

HARBOR SEAL POPULATIONS AND FISHERIES INTERACTIONS

WITH MARINE MAMMALS IN NEW ENGLAND, 1984

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FOURTH ANNUAL REPORT

Contracts NA-80-FA-C-00029

and NA-84-EA-C-00070

To

Northeast Fisheries Center

National Marine Fisheries Service

U.S. Department of Commerce

Woods Hole, Massachusetts

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INTRODUCTION

This report summarizes research activities conducted during 1984 under contracts NA-80-FA-C-00029 and NA-84-EA-C-00070 to the Northeast Fisheries Center, NMFS. The assessment of marine mammal-fisheries interactions was a primary goal under both contracts and represented the focus of 1984 research activities. Objectives were to :

- 1) document the species and number of marine mammals incidentally taken in New England groundfish gillnets,
- 2) document the circumstances of entanglement and identify potential means of reducing or mitigating losses associated with entanglement,
- 3) identify population characteristics of the marine mammals taken and assess the impact of this take on the populations involved,
- 4) assess the distribution and timing of the entanglements relative to the distributions of marine mammal populations, and
- 5) investigate marine mammal conflicts with other fisheries to identify those qualifying for a small-take exemption.

FISHERIES INTERACTIONS

Groundfish Gillnet Fishery

Permit Distribution - A small-take exemption to the Marine Mammal Protection Act was obtained in February 1984 on behalf of the New England groundfish gillnetters. Personnel of UMO, acting as the receiver of reports, distributed permits and logbooks (Appendix A) to gillnetters to facilitate the reporting of their incidental capture of 2

phocid and 5 small cetacean species (Appendix B). To date, 11 gillnetters have received permits and logbooks in which they reported the capture of 30 harbor porpoise (Phocoena phocoena), 5 harbor seals (Phoca vitulina), and 4 grey seals (Halichoerus grypus) in 1984. Although the seasonal and transient nature of this fishery makes it difficult to determine overall gillnetting effort, we believe this sample to be approx. 10% of the groundfish gillnetters fishing in Maine, New Hampshire, and Massachusetts in 1984.

Carcass Collection - Cooperating gillnetters were asked to bring legally taken marine mammal carcasses to shore for necropsy by UMO personnel, as authorized under Scientific Permit No. 431. Twenty-five of the 39 (64%) marine mammals reported in logs were collected for necropsy, including 21 (10M:11F) Phocoena and 4 (2M:2F) harbor seals (Table 1).

The harbor seals were collected from 25 June - 29 August; all were young of the year. Preliminary examination of their stomach contents revealed the presence of fish otoliths, flesh and bones, squid beaks, and shrimp. In addition, stomachs of all specimens were infected with anasakine nematodes. Nematodes were also collected from the heart of one specimen and lungs of another.

Based on body length and macroscopic gonadal examination of the porpoise carcasses, 4 of the 10 males (40.0%) and 3 of the 11 females (27.3%) were adults; 2 of the adult females were lactating (16 August and 19 September). Tooth sectioning and microscopic gonadal examination will be used to verify these findings. Stomachs of 13 of the carcasses (61.9%) contained more than 40 cc of food remains; traces of identifiable prey remains were found in all specimens. Prey items

identified to date include mackerel, gadids, squid, shrimp, and several unidentified fish species. Parasites were recovered from all specimens. Nematodes were present in the lungs of 16 (76.2%), ear sinuses of 15 (71.4%), heart of 4 (19.0%) and stomach of 3 (14.3%) porpoises. Trematodes were present in the liver of 16 (76.2%) of the specimens. Further identification of prey remains and endoparasites is in progress. Duplicate tissue samples were collected from the blubber, skeletal muscle, heart, liver, and kidney for future contaminant analysis.

At-Sea Sampling - Although all cooperators volunteered to allow UMO personnel onboard for at-sea observation fishing activities, vessel size and scheduling conflicts limited the observation to 4 vessels. The boats samples fished 3 or 4 "strings" of up to 20 nets, each measuring approximately 300 ft x 12 ft and constructed of 6 - 6 1/2" mesh monofilament. Between 14 June and 19 September 1984, we observed the retrieval of 601 nets on these boats. Although nets are generally tended daily, 60 of the 601 nets had been set for two nights and 20 had been set over 3 nights. Therefore, a more realistic measure of the effective fishing effort observed is 701 net-days (net-day = each day a net was left in the water, tended or not, see Gilbert & Wynne 1983).

