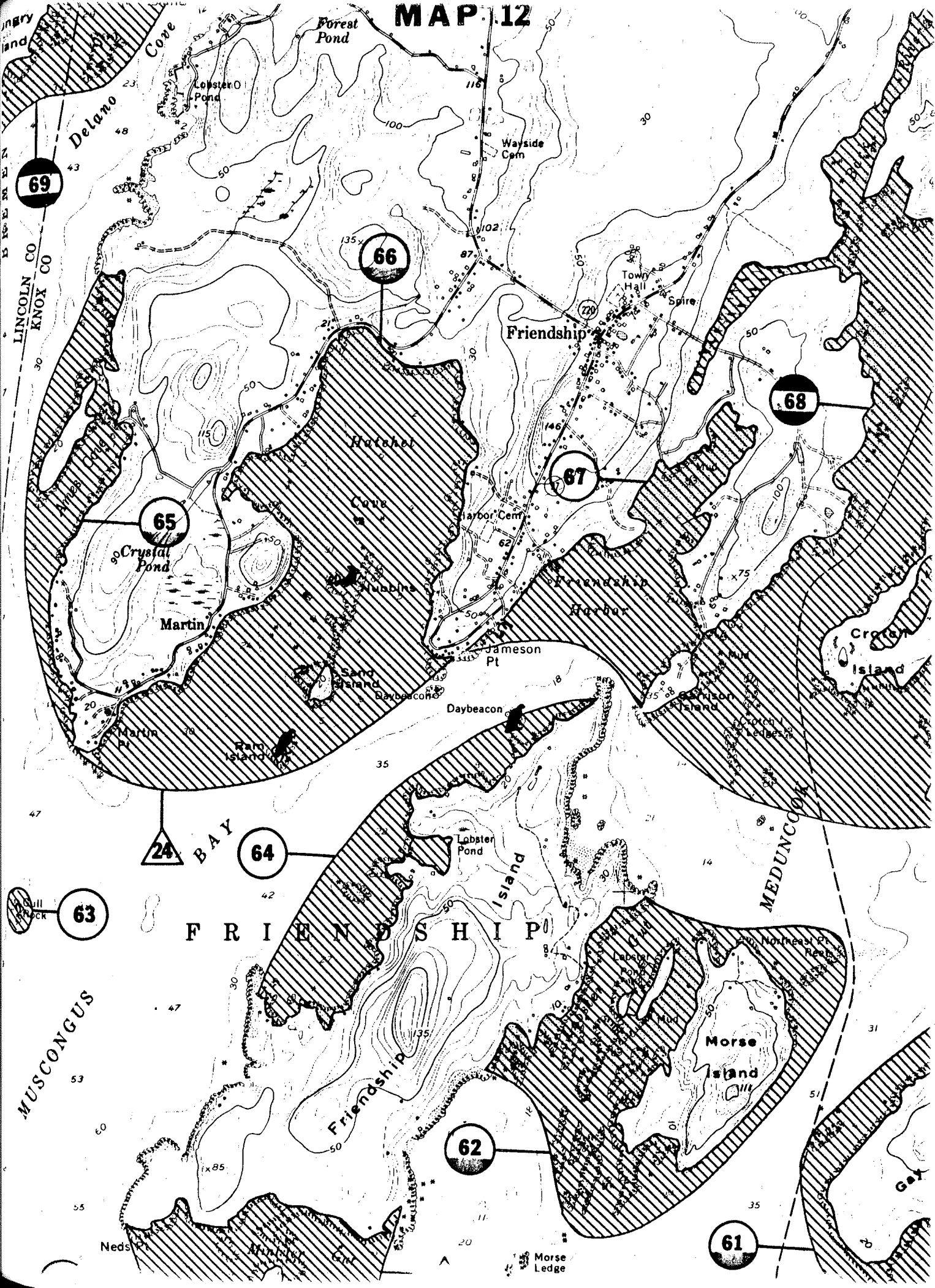
69 Hungry Island

Fall	MED-HIGH
Winter	HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

Seals

10 Little Cranberry Island
All Seasons — Low

24 Nubbins
All Seasons — Med-Low


MAP 12
Forest Pond
Lobster Pond
Delano Cove
Wayside Cem
69
66
LINCOLN CO
KNOX CO
Town Hall
Spire
Friendship
68
67
Hatchet Cove
Harbor Cem
65
Crystal Pond
Hubbins
Martin
Friendship Harbor
Jameson Pt
Sand Island
Daybeacon
Martin Pt
Ram Island
Garrison Island
Crotch Island
Ledges
24
BAY
64
Lobster Pond
Island
MEDUNCOOK
63
FRIENDSHIP
Gut
Northeast Pt
Reefs
Morse Island
MUSCONGUS
Friendship
62
Neds Pt
Morse Ledge
61

AREA PRIORITY RATINGS BY SEASON

Key to Map 13

Marine Birds

69 Hungry Island

Fall	MED-HIGH
Winter	HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

70 Jones Neck

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

71 Back River

Fall	MED-HIGH
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

72 Goose River

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

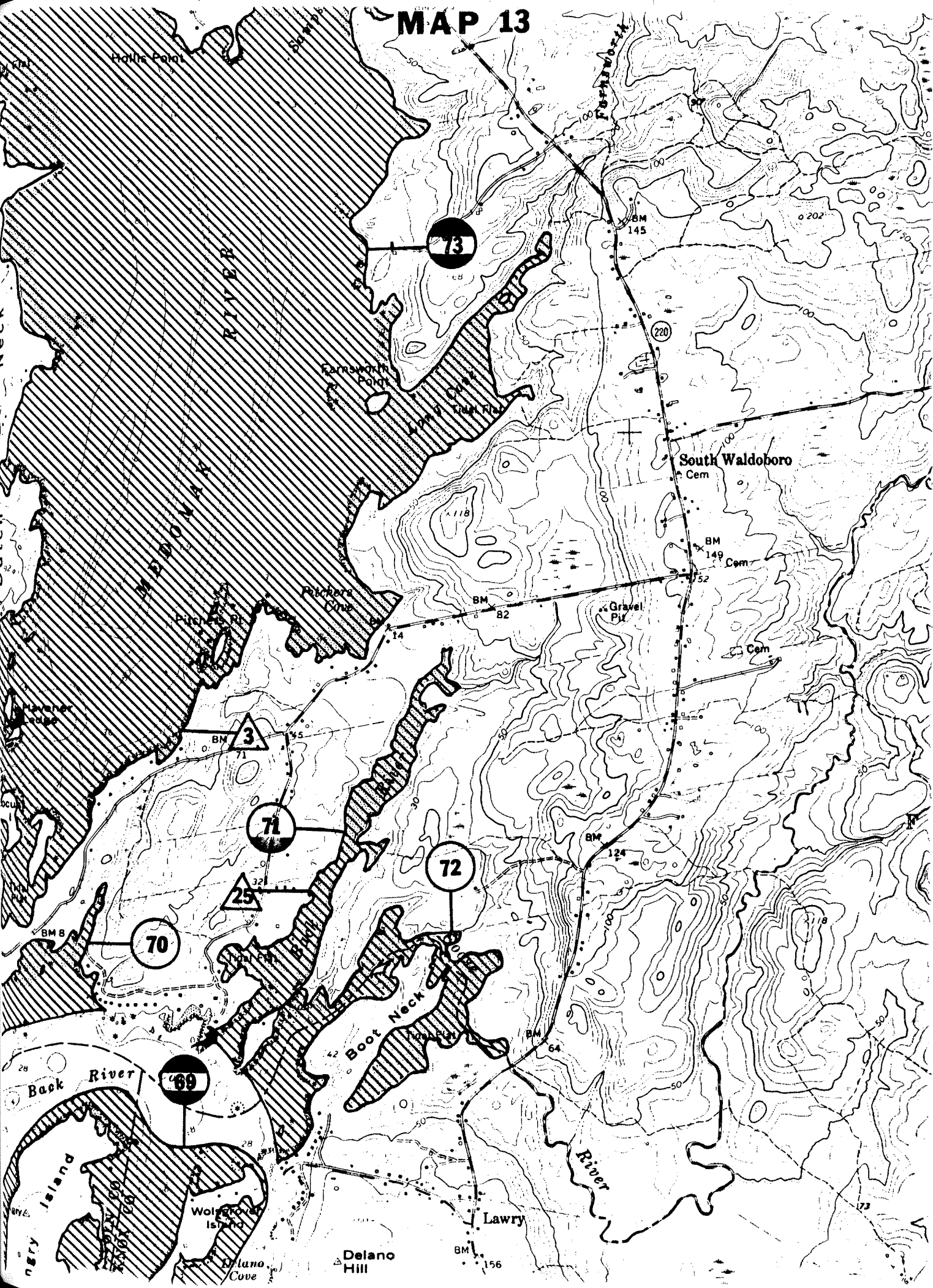
73 Medomack River

Fall	HIGH
Winter	HIGH
Spring	MED-HIGH
Nesting	HIGH
Post nesting	HIGH

Seals

3 Havener Ledge
All Seasons — Low

25 Back River Ledge
All Seasons — Med-Low


MAP 13
Halfs Point
Farnsworth Point
Upper Outer Tidal Flat
MEDOMAK RIVER
Pitchers Cove
Pitchers Pt
Flaherer Ledge
Back River
Boot Neck
Tidal Flat
Wolfe Neck
Wolfe Island
Delano Cove
Delano Hill
Lawry
South Waldoboro
Cem
Gravel Pit
BM 145
BM 149
BM 82
BM 124
BM 64
BM 156
BM 8
River
13
71
72
70
69
3
25
220

AREA PRIORITY RATINGS BY SEASON

Key to Map 14

Marine Birds

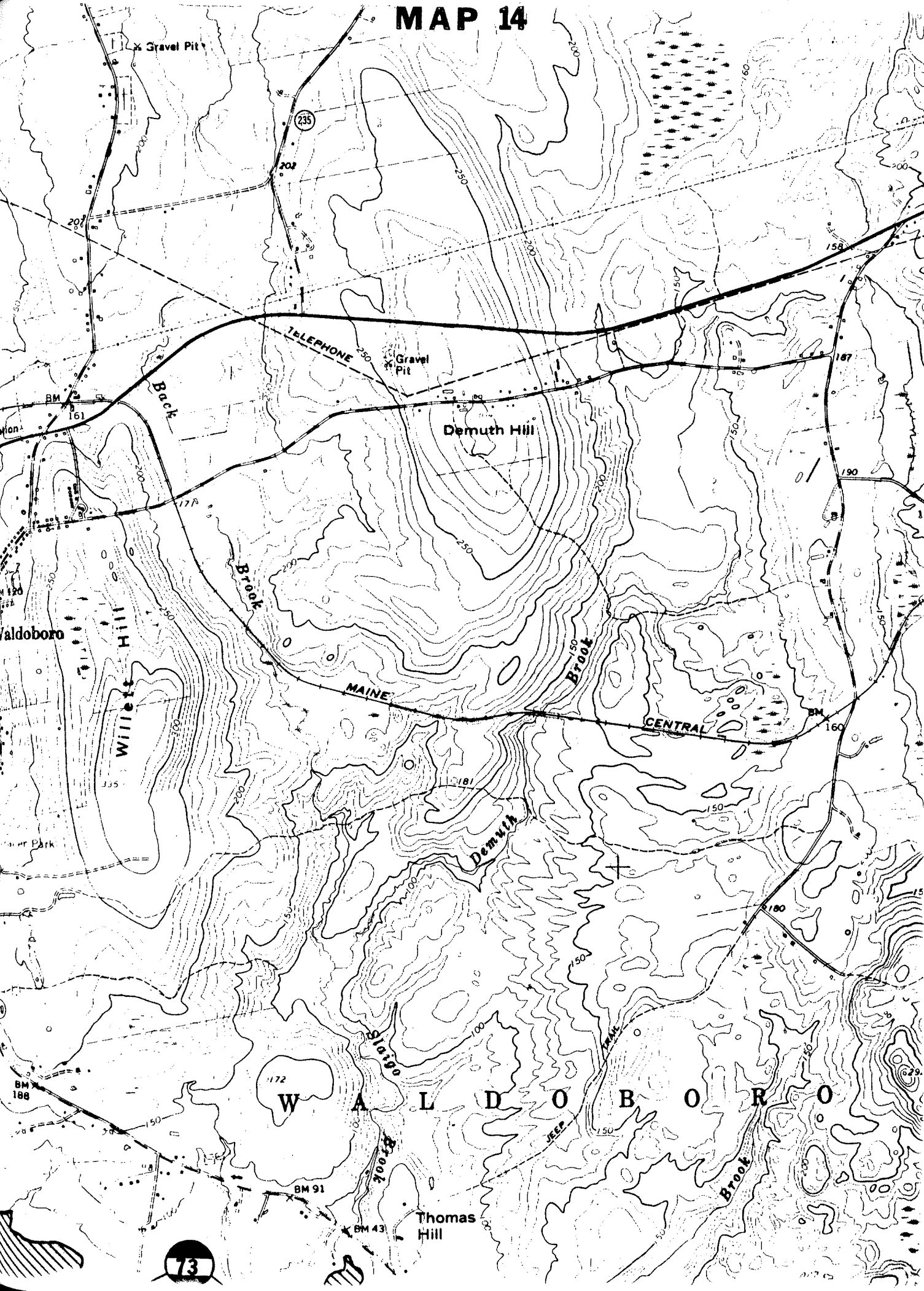
73 Medomack River

Fall	HIGH
Winter	HIGH
Spring	MED-HIGH
Nesting	HIGH
Post nesting	HIGH

Seals

3 Havener Ledge

All Seasons	Low


MAP 14
Gravel Pit
235
202
TELEPHONE
Gravel Pit
Back
BM 161
Demuth Hill
Brook
Willett Hill
Waldoboro
MAINE CENTRAL
BM 160
Brook
Demuth
Slaigo
Brook
WALDOBORO
TRAIL
JEEP
BM 188
BM 91
BM 43
Thomas Hill
Brook
73