Six marine mammals (4 Phocoena: 2 grey seals) were recovered from gillnets during at-sea sampling, resulting in an observed capture rate of 1 capture / 116.8 net-days. All marine mammals were entangled in separate nets and were dead when recovered; 2 Phocoena were entangled in nets at opposite ends of one string. Characteristics of the strings involved in marine mammal by-catch, including depth, length, and fish species caught, are not obviously different from those which did not

capture mammals (Table 2). Statistical comparisons will be made of these and other parameters when the sample size is sufficiently large.

Observations of free-swimming marine mammals were also recorded during at-sea sampling. A minke whale was observed as it surfaced repeatedly within 3 m of a vessel that was hauling in a net on 16 June 1984. The minke circled the boat at least 3 times and swam parallel to the incoming net without becoming entangled. It is possible the whale was feeding on invertebrates brought to the surface by the net and netted fish. Although gillnetters reported large "schools of porpoises" on the fishing grounds in mid-August, no evidence of feeding groups was observed during at-sea sampling.

Lobster Fishery

Marine mammal conflicts with the lobster fishery include cetacean and seal entanglement in trap warps, capture of pups in traps, robbing of bait from traps, and perceived competition for shedding lobsters by seals. Entanglement in the warps of inshore lobster traps is rare; scattered reports of large whales entangling in the bridled warps of offshore traps have been received but not fully investigated. Inshore lobstermen have voiced concern over loss of bait to seals who reportedly open traps or enter the trap "head" to rob the bait. Fishermen reporting this type of interaction say the problem is usually restricted to spring when fresh bait is used and probably involves a few "repeat offenders".

We accompanied one lobsterman on 6 occasions between 21 July and 25 October 1984 as he checked 1280 traps. His traps were located in the relatively open waters of Penobscot Bay as well as immediately off islands and ledges, many of which were used by seals. No direct interactions with seals were observed. Additional at-sea sampling is

scheduled for spring 1985 when fresh bait is used.

Although we received infrequent reports of seal pups being caught in lobster traps, a Maine Department of Marine Resource official (Phil Averill, Fisheries Technology Service, pers. commun.) reported observations of approximately 2 pup captures per port per year by mid-coastal lobster fishermen. The extent, location, and timing of this incidental take will be investigated further in 1985.

The interaction of greatest concern to lobstermen interviewed was competition with seals for lobsters, particularly "shedders". Lobstermen have witnessed an increase in seal numbers while experiencing a reduction in their lobster harvest. Although some fishermen acknowledge other factors which may negatively affect the lobster harvest (e.g. overharvest, habitat destruction, illegal harvests), many feel the increasing number of seals is directly responsible for the poor take this year. Several individuals, including the president of the Maine Lobstermen's Association, have voiced concerns to UMO researchers and NMFS personnel and requested action to reduce competition with seals. Assessment of indirect conflicts between this fishery and the harbor seal population will necessitate further documentation of 1) changes in the harbor seal population level, 2) spatial and temporal variation in harbor seal food habits, and 3) degree of overlap in human/seal foraging patterns.

Herring Fisheries

We had planned to interview and observe stop seiners and weir fishermen in mid-coastal Maine to identify the conflicts existing between fixed herring fisheries and marine mammals. Because the herring did not come inshore in 1984, this research will be attempted in the

summer of 1985.

Purse seiners were reported to accidentally entrap seals and "dolphins" with seines set for herring off mid-coast Maine. A captain of a herring-tender boat reported observing the incidental capture and release of 2 seals in one week of September. He reported that, occasionally, seals drown before the seine is emptied. We hope to interview purse seiners and accompany tenders in the summer of 1985 in order to identify the marine mammals involved and to estimate the incidental marine mammal capture rate in this fishery.

Halibut Tub Trawls

Tub trawls are used to fish for halibut and other groundfish in mid-coast Maine. A galvanized tub holds a coil of line upon which hooked gangions are spaced, each typically baited with herring and left to fish overnight. Although reports of marine mammal conflicts are rare, one tub trawler reported landing 1 or 2 large seals a year which had been hooked through the skin and recovered alive. He has never caught one by the mouth and assumes the seals are snagged as they follow the baited hook. Infrequent reports elsewhere suggest seals may rob bait off the longlines and be hauled in if they have swallowed the hook. We will interview tub trawl fishermen to estimate the levels of seal by-catch in this fishery and determine if application for a small-take permit is appropriate.