AREA PRIORITY RATINGS BY SEASON

Key to Map 15

Marine Birds

61 Gay Island

Fall	Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Low

68 Meduncook River

Fall	MED-HIGH
Winter	MED-HIGH
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

74 Maple Juice Cove

Fall	MED-HIGH
Winter	MED-HIGH
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

75 Pleasant Point

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

76 St. George River S.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

77 Teel Cove

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

78 Davis Cove

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

79 Pleasant Point Gut

Fall	Med-Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

80 Turkey Cove

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

81 Deep Cove

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

82 Caldwell Island

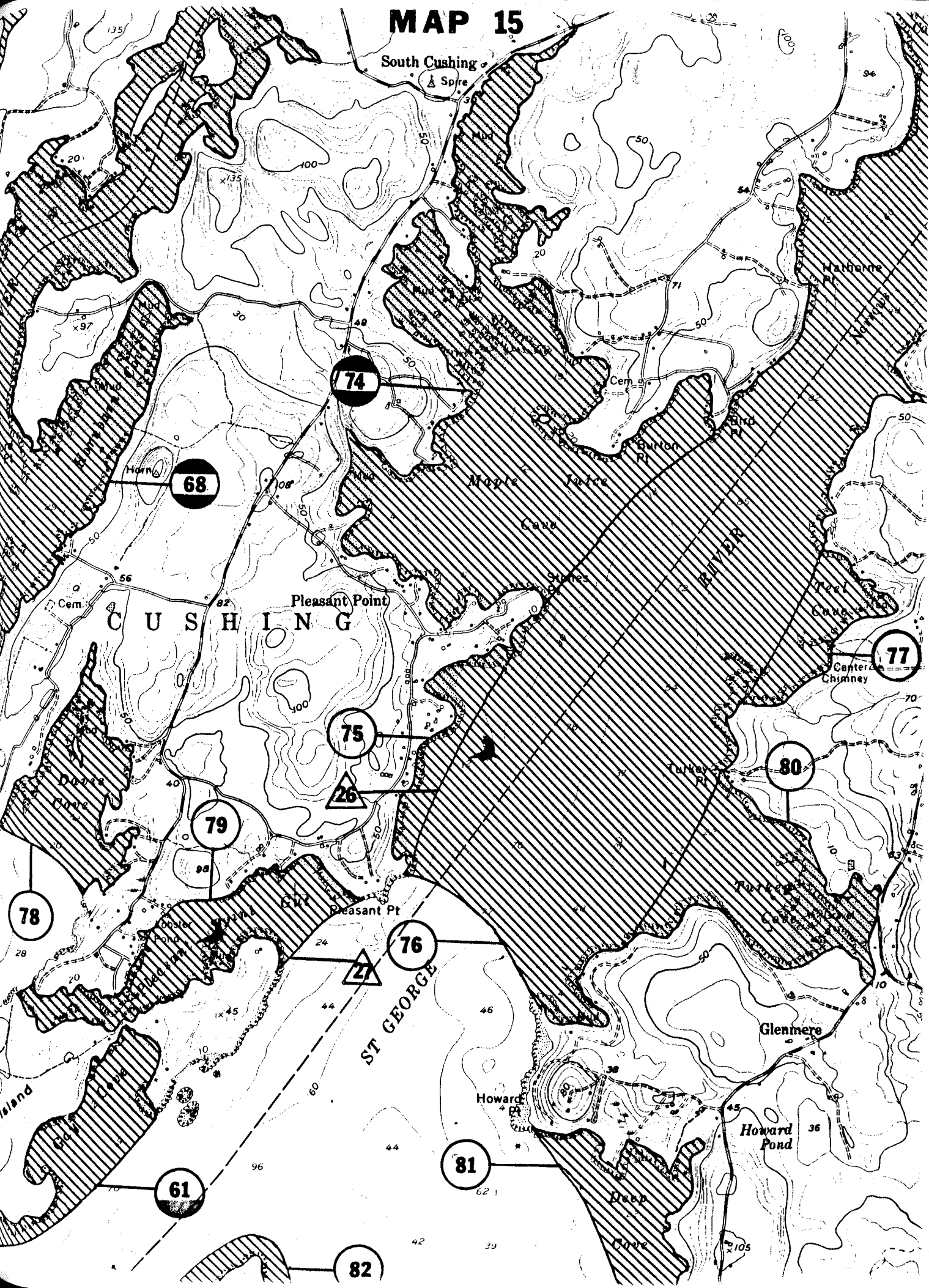
Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

Seals

26 Pleasant Point Ledge
All Seasons — Med-Low

27 Gay Island Ledge
All Seasons — Med-Low

28 Little Caldwell Island
All Seasons — Medium


MAP 15
South Cushing
Spire
Harborne Pt
Cem
Burton Pt
Bird Pt
Maple Juice Cove
RIVER
Horn
Cem
CUSHING
Pleasant Point
Center Chimney
Turkey Pt
Turkey Cove
Dunns Cove
Lobster Pond
Pleasant Pt
ST GEORGE
Glenmere
Howard Pt
Howard Pond
Deep Cove
74
68
77
75
26
80
79
78
76
27
81
61
82

AREA PRIORITY RATINGS BY SEASON

Key to Map 16

Marine Birds

52 Benner Island

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

55 Thompson Island

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

57 McGee/Barter Is.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

82 Caldwell Island

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

83 Goose Rock

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

84 Stone/Seavey Is.

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

85 Teel Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

86 Bar Island E.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

87 Hooper Island

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

88 Marshall Point

Fall	Low
Winter	Low
Spring	Medium
Nesting	Low
Post nesting	Low

89 Inner Shag Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

90 Outer Shag Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

91 Hart Island

Fall	Low
Winter	MED-HIGH
Spring	Med-Low
Nesting	Med-Low
Post nesting	Low

92 Gunning Rocks

Fall	Med-Low
Winter	Low
Spring	Medium
Nesting	Med-Low
Post nesting	Med-Low

93 Black Rock

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

94 Davis Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

95 Shag Ledges

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Medium
Post nesting	Low

96 Old Cilley Ledge

Fall	MED-HIGH
Winter	Low
Spring	Low
Nesting	Low
Post nesting	HIGH

97 Dry Ledges

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

98 Burnt Island

Fall	Med-Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Med-Low

Seals

23 Thompson Island Ledge
All Seasons — Med-Low

28 Little Caldwell Island
All Seasons — Medium

29 Stone Island Ledge
All Seasons — Low

31 Hart Island Ledges
All Seasons — Low

32 Gunning Rock Shoals
All Seasons — Med-Low

33 Shag Ledges
All Seasons — Low


MAP 16
Little Caldwell Islands
Goose Rock
Stone Island
Teel Island
Hooper Island
Blubber Island
Port Clyde
Port Clyde Harbor
U S COAST GUARD STATION
Marshall
Allen Ledge
Outer Shag Ledge
Old Horse Ledge
Daybeacon
Hart I
Hart Island Ledges
Gunning Rock
Duck Rock
Davis Island
Shag Ledges
Carey Rock
Georges Harbor
STGEORGE
83
28
82
84
85
30
29
87
88
86
57
89
90
91
31
32
92
93
23
55
94
33
95
96
52
98

AREA PRIORITY RATINGS BY SEASON

Key to Map 17

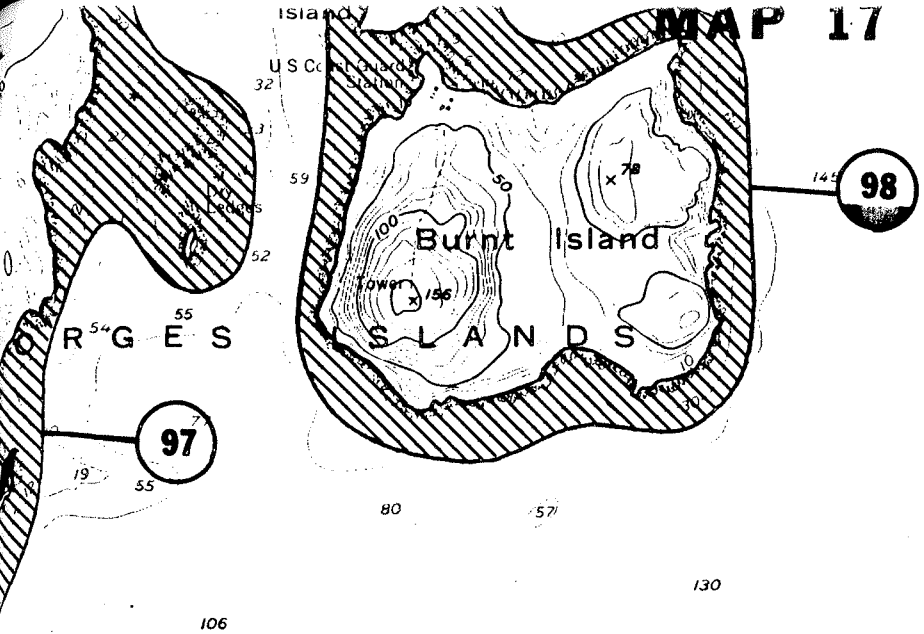
Marine Birds

97 Dry Ledges

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

98 Burnt Island

Fall	Med-Low
Winter	MED-HIGH
Spring	Low
Nesting	Low
Post nesting	Med-Low


MAP 17
Island
U S Coast Guard Station
Dry Ledges
Burnt Island
Lower
98
97
O R G E S
S L A N D S

O R G E

AREA PRIORITY RATINGS BY SEASON

Key to Map 18

Marine Birds

40 Monhegan Island

Fall	HIGH
Winter	Medium
Spring	Low
Nesting	Low
Post nesting	Medium

99 Eastern Duck Rocks

Fall	Med-Low
Winter	Low
Spring	Med-Low
Nesting	Med-Low
Post nesting	Medium

100 Seal Ledges/Monhegan

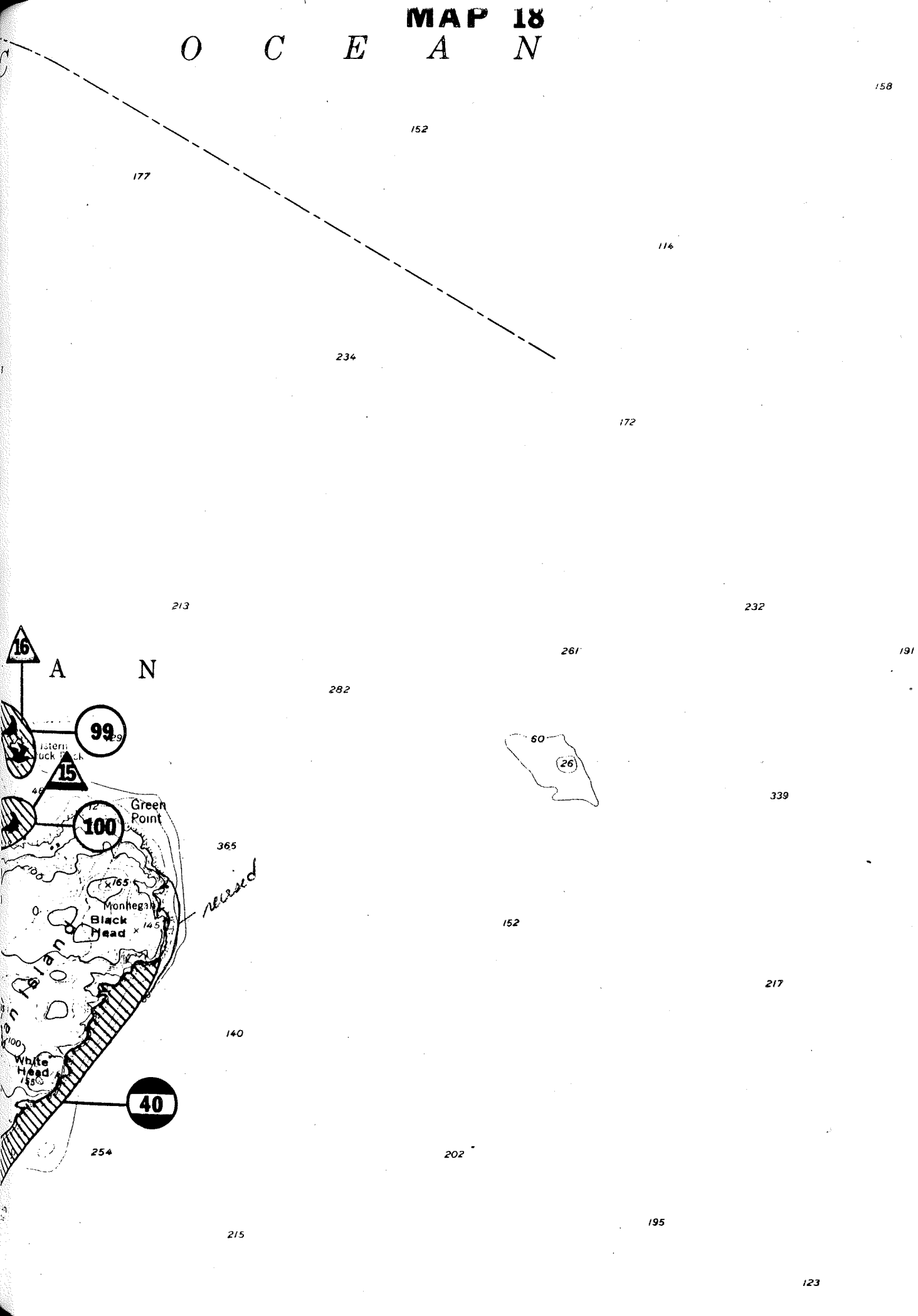
Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

Seals

15 Seal Ledges/Monhegan
All Seasons HIGH

16 Eastern Duck Rocks
All Seasons MED-HIGH

MAP 18


O C E A N
A N
16
99
15
100
40
Green Point
Black Head
White Head
Monhegan
Island
released
158
152
177
114
234
172
213
232
261
191
282
60
26
339
365
165
145
152
217
140
100
254
202
195
215
123

AREA PRIORITY RATINGS BY SEASON

Key to Map 19

Marine Birds

92 Gunning Rocks

Fall	Med-Low
Winter	Low
Spring	Medium
Nesting	Med-Low
Post nesting	Med-Low

101 The Brothers

Fall	Low
Winter	HIGH
Spring	Low
Nesting	HIGH
Post nesting	Low

102 Hay Ledge

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Med-Low
Post nesting	Medium

103 Mosquito Island

Fall	Medium
Winter	Med-Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

104 Mosquito Harbor

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

105 Mosquito Head

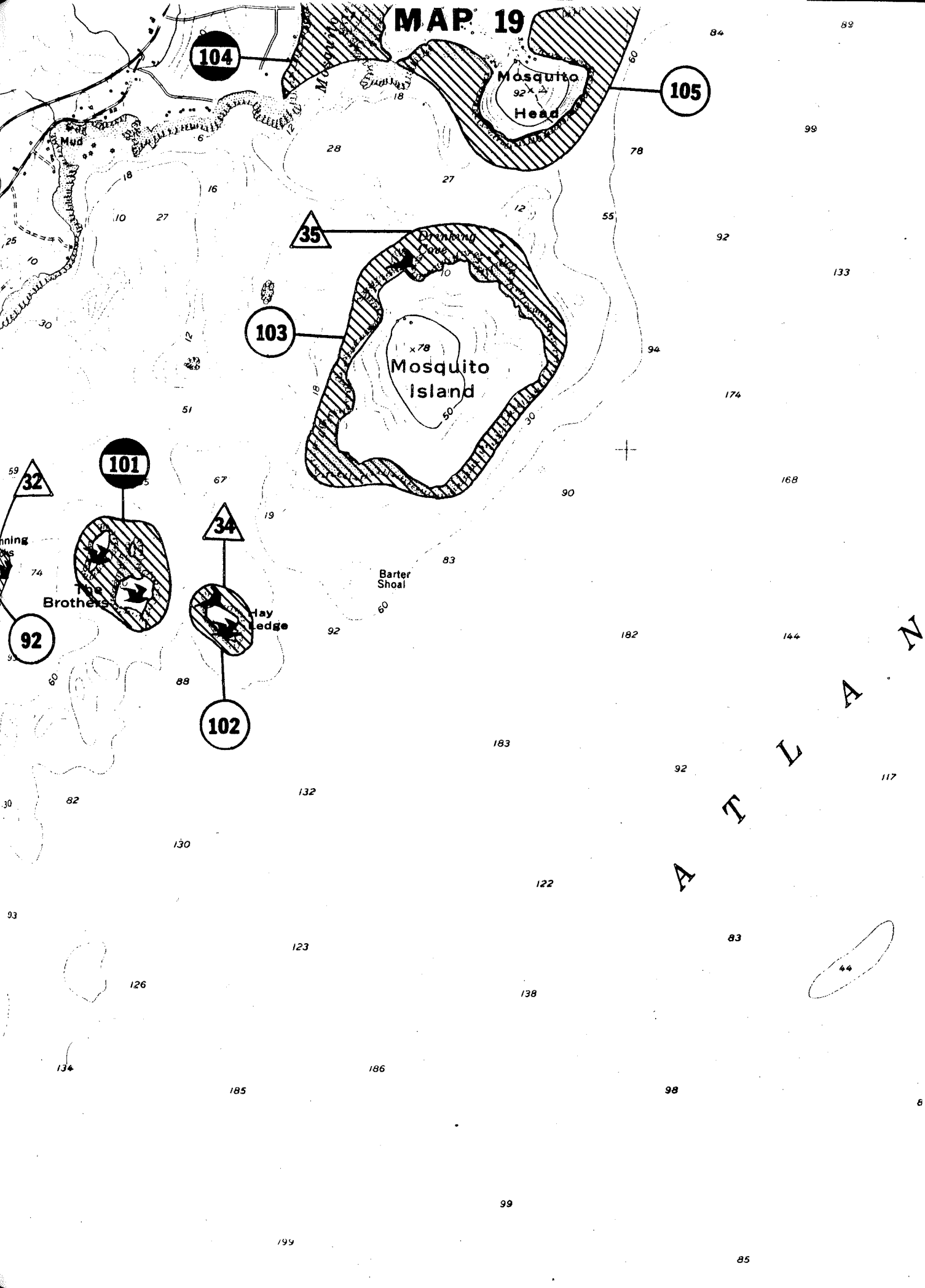
Fall	Medium
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

Seals

32 Gunning Rock Shoals
All Seasons Med-Low

34 Hay Ledge
All Seasons Med-Low

35 Mosquito Island Ledge
All Seasons Med-Low


MAP 19
104
105
Mosquito Head
35
Diamond Cove
103
Mosquito Island
101
32
34
92
The Brothers
Hay Ledge
Barter Shoal
102
Mud
ATLAN

AREA PRIORITY RATINGS BY SEASON

Key to Map 20

Marine Birds

76 St. George River S.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

104 Mosquito Harbor

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

105 Mosquito Head

Fall	Medium
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

106 Hart Ledge

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

107 Southern Island

Fall	Low
Winter	MED-HIGH
Spring	Med-Low
Nesting	Low
Post nesting	Low

108 Tenants Harbor

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	HIGH
Post nesting	HIGH

109 Northern Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Med-Low

110 Long Cove

Fall	Med-Low
Winter	Medium
Spring	Med-Low
Nesting	Low
Post nesting	HIGH

111 Otis Cove

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

112 Watts Cove

Fall	Medium
Winter	Med-Low
Spring	Medium
Nesting	HIGH
Post nesting	HIGH

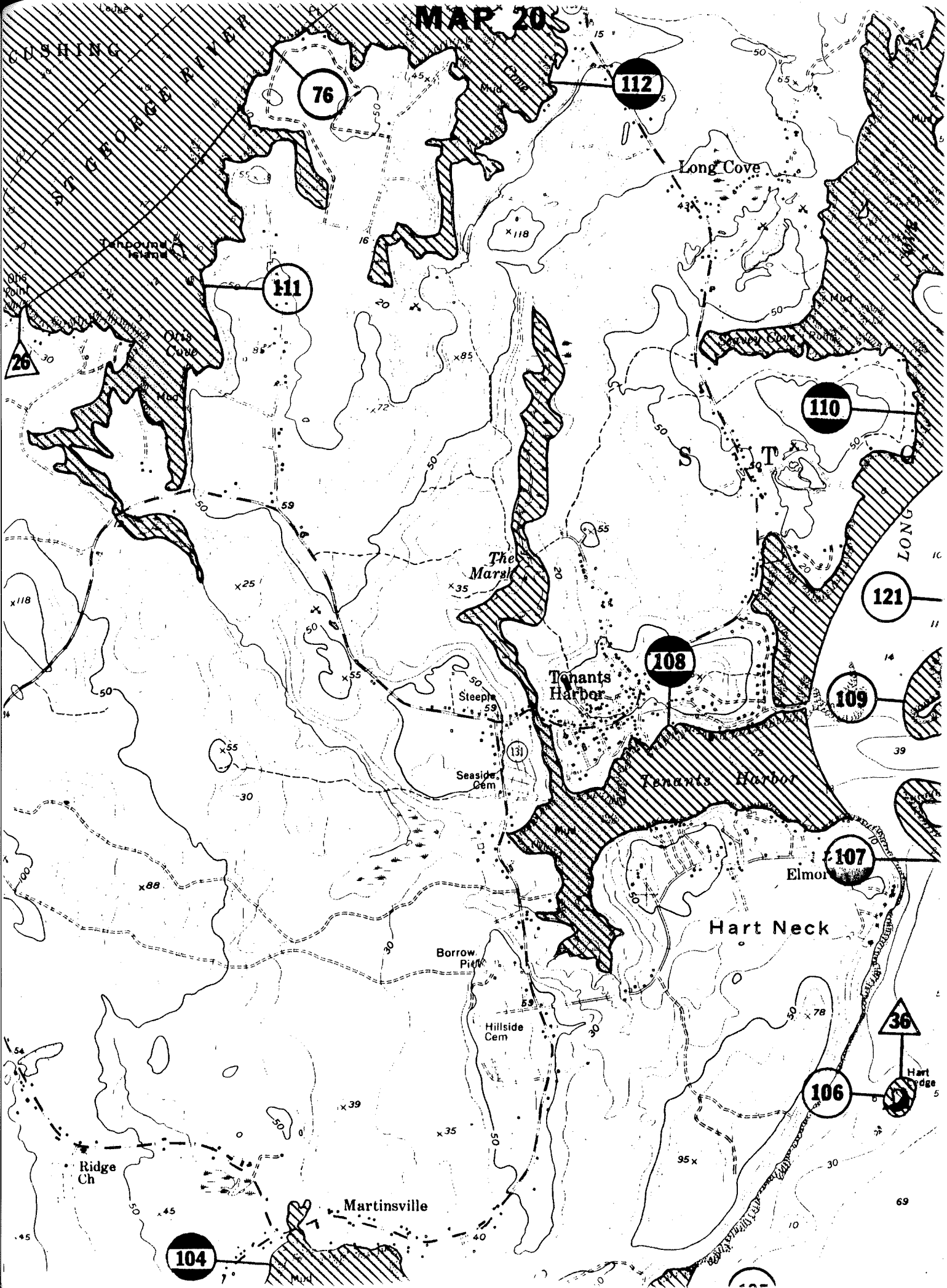
121 High Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

Seals

26 Pleasant Point Ledge
All Seasons — Med-Low

36 Hart Ledge
All Seasons — Low


MAP 20
GUSHING
GEORGES RIVER
76
112
Long Cove
Tahoonud Island
111
Otis Cove
26
110
S T
The Marsh
121
108
Tenants Harbor
109
Steeple
Seaside Cem
Tenants Harbor
107
Elmore
Hart Neck
Borrow Pit
Hillside Cem
36
106
Hart Ledge
Ridge Ch
Martinsville
104

AREA PRIORITY RATINGS BY SEASON

Key to Map 21

Marine Birds

76 St. George River S.

Fall	Low
Winter	Med-Low
Spring	Low
Nesting	Low
Post nesting	Low

110 Long Cove

Fall	Med-Low
Winter	Medium
Spring	Med-Low
Nesting	Low
Post nesting	HIGH

112 Watts Cove

Fall	Medium
Winter	Med-Low
Spring	Medium
Nesting	HIGH
Post nesting	HIGH

113 Broad Cove/Cushing

Fall	MED-HIGH
Winter	Medium
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