SEAL TAGGING

Effort was resumed to capture and tag harbor seal pups to facilitate the identification of individuals and document their movements. Eighteen pups (11M:7F) were captured on 9 ledges in Blue Hill and Jericho Bays from 9-23 June 1984. A numbered yellow Allflex

tag and orange and white nylon streamer were applied to the webbing of each hind flipper. Pups were released at the site after sex and standard measurements were recorded.

Nine observations of tagged seals were reported in 1984; 4 were pups tagged in 1983, 4 were pups tagged in 1984, and one was of an undetermined cohort (Table 3). In addition, a 1983 tag and streamer were recovered from a tidal pool where both had apparently been sloughed from a live seal.

Table 1. Marine mammals recovered from active fishing gear and necropsied under Scientific Permit No. 431 during 1984. All measurements in cm.

| <i>Phocoena phocoena</i> | | | | | | |
|--------------------------|-----|-------------------|----------------|-------------|----------------|-------------------|
| Collection Date | Sex | Std. Length | Axillary Girth | Fluke Width | Flipper Length | Specimen File No. |
| 6-20 | F | 126+ ¹ | - | Removed | 21.0 | PP4-001 |
| 6-22 | M | 117 | 74.0 | 26.7 | 18.5 | PP4-002 |
| 6-27 | M | 120.4 | 71.4 | 16.4 | 25.0 | PP4-003 |
| 6-27 | F | 125.0 | 82.3 | 30.5 | 20.0 | PP4-004 |
| 6-27 | M | 144.0 | 84.5 | 30.0 | 21.5 | PP4-005 |
| 8-08 | M | 149.0 | 85.0 | 34.7 | 18.5 | PP4-006 |
| 8-09 | M | 134.3 | - | 29.5 | 17.5 | PP4-007 |
| 8-10 | F | 126.0 | - | 33.5 | 19.0 | PP4-008 |
| 8-13 | F | 136.0 | - | 30.5 | - | PP4-009 |
| 8-14 | M | 137.0+ | 82.5 | Removed | 21.3 | PP4-010 |
| 8-14 | M | 125.8 | 83.7 | 232.0 | 20.0 | PP4-011 |
| 8-16 | F | 155.0 | 95.6 | 42.5 | 24.5 | PP4-012 |
| 8-19 | M | 131.5 | 84.0 | 35.2 | 20.3 | PP4-013 |
| 8-19 | F | 140.0 | 86.0 | 31.0 | 18.5 | PP4-014 |
| 8-23 | F | 126.5 | 80.0 | 33.2 | - | PP4-015 |
| 9-04 | F | 128.0 | 83.3 | 32.5 | 20.0 | PP4-016 |
| 9-05 | M | 141.2 | 82.5 | 35.5 | 20.8 | PP-017 |
| 9-08 | F | 127.0 | 81.7 | 32.9 | 19.0 | PP4-018 |
| 9-12 | F | 137.0 | 83.1 | 33.5 | 19.8 | PP4-019 |
| 9-19 | F | 162.8 | 98.4 | 41.2 | 22.3 | PP4-020 |
| 10-09 | M | 127.8 | 79.9 | 32.1 | 18.0 | PP4-021 |

¹ (+) indicates removal of fluke prevented measurement of total length.

Table 1. (Cont.)

Phoca vitulina

| Collection Date | Sex | Std. Length | Axillary Girth | Fluke Width | Flipper Length | Specimen File No. |
|--------------------|-----|----------------|-------------------|----------------|-------------------|----------------------|
| 6-27 | F | 88.0 | 58.0 | 17.0 | 22.5 | PV4-001 |
| 8-09 | M | 89.5 | 63.0 | 15.5 | 21.0 | PV4-002 |
| 8-21 | M | 106.8 | 71.0 | 18.2 | 25.4 | PV4-003 |
| 8-29 | F | 93.7 | 60.0 | 19.2 | 10.7 | PV4-004 |
| 10-09 | M | 139.2 | 84.5 | 21.2 | 26.7 | PV4-005 |

Table 2. Characteristics of gillnet "strings" observed with and without marine mammal (mm) by-catch during at-sea sampling, 1984.

| | | Strings with mm by-catch (N = 5) | Strings without mm by-catch (N = 26) |
|--|------------------------|--|--|
| Depth | range | 47-55 fathoms | 40-77 fathoms |
| | mean | x = 52.3 | 55.3 |
| Length | range | 16-20 nets | 15-23 nets |
| | mean | x = 19.3 | x = 19.4 |
| # days since tended | range | 1 - 3 days | 1 - 2 days |
| | mean | 1.67 | 1.12 |
| Species Composition ¹ of fish caught | | | |
| | Cod | 4 (80) | 15 (57.7) |
| | Flatfish | 1 (20) | 3 (11.5) |
| | Dogfish | 1 (20) | 0 |
| | Red Hake | 2 (40) | 5 (19.2) |
| | Mackerel | 0 | 1 (3.8) |
| | T-Pollock ² | 0 | 3 (11.5) |
| | Misc. ³ | 0 | 1 (3.8) |

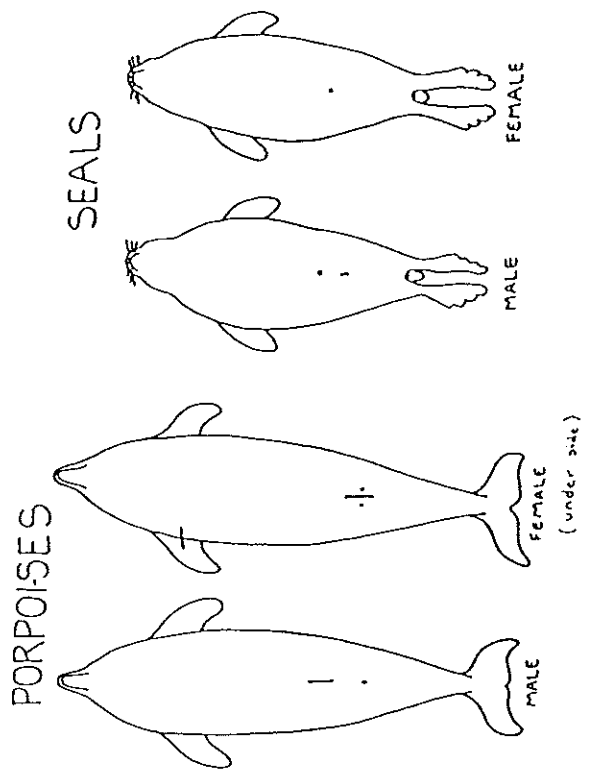
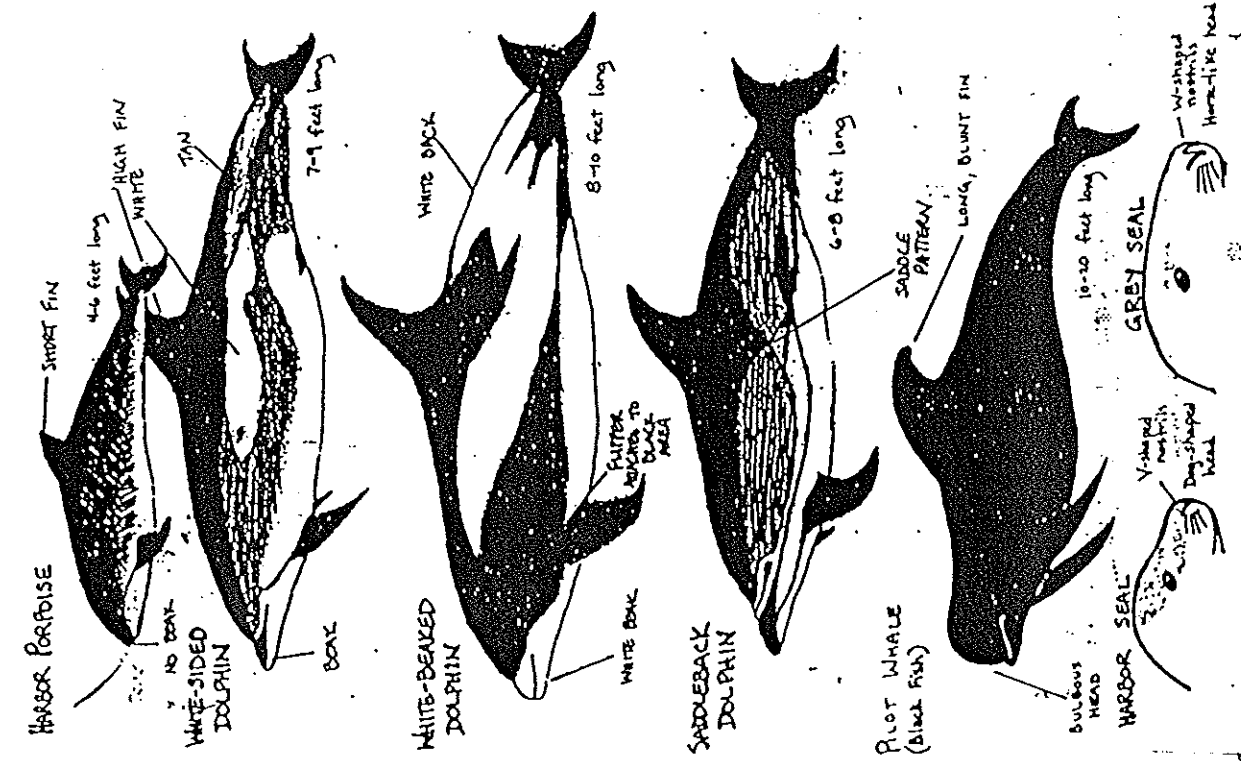
¹ Number (%) of strings in which these fish species represented at least 40% of the haul, as determined by visual estimate of the number of fish landed.