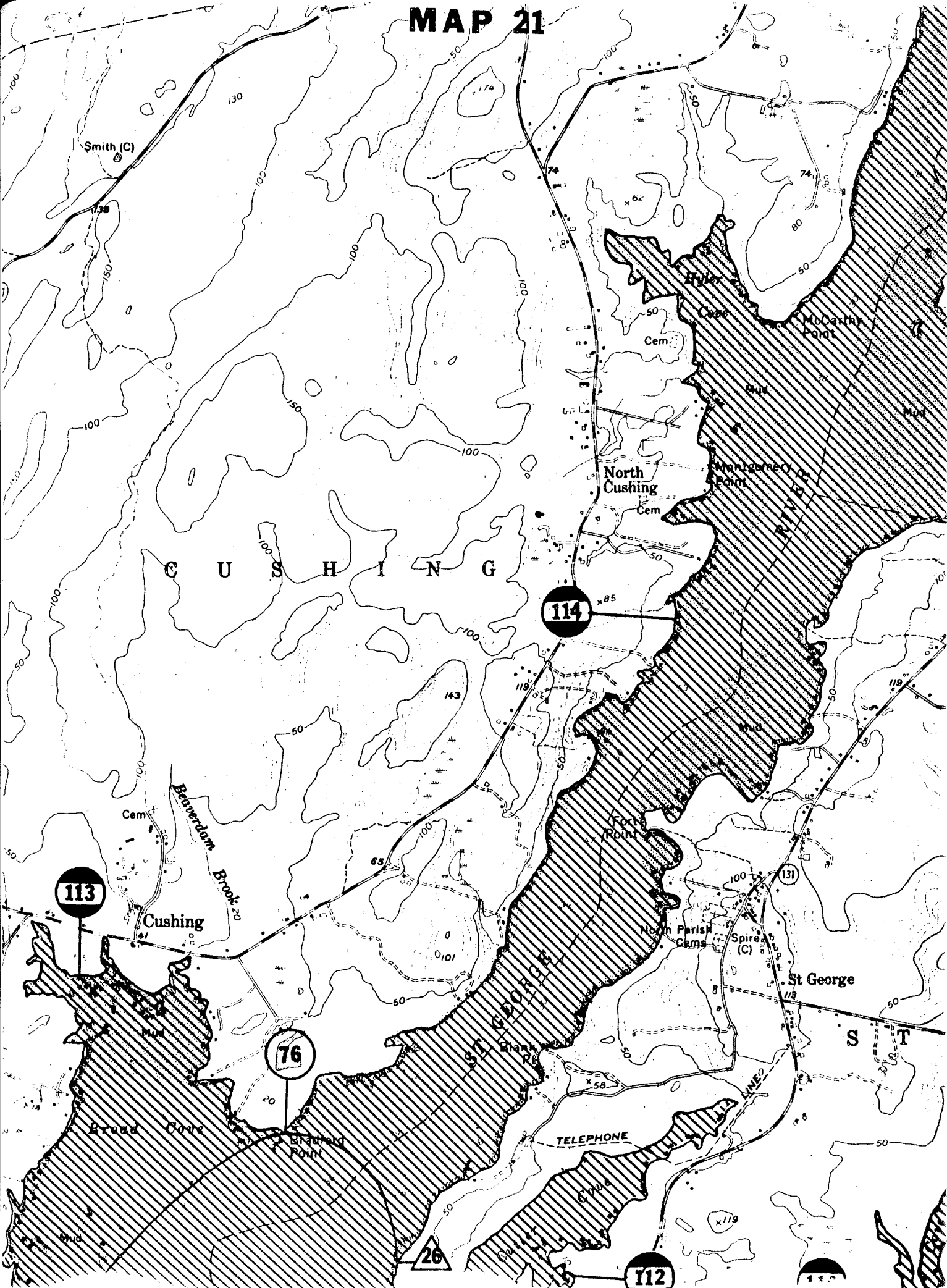
114 St. George River N.

Fall	HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

Seals

26 Pleasant Point Ledge

All Seasons	Med-Low


MAP 21
Smith (C)
Hyler
Cape
McCarthy Point
Cem
Mud
North Cushing
Montgomery Point
Cem
C U S H I N G
114
Beaverdam Brook
Cem
113
Cushing
Fort Point
131
North Parish Cems
Spire (C)
St George
S T
ST GEORGE
Blank Pt
76
Broad Cove
Bradford Point
TELEPHONE
LINE
Cove
26
112

AREA PRIORITY RATINGS BY SEASON

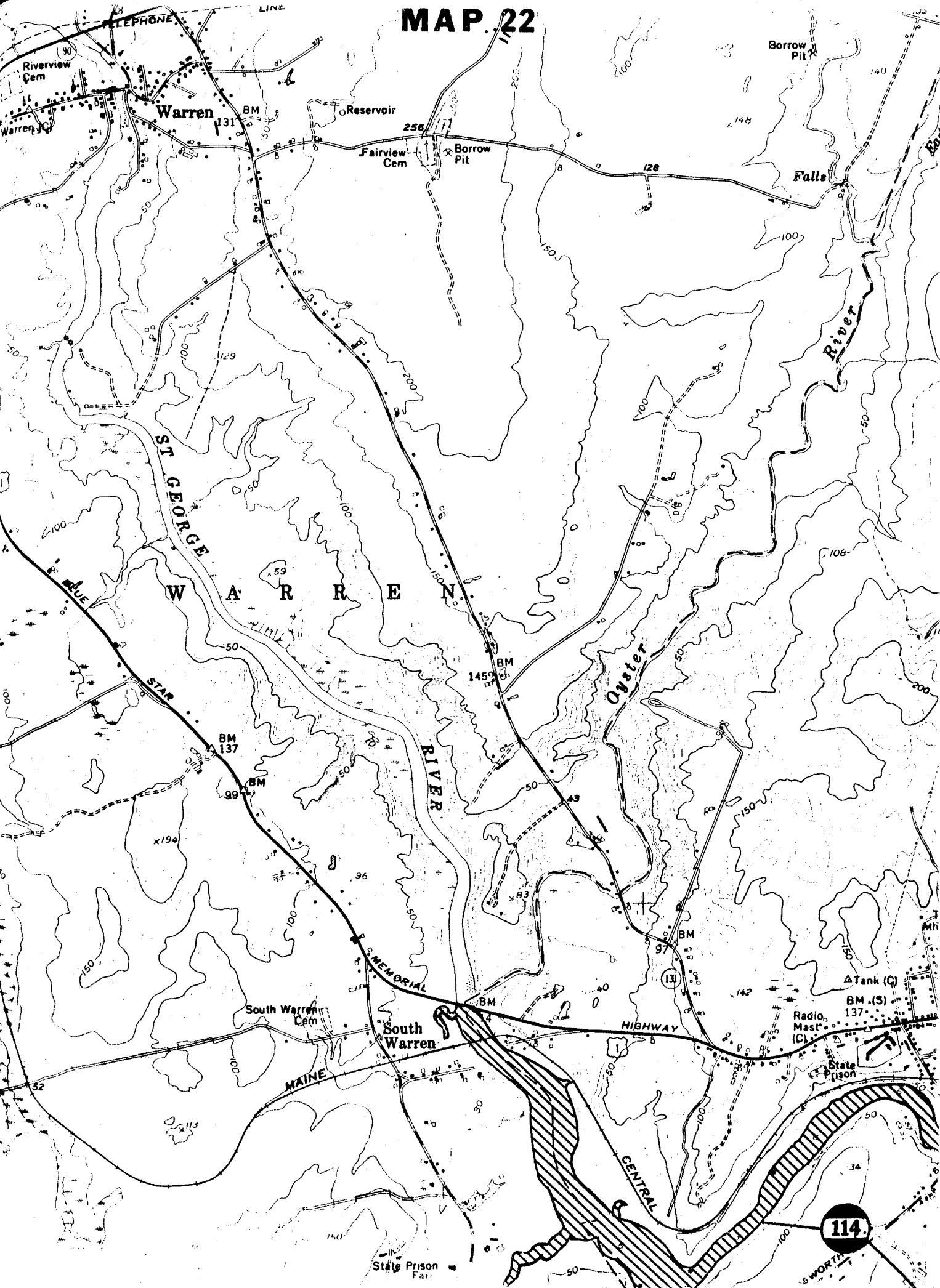
Key to Map 22

Marine Birds

114 St. George River N.

Fall	HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

MAP 22


Riverview Cem
Warren
Warren J.C.
BM 131
Reservoir
Fairview Cem
Borrow Pit
Borrow Pit
Falls
256
128
ST GEORGE
W A R R E N
BLUE STAR
MEMORIAL HIGHWAY
MAINE CENTRAL
Oyster River
RIVER
BM 137
BM 99
BM 145
BM 97
South Warren Cem
South Warren
State Prison Farm
State Prison
Tank (C)
BM (S) 137
Radio Mast (C)
114

AREA PRIORITY RATINGS BY SEASON

Key to Map 23

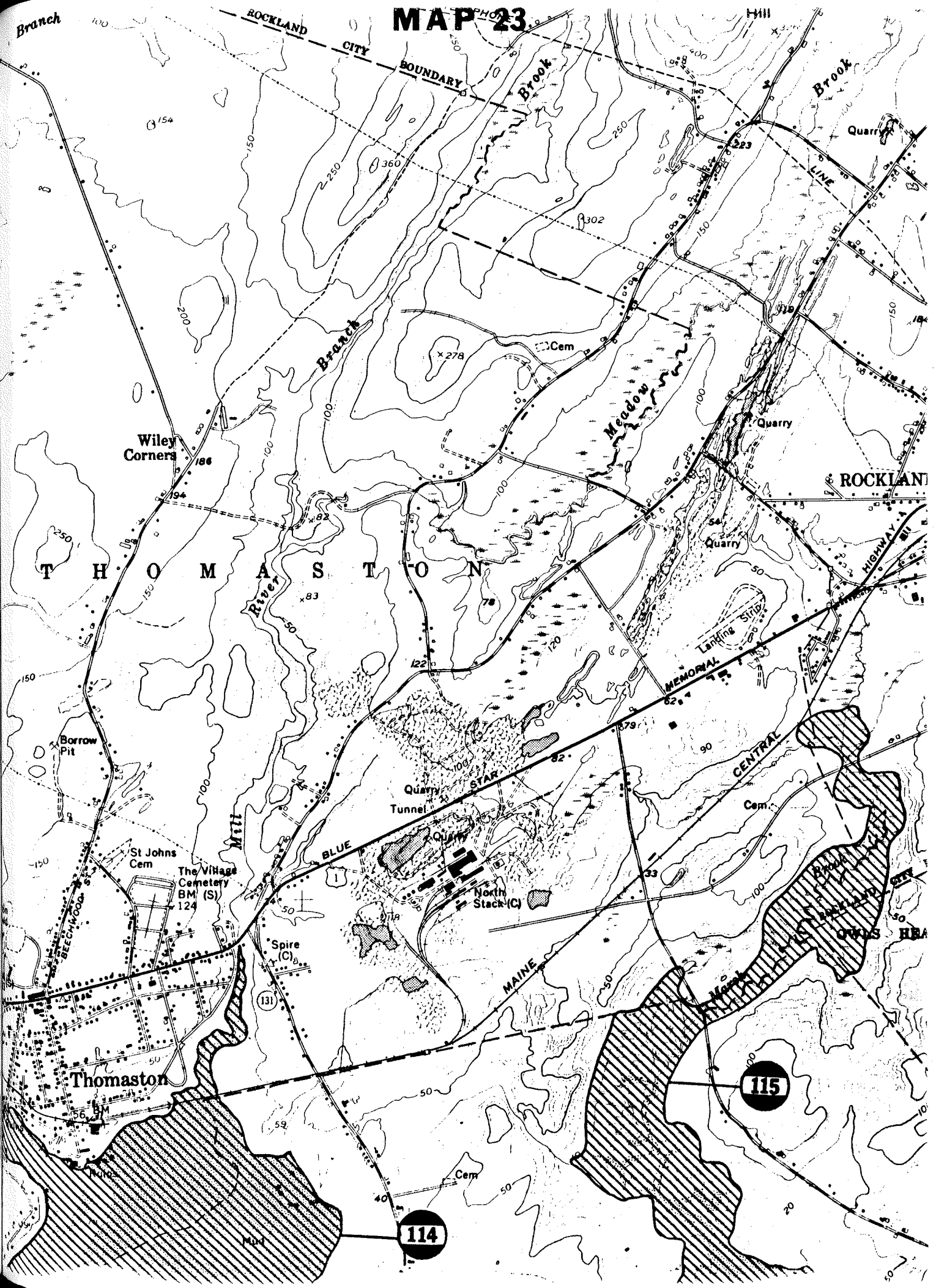
Marine Birds

114 St. George River N.

Fall	HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

115 Weskeag River

Fall	MED-HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH


MAP 23
ROCKLAND CITY BOUNDARY
Branch
Brook
Meadow
Quarry
LINE
Cem
Wiley Corners
ROCKLAN
T H O M A S T O N
River
Landing Strip
HIGHWAY
MEMORIAL
CENTRAL
STAR
BLUE
MAINE
Mill
Borrow Pit
Quarry
Tunnel
St Johns Cem
The Village Cemetery
BM (S)
124
BEECHWOOD
Spire (C)
North Stack (C)
Thomaston
BM
Mud
Marsh
115
114

AREA PRIORITY RATINGS BY SEASON

Key to Map 24

Marine Birds

114 St. George River N.

Fall	HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

115 Weskeag River

Fall	MED-HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

116 Wheeler Bay

Fall	Low
Winter	Med-Low
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

117 Seal Harbor

Fall	Medium
Winter	Medium
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

130 Elwell Point

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

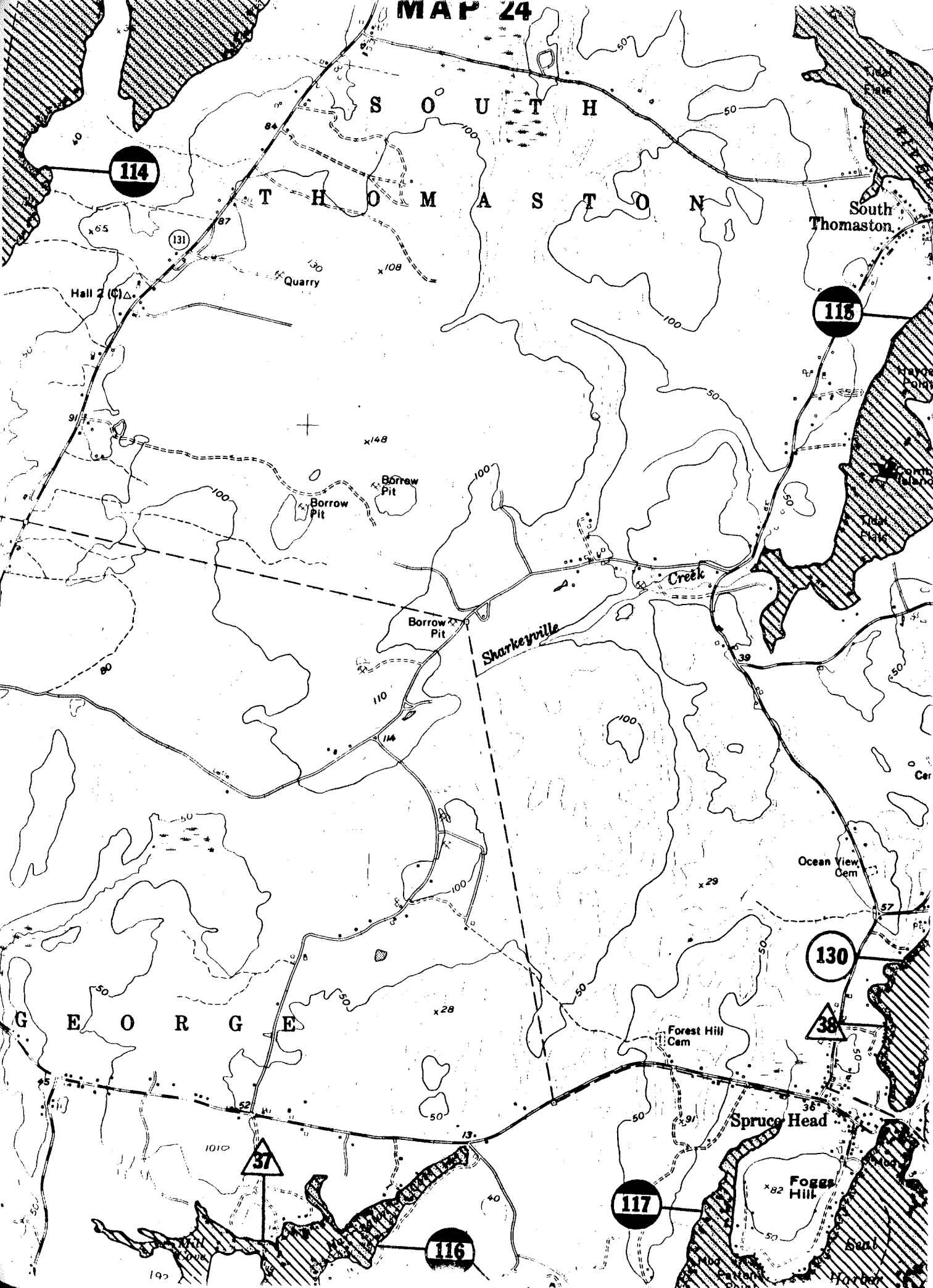
Seals

37 Ram Island Ledge

All Seasons	Low

38 Elwell Ledge

All Seasons	Low


MAP 24
S O U T H
T H O M A S T O N
South Thomaston
114
115
116
117
130
131
37
38
Hall 2 (C)
Quarry
Borrow Pit
Borrow Pit
Borrow Pit
Creek
Sharkeyville
Ocean View Cem
Forest Hill Cem
Spruce Head
Fogas Hill
G E O R G E

AREA PRIORITY RATINGS BY SEASON

Key to Map 25

Marine Birds

107 Southern Island

Fall	Low
Winter	MED-HIGH
Spring	Med-Low
Nesting	Low.
Post nesting	Low

109 Northern Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Med-Low

110 Long Cove

Fall	Med-Low
Winter	Medium
Spring	Med-Low
Nesting	Low
Post nesting	HIGH

116 Wheeler Bay

Fall	Low
Winter	Med-Low
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

117 Seal Harbor

Fall	Medium
Winter	Medium
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

118 Clark Cove

Fall	Low
Winter	Low
Spring	Low
Nesting	HIGH
Post nesting	HIGH

119 Eagle Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

120 Norton/Whitehead Is.

Fall	Low
Winter	Med-Low
Spring	Medium
Nesting	Low
Post nesting	Low

121 High Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

122 Seavey Ledges

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

123 Norton I. Ledges

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Med-Low
Post nesting	Med-Low

Seals

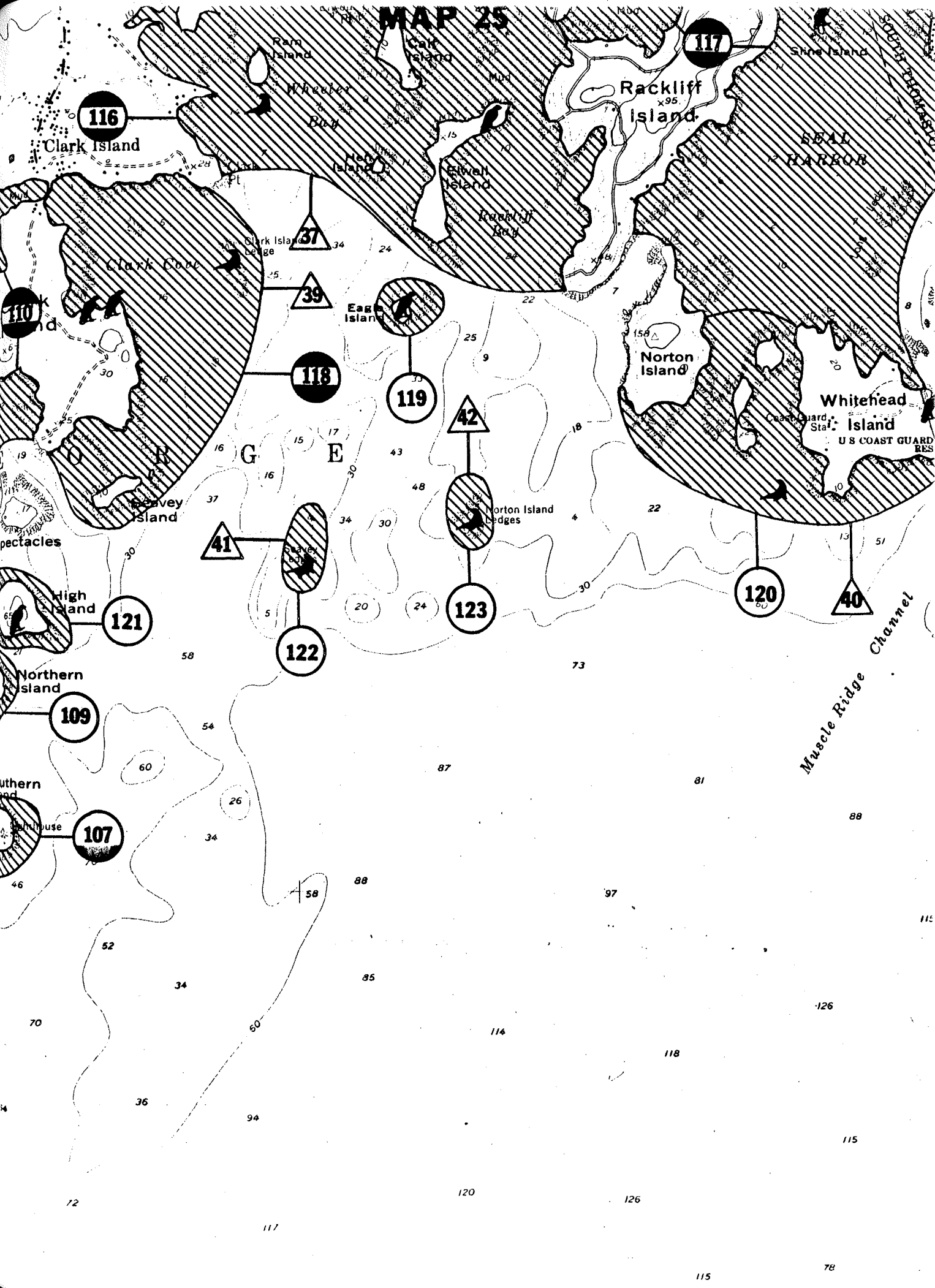
37 Ram Island Ledge
All Seasons Low

39 Clark Island Ledge
All Seasons Low

40 Whitehead Island Ledge
All Seasons Low

41 Seavey Ledges
All Seasons Low

42 Norton Island Ledges
All Seasons Medium


MAP 25
Ram Island
Clark Island
Wheeler Bay
Mud
Rackliff Island
Shag Island
SOUTH THOMASTON
SEAL HARBOR
Clark Island
Clark Pt
Hen Island
Elwell Island
Rockhill Bay
Clark Island Ledge
Clark Cove
Eagle Island
Norton Island
Norton Island Ledges
Whitehead Island
Coast Guard Sta.
U S COAST GUARD RES
Beavey Island
Spectacles
High Island
Northern Island
Lighthouse
Muscle Ridge Channel
116
117
37
39
110
118
119
42
41
121
122
123
120
40
109
107

AREA PRIORITY RATINGS BY SEASON

Key to Map 26

Marine Birds

124 Wheeler Big Rock

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

125 Metinic Island

Fall	MED-HIGH
Winter	Med-Low
Spring	HIGH
Nesting	HIGH
Post nesting	MED-HIGH

126 Hog Island/Nubble

Fall	Medium
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Medium

127 Metinic Green Island

Fall	Medium
Winter	Medium
Spring	Medium
Nesting	HIGH
Post nesting	Med-Low

Seals

43 Wheeler Big Rock
All Seasons Medium

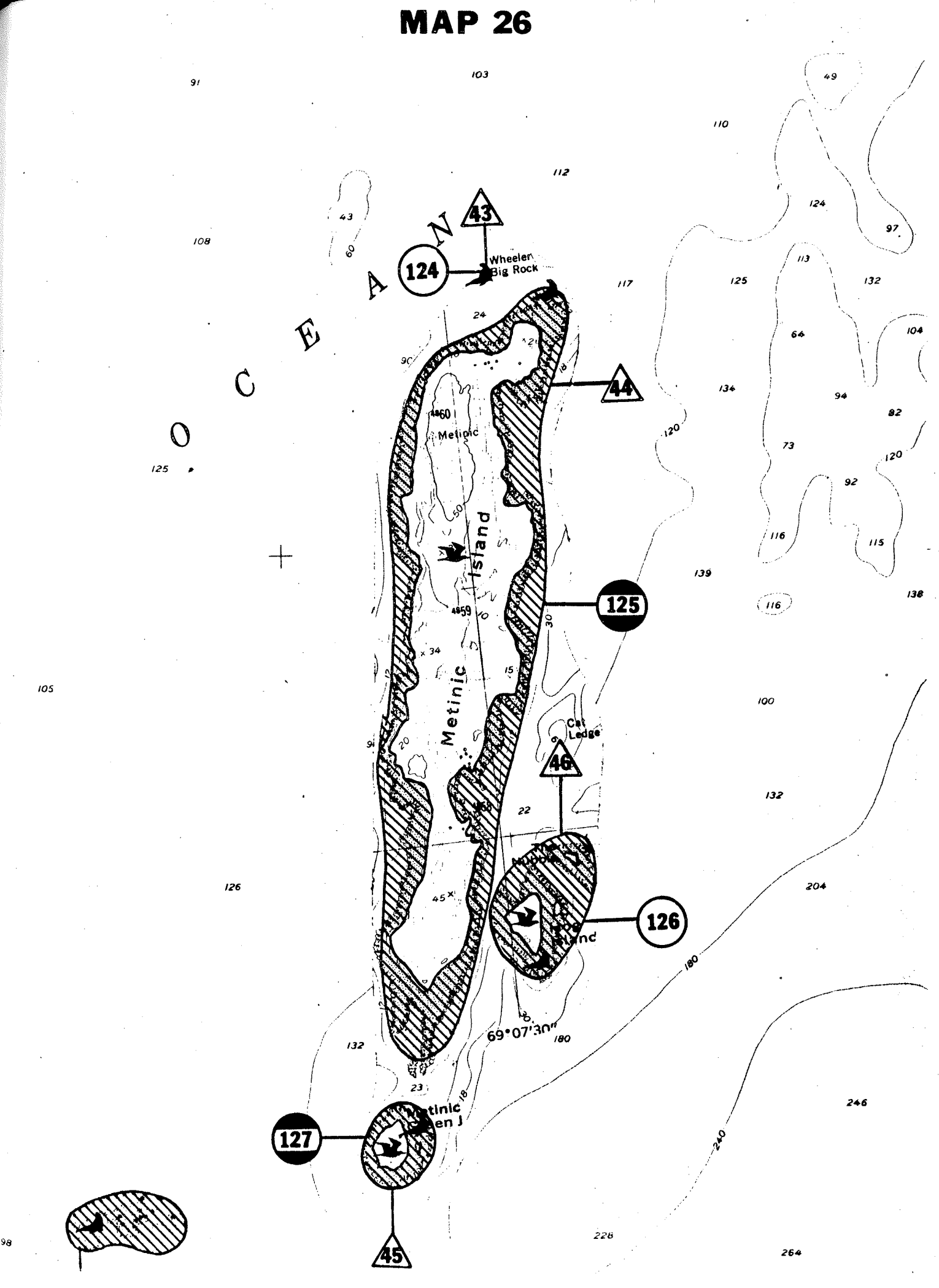
44 Metinic Island Ledge
All Seasons Med-Low

45 Metinic Green Is. Ldg.
All Seasons Medium

46 Hog Island Ledge
All Seasons Med-Low

48 Southeast Breaker
All Seasons Med-Low

MAP 26


OCEAN
Metinic Island
Wheeler Big Rock
Cat Ledge
69°07'30"
43
124
44
125
46
126
127
45

AREA PRIORITY RATINGS BY SEASON

Key to Map 27

Marine Birds

117 Seal Harbor

Fall	Medium
Winter	Medium
Spring	Med-Low
Nesting	HIGH
Post nesting	HIGH

120 Norton/Whitehead Is.

Fall	Low
Winter	Med-Low
Spring	Medium
Nesting	Low
Post nesting	Low

128 Yellow Ridge Island

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Med-Low
Post nesting	Low

129 Seal Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Medium
Post nesting	Low

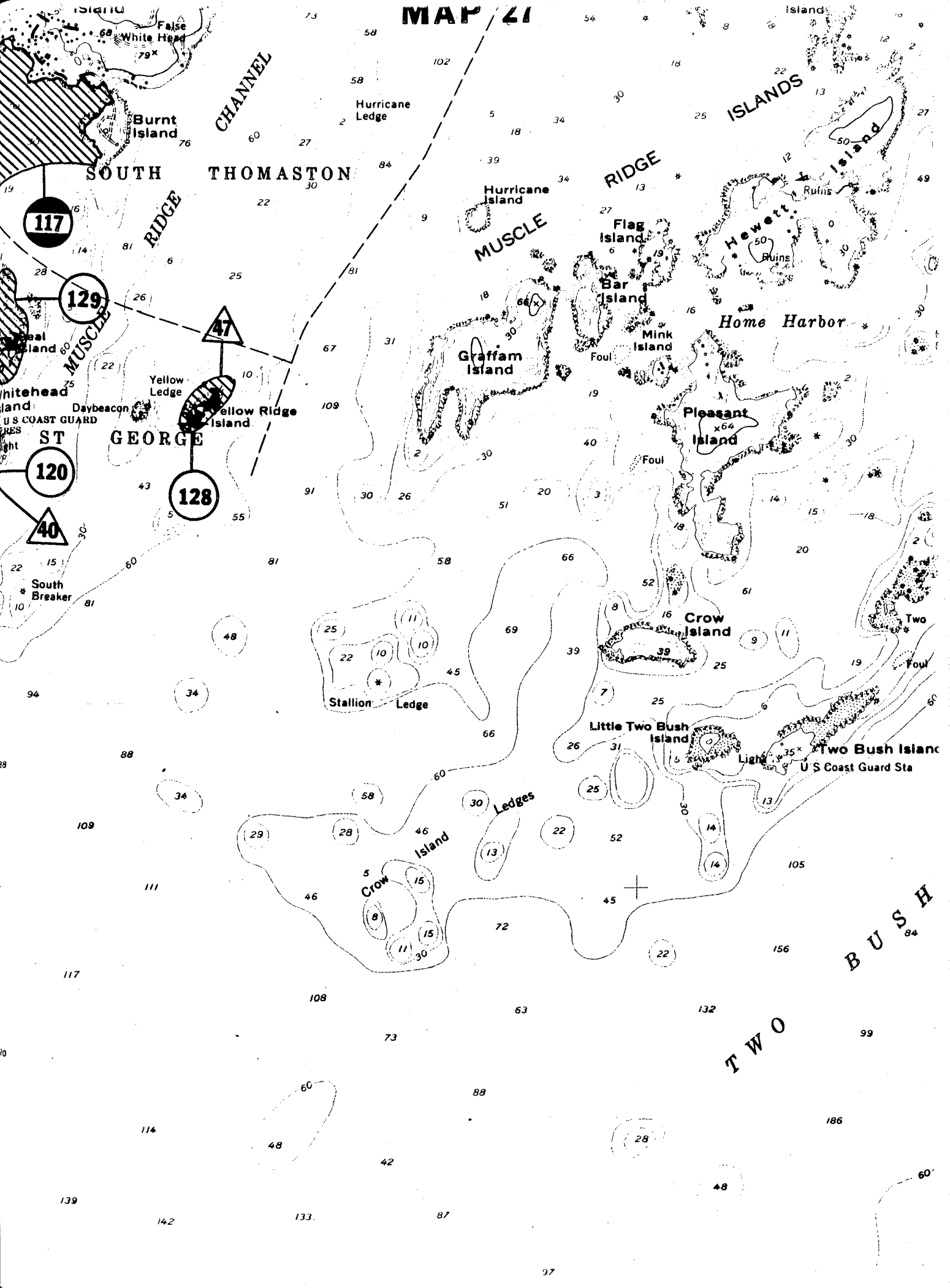
Seals

40 Whitehead Island Ledge

All Seasons	Low

47 Yellow Ridge I. Ledge

All Seasons	Low


MAP 27
False White Head
Burnt Island
CHANNEL
Hurricane Ledge
SOUTH THOMASTON
RIDGE
117
129
47
MUSCLE
Yellow Ledge
Daybeacon
Yellow Ridge Island
ST GEORGE
120
128
40
South Breaker
Hurricane Island
MUSCLE
RIDGE
Flag Island
Bar Island
Graffam Island
Foul
Mink Island
Home Harbor
Pleasant Island
Foul
ISLANDS
Island
Hewett
Ruins
Ruins
Crow Island
Two
Foul
Stallion Ledge
Little Two Bush Island
Light
Two Bush Island
U S Coast Guard Sta
Ledges
Crow Island
TWO BUSH

AREA PRIORITY RATINGS BY SEASON

Key to Map 28

Marine Birds

115 Weskeag River

Fall	MED-HIGH
Winter	HIGH
Spring	HIGH
Nesting	HIGH
Post nesting	HIGH

130 Elwell Point

Fall	Med-Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

131 Garden Island

Fall	Med-Low
Winter	Low
Spring	MED-HIGH
Nesting	Medium
Post nesting	Low

132 Garden Island Ledge

Fall	Low
Winter	Low
Spring	Med-Low
Nesting	Low
Post nesting	Low

133 Tommy Island

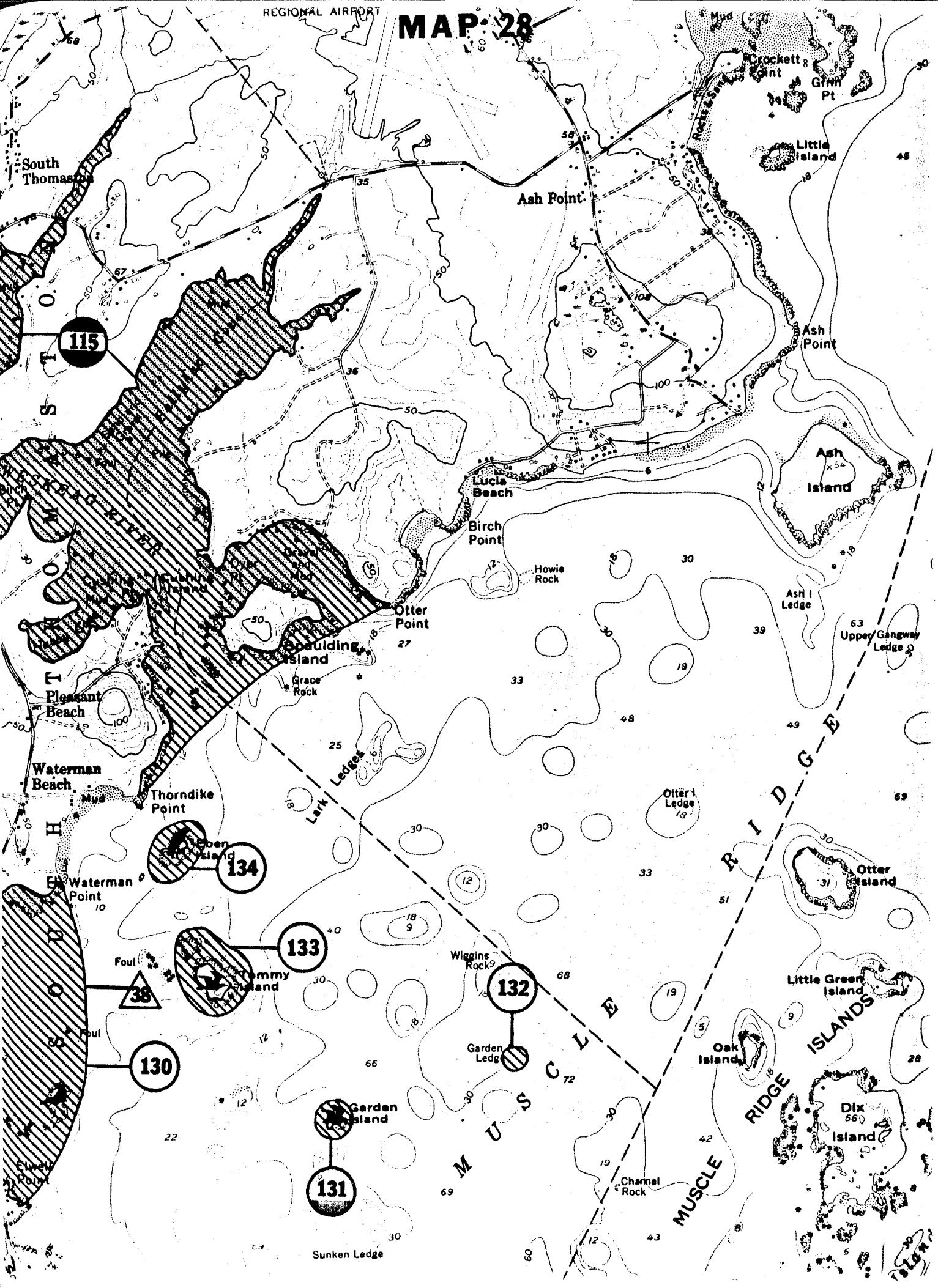
Fall	Med-Low
Winter	Low
Spring	Med-Low
Nesting	Med-Low
Post nesting	Low

134 Eben Island

Fall	Low
Winter	Low
Spring	Low
Nesting	Low
Post nesting	Low

Seals

38 Elwell Ledge
All Seasons Low


MAP 28
REGIONAL AIRPORT
South Thomaston
Ash Point
Crockett Point
Green Pt
Little Island
Ash Point
Ash Island
Lucia Beach
Birch Point
Howie Rock
Ash I Ledge
Upper Gangway Ledge
Otter Point
Goulding Island
Grace Rock
Pleasant Beach
Waterman Beach
Thorndike Point
Lark Ledges
Otter I Ledge
Otter Island
Waterman Point
Tommy Island
Wiggins Rock
Little Green Island
Oak Island
Garden Ledge
Garden Island
Dix Island
Channel Rock
Sunken Ledge
Ellery Point
MUSCLE RIDGE
MUSCLE RIDGE ISLANDS
WESSAWESKEAG RIVER
115
134
133
132
38
130
131

Appendix C

Marine wildlife observed in the 134 concentration areas of Muscongus Bay, by season.

AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cr. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
1 PEMAQUID NECK																															
Fall					O													O								O					
Winter																		O								O					
Spring																		X								X					
Nesting																										X		O			
Post nesting					O													X						X		X					
2 NEW HARBOR DRY LEDGES																															
Fall					O													O								O					
Winter													X					O							O	O					
Spring																X		O								O					
Nesting					X																			X	X				X		
Post nesting					O																					O		O			
3 LITTLE ISLAND																															
Fall																		X								X					
Winter																X		O													
Spring																															
Nesting																															
Post nesting																								X	X	O					
4 NEW HARBOR																															
Fall					X													X	X							O					
Winter																		O	X							X					
Spring																		X		O											
Nesting					X													X								X		O			
Post nesting																										X					
5 LONG COVE																															
Fall																		X						O		X					
Winter																		O						O		X					
Spring																		X							X						
Nesting																															
Post nesting					X													X								O					
6 HADDOCK ISLAND																															
Fall																		O	X							X					
Winter																		O							O	X					
Spring																	X	O		O						O					
Nesting					X	O												O					O		O	O				O		
Post nesting					O																					O					

NOTE: X : Indicates species occurrence in that season

O : Indicates a significant percent (over 1%) of Muscongus Bay's total population for that species can be expected.

AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																													
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
7 WEBBER SUNKEN LEDGE																																
Fall																		X							O							
Winter																																
Spring																		X														
Nesting																		O								X						
Post nesting				X																						X						
8 WEBBER DRY LEDGE																																
Fall																																
Winter																		X	O							O						
Spring																		X														
Nesting																																
Post nesting																																
9 BAR ISLAND W.																																
Fall																		X	X							X						
Winter																X		X	X													
Spring																		X														
Nesting																		X						O								
Post nesting																								X								
10 BROWNS HEAD																																
Fall																X		X								O						
Winter																		O	X							X						
Spring																		X							X	X						
Nesting																																
Post nesting																		X						X		O						
11 LOUDS ISLAND WEST																																
Fall																										X						
Winter		O														O		O	O	O						X						
Spring																O		O	X	O					X	X						
Nesting				X														O							X	X		X				
Post nesting																										X						
12 POLAND LEDGES																																
Fall																									X	X						
Winter																X		O														
Spring		O																O	O						X							
Nesting				X									O													X						
Post nesting																																

NOTE: X : Indicates species occurrence in that season

O : Indicates a significant percent (over 1%) of Muscongus Bay's total population for that species can be expected.

AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
13 ROUND POND																																
Fall																O		O								X						
Winter																X	X	O								X						
Spring																X										X						
Nesting																							O			X						
Post nesting																								X	X	X		X				
14 MEDOMACK RIVER N.																																
Fall					X									X												O		X				
Winter																																
Spring										O				O		X										O						
Nesting														O							O				X	X						
Post nesting																								O								
15 BROAD COVE																																
Fall					O									O				X						O	X	O		O				
Winter														O		O		O								X						
Spring														O		O	O	O			O					O						
Nesting						X												X								X						
Post nesting					O	O																		O		O		O				
16 GREENLAND COVE																																
Fall																							O			O						
Winter														O		O		O								X						
Spring														O		O	X	O		O						O						
Nesting														O				X		X				X	X	X						
Post nesting					O																			X		O						
17 HOCKOMOCK CHANNEL																																
Fall																		X							X	O						
Winter														O		O	O	X	O		O	O				X						
Spring		O																X							X	O						
Nesting																		X					O	X	X	X						
Post nesting																								X	X	X		X				
18 BREMEN LONG ISLAND																																
Fall					X													X	X							O						
Winter																O	X	O			O					O						
Spring														O		O	O	O							O	O						
Nesting																	O						O			X						
Post nesting					X												X	O						X		O		X				

NOTE: X : Indicates species occurrence in that season

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																													
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
19 HOG ISLAND																																
Fall																O		O				O			O							
Winter														O		X		O		O												
Spring																X	X	O		O				O		X	X					
Nesting					X																	O		O			X					
Post nesting					O																						O					
20 CROTCH ISLANDS																																
Fall																																
Winter																		X									X					
Spring																										X	X					
Nesting					X												X							X	X	X		X				
Post nesting																											X					
21 COOMBS LEDGE																																
Fall																	X															
Winter																	X									O						
Spring																																
Nesting																																
Post nesting																																
22 JIMS ISLAND																																
Fall													O				X									X						
Winter																X	X	X								O						
Spring					O												O									X						
Nesting																O	X						O			X						
Post nesting					O												X							X		X		O				
23 COW ISLAND																																
Fall													O			O	X									X						
Winter																X	X	X		O						X						
Spring																	X	O		O						X						
Nesting																	X						O									
Post nesting					X																		O									
24 LOUDS ISLAND EAST																																
Fall																		X								X		O				
Winter	O												X			X	X	X	O	O					O	O						
Spring	O															X	X			O					X	X						
Nesting																							O			X						
Post nesting					X																		O		X	X						

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cr. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillerot	Razorbill Auk	Common Puffin
25 KILLICK STONE ISLAND																															
Fall																									X						
Winter																X									X						
Spring																X	X								X						
Nesting																	X								X	O		O			
Post nesting																							X		X						
26 THIEF ISLAND																															
Fall																															
Winter																X	X														
Spring																X	X														
Nesting																	X					O									
Post nesting																									X						
27 JONES GARDEN ISLAND																															
Fall					O												X								O	X		O			
Winter																X	X	O	O												
Spring									O							X									X						
Nesting					O												X								O	X					
Post nesting					O																			X		O		O			
28 MARSH ISLAND																															
Fall																	X								X	X					
Winter																X	O	X		O						X					
Spring																X	X								X						
Nesting																	X														
Post nesting																										X					
29 POLINS LEDGES																															
Fall				X													X									X					
Winter		O															X	X													
Spring																	O														
Nesting																															
Post nesting					O																			X		X					
30 WRECK ISLAND																															
Fall																	X	X													
Winter		O															X	X													
Spring				O	O											X	O									X					
Nesting				X	O												O					O		O	O				X		
Post nesting				O													X					O	X	X	X		O				

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
31 WRECK ISLAND LEDGES																															
Fall					O												X								O	X					
Winter					O												X									X					
Spring																X	X														
Nesting					X												X									X					
Post nesting					O																				O	X					
32 ROSS ISLAND																															
Fall																	X														
Winter																	O									X					
Spring																	X								O	O					
Nesting					O												O								O	O			O		
Post nesting					O																			X	O	X					
33 DEVILS ELBOW																															
Fall					X												X									X					
Winter																	X	X													
Spring																															
Nesting					X																				X	X					
Post nesting																															
34 HARBOR ISLAND																															
Fall					X											X	X									X					
Winter		O												O		X	O	O	O						O	X					
Spring																	O		O							O					
Nesting																	O						O		X	X					
Post nesting					X												X						O	X	O	O					
35 CRANE ISLAND																															
Fall																O	O									X					
Winter		O															O	X						O		X					
Spring																X	X									X					
Nesting																	O						O			X					
Post nesting																	X									O					
36 WESTERN EGG ROCK																															
Fall					O												O	X							O	X					
Winter																X	X	X													
Spring					O						O					X	O								O	X					
Nesting					O												O														
Post nesting																	X								O	O					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
37 LITTLE FRANKLIN LEDGE																															
Fall																									X						
Winter																	X														
Spring					O												X								X						
Nesting					X												X								X						
Post nesting					O												O							X							
38 MIDWAY ROCKS																															
Fall																															
Winter																	O														
Spring																X	X														
Nesting																X	X		O												
Post nesting																	X														
39 EASTERN EGG ROCK																															
Fall																	O						O		O	O					
Winter																X	O								O	O					
Spring																X	O	O	O							X						
Nesting			O		X												X										O	O	O		O	
Post nesting																															
40 MONHEGAN ISLAND																															
Fall																	O								X	X					
Winter					X												X								O	O					
Spring																	X								O	X					
Nesting					X												X			O					X	O		O			
Post nesting																	X						X		O	O		O			
41 MANANA ISLAND																															
Fall		O															X									X					
Winter																	X														
Spring																	X														
Nesting																	X								X	O					
Post nesting																									O			O			
42 INNER DUCK ROCK																															
Fall																	O														
Winter																															
Spring																															
Nesting																															
Post nesting																	X								X	X				O	

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
43 DUCK ROCKS																															
Fall					O													X							O	X					
Winter																		X								X					
Spring																		X							X	X					
Nesting																		X							X	O					
Post nesting																		X							O						
44 SHARK ISLAND																															
Fall																X		O								X					
Winter																		X								X					
Spring																		O							O	O					
Nesting					O													O							O	X			O		
Post nesting																		O													
45 LITTLE EGG RK. SHLS.																															
Fall																		O	X	O											
Winter																		X								X					
Spring																		O		O											
Nesting																															
Post nesting																															
46 LITTLE EGG ROCK																															
Fall		O			O													O								O					
Winter																		O								X					
Spring																		O							O	O					
Nesting					O													X							X	X			O		
Post nesting					O													O								X					
47 OLD MAN LEDGE																															
Fall																		X													
Winter																		X								X					
Spring																		X	O	O											
Nesting					O													X		O					X						
Post nesting																															
48 OLD WOMAN LEDGE																															
Fall																		O													
Winter																		O													
Spring																		O		O											
Nesting					X													X								X		O			
Post nesting																		O													

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																												
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
49 ALLEN ISLAND																																
Fall																	O														
Winter		O														X	X	X	O					O							
Spring																	X								X						
Nesting																	X						O			X					
Post nesting																	O						O	X	X	X					
50 SEAL LEDGES																																
Fall																	O									X					
Winter																																
Spring																																
Nesting																																
Post nesting																																
51 OLD HUMP LEDGE																																
Fall																																
Winter																	X							O								
Spring																	X															
Nesting			O	X													X								O	X			X			
Post nesting				O													O							X	X	X						
52 BENNER ISLAND																																
Fall																									X							
Winter																																
Spring		O															X	X														
Nesting																							O			X						
Post nesting																																
53 FRANKLIN ISLAND																																
Fall																	X									X						
Winter																	X															
Spring																	X								X	X						
Nesting								O									O						O		X	O		O		X		
Post nesting																									X	X						
54 LONG LEDGE																																
Fall																	X	X							O							
Winter					O												X	X						O		X						
Spring		O			O												O	X								X						
Nesting					O												X								O	X						
Post nesting					O												X								O	O						

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
55 THOMPSON ISLAND																															
Fall																		X													
Winter																X		X	X							X					
Spring																X		O	O		O					X					
Nesting					X													X					O			X		O			
Post nesting					X													X								X					
56 GANGWAY LEDGE																															
Fall					O													X								X					
Winter																		X													
Spring																		X							X						
Nesting																															
Post nesting					O																				X						
57 MCGEE/BARTER IS.																															
Fall																		X													
Winter		O														X		X	X					O		X					
Spring																X		X								X					
Nesting																		X					O		X	X		O			
Post nesting					X													X							X	X					
58 TWO BUSH ISLAND																															
Fall																															
Winter																		X	X							X					
Spring																X															
Nesting																		X								X					
Post nesting																							O		O	O					
59 CRANBERRY ISLAND																															
Fall																O	X	X							X	X					
Winter		O														O	X	O		O						X					
Spring																X	O	X	X							X					
Nesting					X												X						O			X					
Post nesting					X																			X	X	O		O			
60 OTTER ISLAND																															
Fall																		X		O						X					
Winter		O														X		X	O		O					X					
Spring																X		X							X	X					
Nesting					X											O		X					O			X					
Post nesting																		X						X	O	O					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
61 GAY ISLAND																															
Fall																															
Winter		O														O	X	O		O						O					
Spring																X	X									X					
Nesting																	X														
Post nesting					O																										
62 MORSE ISLAND																															
Fall					O												O	X								X					
Winter																O	X	O	O						O	X					
Spring																	O	X	O		O					O					
Nesting					X													X			O				X	O					
Post nesting					O													X								O					
63 GULL ROCK																															
Fall																		X													
Winter																		O	X					O		X					
Spring																		X								X					
Nesting					X													X								X					
Post nesting					X																					X					
64 FRIENDSHIP LONG ISLAND																															
Fall																			X							X					
Winter																			X												
Spring																		X	X							X					
Nesting																							O								
Post nesting					X													X				O				X					
65 AMES COVE																															
Fall																															
Winter		O														X		O													
Spring		O														X	O									X					
Nesting					X												X								X	X					
Post nesting																	X								O	X					
66 HATCHET COVE																															
Fall																		O								O					
Winter																O	X	X			O					X					
Spring																X	O	O								O					
Nesting																	X					O		X	X						
Post nesting					X												X						X	X	O						

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Glideye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
67 FRIENDSHIP																															
Fall																O	O														
Winter		O														O		O								X					
Spring																X	X	O								X					
Nesting																								X		O					
Post nesting																								X	X	X					
68 MEDUNCOOK RIVER																															
Fall					X	O										O	X	O							X	O					
Winter														X		O	X	O								O					
Spring														X		X	X	O							X	O					
Nesting					X									O			X				O			X	X	X					
Post nesting					O									O			O							O							
69 HUNGRY ISLAND																															
Fall					O	O								X		O	X	O						O	X	O					
Winter		O												O		O	X	O								O					
Spring																O	O	O								X					
Nesting					X												O								X	O		O			
Post nesting					O																			X	O	O					
70 JONES NECK																															
Fall																O										X					
Winter																O					O										
Spring																O										X					
Nesting																															
Post nesting																								X							
71 BACK RIVER																															
Fall					O	O								O											X	X					
Winter																O		X							O						
Spring														O		X		X								X					
Nesting																										X					
Post nesting																								X							
72 GOOSE RIVER																															
Fall																										X					
Winter																		X													
Spring														X		O		X								X					
Nesting																										X					
Post nesting					X																					X					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
73 MEDOMACK RIVER																																
Fall					O	O								O			X	O			O				O	O					
Winter														O		O	O		O		O	O				O	O					
Spring														X			O	X	X								O					
Nesting					O									O				X						X	X	X						
Post nesting					O	O												O					O	X	X	O		O	O			
74 MAPLE JUICE COVE																																
Fall														X			O	X	O						O	O	O					
Winter																	O	X	X							O	O					
Spring														X			O	X	O								X					
Nesting					X													X					O	O			O					
Post nesting					O																			O			X		O			
75 PLEASANT POINT																																
Fall																																
Winter										O							O		X								O					
Spring																											X					
Nesting																																
Post nesting																																
76 ST. GEORGE RIVER S.																																
Fall																																
Winter																	X	X	O								X					
Spring																	X										X					
Nesting					X													X			O						X					
Post nesting																																
77 TEEL COVE																																
Fall					O													X						X		X					
Winter																	X		X													
Spring																	O															
Nesting				X																												
Post nesting																																
78 DAVIS COVE																																
Fall																																
Winter																	X										X					
Spring																		X	O													
Nesting																		X									X					
Post nesting																								X			X					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
79 PLEASANT POINT GUT																															
Fall																		O							X						
Winter																	O	X							X						
Spring																	X	X	O						X						
Nesting																		X													
Post nesting																					O										
80 TURKEY COVE																															
Fall																		X							X						
Winter																	X	X							X						
Spring																	X	X	O						X						
Nesting																								O	X						
Post nesting																								X	X						
81 DEEP COVE																															
Fall																															
Winter																		X													
Spring		O																	O												
Nesting																										X					
Post nesting																															
82 CALDWELL ISLAND																															
Fall																										X					
Winter																		X													
Spring																	X	X	X	O											
Nesting					X													X				O				X					
Post nesting					O																				X	O					
83 GOOSE ROCK																															
Fall					X														X							X					
Winter																		X													
Spring																															
Nesting																		X													
Post nesting					O																			X							
84 STONE/SEAVEY IS.																															
Fall																															
Winter					X													X													
Spring																	X	X	O							X					
Nesting																		X				O	X								
Post nesting																										X					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																																
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill AUK	Common Puffin
85 TEEL ISLAND																																	
Fall																		X															
Winter		O															X									X							
Spring																		X															
Nesting																		X					O			X							
Post nesting																										X							
86 BAR ISLAND E.																																	
Fall																		X	X														
Winter																		X			O												
Spring																		X							O	X							
Nesting																		O								O							
Post nesting				X																						X							
87 HOOPER ISLAND																																	
Fall				X														X							X	X							
Winter																X		X	O							X							
Spring																		X	O						X	X							
Nesting																		X							X	X		O					
Post nesting				X																				X	X	X							
88 MARSHALL POINT																																	
Fall																										X							
Winter																	X	X															
Spring																		X	O							X							
Nesting																	X																
Post nesting																																	
89 INNER SHAG LEDGE																																	
Fall																	X									X							
Winter																X	X	X								X							
Spring																	X																
Nesting																										X							
Post nesting																																	
90 OUTER SHAG LEDGE																																	
Fall																	X																
Winter																X	X																
Spring																	X																
Nesting																																	
Post nesting																																	

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																												
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-Bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
91 HART ISLAND																																
Fall																		X	X							X						
Winter																	X	O	X		O			O		X						
Spring																	X	O			O					O						
Nesting																		O							O	O						
Post nesting																										X						
92 GUNNING ROCKS																																
Fall																		O						O		X						
Winter																		X	X													
Spring					O												X	X							O	O						
Nesting					O													X							O	X				X		
Post nesting					O													O								O						
93 BLACK ROCK																																
Fall																		X														
Winter																		X	X							X						
Spring																		X														
Nesting																		X								X						
Post nesting																																
94 DAVIS ISLAND																																
Fall																																
Winter		O															X	X	X													
Spring																		X														
Nesting																		X								X						
Post nesting					X													X								X						
95 SHAG LEDGES																																
Fall					O													X							X	X						
Winter																	X	X	X							X						
Spring																		O								X						
Nesting					O													X							O	X			O			
Post nesting					O													O								X		O				
96 OLD CILLEY LEDGE																																
Fall					O													O	X					O		X						
Winter																		O	X							X						
Spring																	X	X		X						X						
Nesting																		X														
Post nesting					O													O								O						

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																												
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cr. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
97 DRY LEDGES																																
Fall																	X															
Winter																	O									O						
Spring																	X															
Nesting					X												X								X	X						
Post nesting																							X									
98 BURNT ISLAND																																
Fall																	O									X						
Winter																	O									O						
Spring																X	O	X							X	X						
Nesting																	X								X	X						
Post nesting													O				O								X	O						
99 EASTERN DUCK ROCKS																																
Fall																	O								O	X						
Winter																																
Spring					O																				O	O						
Nesting					O												X								O	O			O			
Post nesting																								X	O	O						
100 SEAL LEDGES/MONHEGAN																																
Fall																	X									X						
Winter																	X															
Spring																																
Nesting																																
Post nesting																																
101 THE BROTHERS																																
Fall																	X	O														
Winter		O															X									X						
Spring																	O								X	X						
Nesting					X												O								O	O				X		
Post nesting					X																				X	X						
102 HAY LEDGE																																
Fall																	O									X						
Winter																X	X	X								X						
Spring																	X							O	X							
Nesting					O												O							O								
Post nesting					O												O															

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MARINE WILDLIFE EXPECTED (by season)

AREA NUMBER AND NAME	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
103 MOSQUITO ISLAND																																
Fall																		O			O				O	X						
Winter																	X	O	X							X						
Spring																	X	O							X	X						
Nesting					X												O	O							X	X						
Post nesting																		O							X	O						
104 MOSQUITO HARBOR																																
Fall																			X							X						
Winter														X			X	X	X							X						
Spring																	O	X	X			O				X						
Nesting																		X						O		X						
Post nesting																								O	O	O						
105 MOSQUITO HEAD																																
Fall		O																X														
Winter																		O														
Spring																		O														
Nesting																		X														
Post nesting																																
106 HART LEDGE																																
Fall																		X								X						
Winter																	X	O								X						
Spring																		X														
Nesting																										X						
Post nesting																		X														
107 SOUTHERN ISLAND																																
Fall																		X								X						
Winter														O			X	X	O		O					X						
Spring																	X	O	O							O						
Nesting																										X						
Post nesting																																
108 TENANTS HARBOR																																
Fall																	O		X							O						
Winter																	X	X	O							X						
Spring																	X	X	O							X						
Nesting																							O	O		X						
Post nesting																								O				O				

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																												
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cr. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
109 NORTHERN ISLAND																																
Fall																																
Winter																	X	O								X						
Spring																																
Nesting					X												X									X						
Post nesting																							O									
110 LONG COVE																																
Fall					O													O								X						
Winter													X			O		O						O		X						
Spring													X			X		O														
Nesting																	X							X	X	X						
Post nesting																								X								
111 OTIS COVE																																
Fall					O																					X						
Winter																X										X						
Spring																	X															
Nesting					X												X									X						
Post nesting																	X							X		X		X				
112 WATTS COVE																																
Fall					X											O										X						
Winter																O		X		O						X						
Spring													X			O		O								O						
Nesting						X																		O		X						
Post nesting					X	O																		O		X						
113 BROAD COVE/CUSHING																																
Fall						O											X	X		O						O						
Winter													O			O		X								O						
Spring													X			X										O						
Nesting																	X							O	X	X						
Post nesting					X												X							O		O		X				
114 ST GEORGE RIVER N.																																
Fall	O			O	O								O			O		O							X	O						
Winter												O	O		O	O		O									O						
Spring												O	O			O	X	O								X	X						
Nesting				X	X												X			O		O	O	X	O							
Post nesting				O									O											O		O		X				

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																												
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
115 WESKEAG RIVER																													
Fall														O			X	O			O				X	O		O				
Winter		O												O			O	X	O		O					O						
Spring									O					O			O	X									O					
Nesting														O				X			O			O			O		O	X			
Post nesting					X									O										O	X	X		O				
116 WHEELER BAY																													
Fall																		X	X													
Winter														X			O	X	O								X					
Spring														X			O	X														
Nesting					X	X																		O	X	X	X					
Post nesting																		X							O	X	O					
117 SEAL HARBOR																													
Fall																		X	O								X					
Winter																	X	X	O						O		O					
Spring														X			O	X	O							X	O					
Nesting																		X			O		O	X	X	X		O				
Post nesting				O														X							O			O				
118 CLARK COVE																													
Fall				X														X									X					
Winter																	X	X	O													
Spring																		X									X					
Nesting																	O	X					O		X							
Post nesting				O																				X								
119 EAGLE ISLAND																													
Fall																		X														
Winter																		X														
Spring																		X														
Nesting																		X					O									
Post nesting																									X	X						
120 NORTON/WHITEHEAD IS.																													
Fall				X									X					O								X						
Winter		O															X	O	X					O		X						
Spring																	X	O	O	O							X					
Nesting																		X					O					O				
Post nesting																		X								X	X					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
121 HIGH ISLAND																															
Fall																		X							X						
Winter																	X	X							X						
Spring																X	X														
Nesting																	X						O		X						
Post nesting																															
122 SEAVEY LEDGES																															
Fall																	X														
Winter																	X														
Spring																	X														
Nesting																	O														
Post nesting																									X						
123 NORTON ISLAND LEDGES																															
Fall				O													O									X					
Winter																	X									X					
Spring																	O	O													
Nesting				X													O														
Post nesting				O													O														
124 WHEELER BIG ROCK																															
Fall																	X														
Winter				X													X									O					
Spring																															
Nesting																	O									X					
Post nesting																															
125 METINIC ISLAND																															
Fall									O								O	O	O	O				O	O						
Winter																O	O	X						O	X						
Spring				O								O					O		X					O	O						
Nesting				O													O		O					O	O	O		O	O	O	
Post nesting				O												O	O							X	O	O					
126 HOG ISLAND/NUBBLE																															
Fall																	X	X							O	X					
Winter																	X									O					
Spring																	X									X					
Nesting																	X								O	X			X		
Post nesting																	O								O	O					

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																														
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
127 METINIC GREEN ISLAND																															
Fall				O														O								O					
Winter					O												X	O	X					O		X	O					
Spring					O													O							O	X						
Nesting					O													O							O							
Post nesting																		O			O				O	O						
128 YELLOW RIDGE ISLAND																															
Fall					O													X	X							O					
Winter																		O							O	X					
Spring																		X								X					
Nesting					O													O							X	X					
Post nesting																															
129 SEAL ISLAND																															
Fall																		X								X					
Winter																	X	X	X							X					
Spring																		X								O					
Nesting					X													X								O					
Post nesting					O													O						X							
130 ELWELL POINT																															
Fall					O													X								X					
Winter																		O	X							X					
Spring																	O	X													
Nesting																		X								X		O			
Post nesting																								O		O					
131 GARDEN ISLAND																															
Fall					O													X								X					
Winter																		X	X							X					
Spring					O													X						O	O	O					
Nesting					O													O							O	X		X		O	
Post nesting					O																			X		O					
132 GARDEN ISLAND LEDGE																															
Fall																		X													
Winter																		X													
Spring																		X	O												
Nesting																															
Post nesting																															

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AREA NUMBER AND NAME	MARINE WILDLIFE EXPECTED (by Season)																																
	Seals	Loon	Leach's Petrel	Gannet	Cormorant	Great Blue Heron	Snowy Egret	Bl. Cw. Nt. Heron	Glossy Ibis	Canada Goose	Snow Goose	Brant	Mallard	Black Duck	Teal	Scaup	Gldeye./Bfflhd.	Common Eider	Oldsquaw	Scoter	Merganser	Unid. Waterfowl	Bald Eagle	Osprey	Shorebirds	Blk-bk. Gull	Herring Gull	Laughing Gull	Unid. Gull	Tern	Black Guillemot	Razorbill Auk	Common Puffin
133 TOMMY ISLAND																																	
Fall					O													X								O	O						
Winter																		X									X						
Spring																		O									O						
Nesting																		X								O	O				O		
Post nesting					O																						O						
134 EBEN ISLAND																																	
Fall																		X															
Winter																																	
Spring																		X									X						
Nesting																		X						O			X						
Post nesting																											X						
Fall																																	
Winter																																	
Spring																																	
Nesting																																	
Post nesting																																	
Fall																																	
Winter																																	
Spring																																	
Nesting																																	
Post nesting																																	
Fall																																	
Winter																																	
Spring																																	
Nesting																																	
Post nesting																																	
Fall																																	
Winter																																	
Spring																																	
Nesting																																	
Post nesting																																	

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