² T-Pollock = immature pollock of unmarketable size.

³ Misc. = sea ravens, sculpins, gosefish

Table 3. 1984 Observations of harbor seals tagged in Jericho and Blue Hill Bays, Maine.

| <u>Date Resighted</u> | <u>Location</u> | <u>Date Tagged</u> | <u>Approximate Straight Line Distance From Nearest Tag Site</u> |
|-----------------------|------------------|--------------------|---|
| <u>1984</u> | | | |
| 6/10/84 | Jericho Bay, ME | 6/9/84 | < 1 km |
| 6/11/84 (2 pups) | Jericho Bay, ME | 6/9 or 6/10/84 | < 1 km |
| 7/6/84 | Digby, N. S. | 6/23/84 | 230 km |
| <u>1983</u> | | | |
| 1/29/84 | Race Pt. MA | 6/5 to 6/9/83 | 248 km |
| 3/15/84 | Race Pt. MA | 6/5 to 6/9/83 | 248 km |
| May 1984 | Shelburne, N. S. | 6/5 to 6/9/83 | 248 km |
| 6/27/84 | Jericho Bay, ME | 6/2 to 6/22/83 | 2 km |
| <u>UNID</u> | | | |
| 10/29/84 | Manomet, MA | ? | 268 km |



LETTER OF EXEMPTION

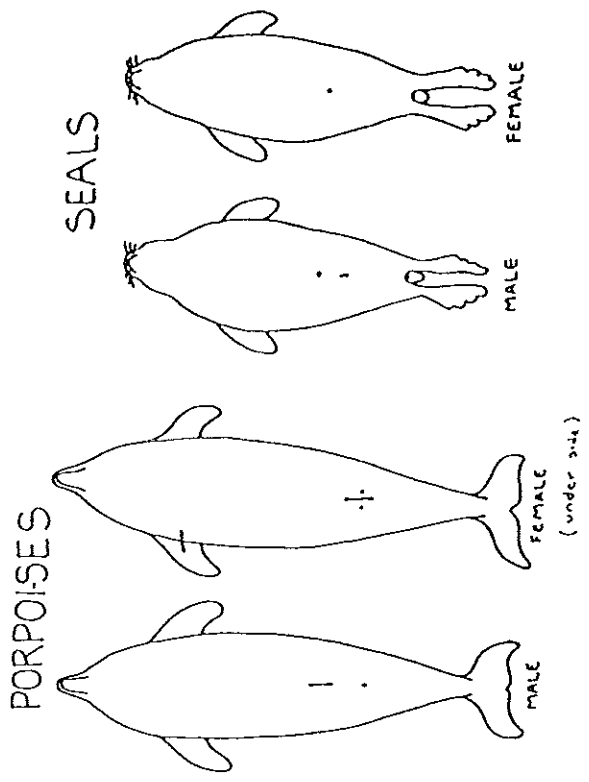
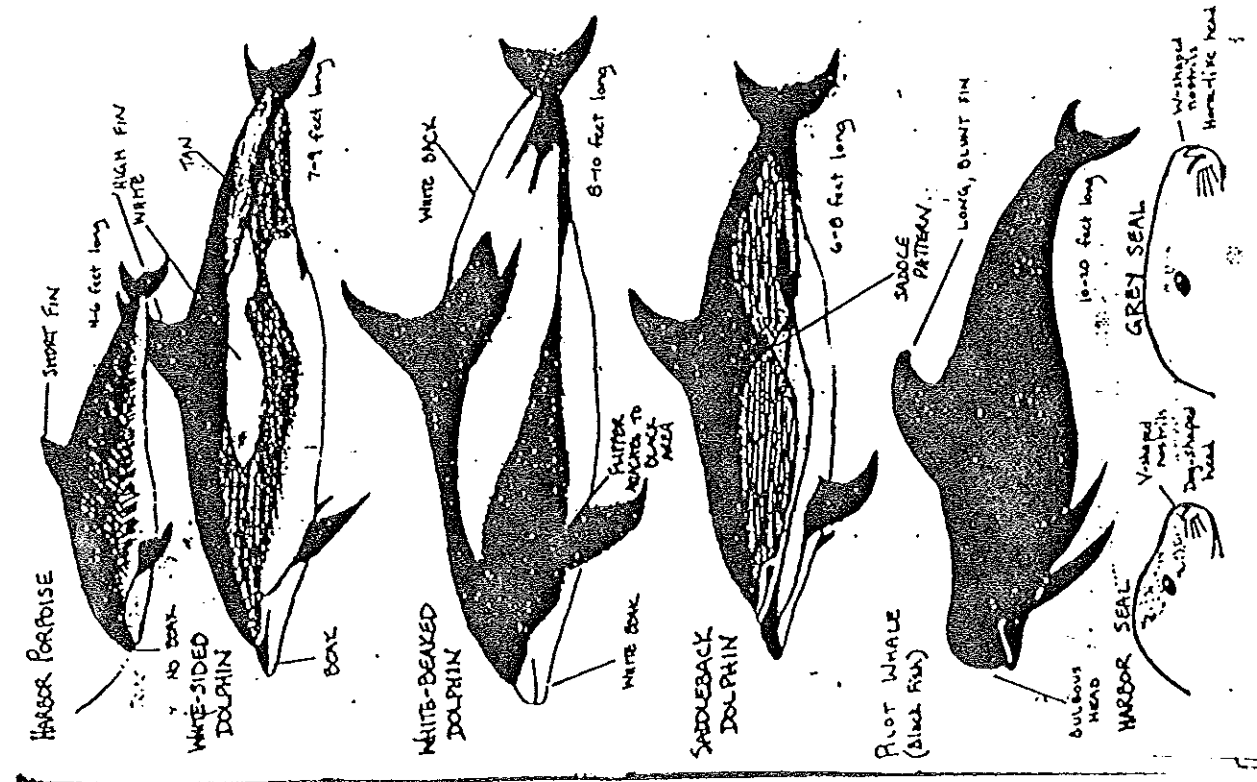
Appendix B

Marine mammal species and annual take allowed under an incidental take permit granted to New England commercial groundfish gillnetters, February 1984.

| <u>Species</u> | <u>Allowable Take</u> |
|--|-----------------------|
| Harbor seal (<u>Phoca vitulina</u>) | 50 |
| Harbor porpoise (<u>Phocoena phocoena</u>) | 180 |
| Grey Seal (<u>Halichoerus grypus</u>) | } |
| White-sided dolphin (<u>Lagenorhynchus acutus</u>) | } |
| Common dolphin (<u>Delphinus delphis</u>) | } |
| White-beaked dolphin (<u>Lagenorhynchus albirostris</u>) | } |
| Pilot whale (<u>Globicephala melaena</u>) | } |
| | total of 50 |

Table 3. 1984 Observations of harbor seals tagged in Jericho and Blue Hill Bays, Maine.

| <u>Date Resighted</u> | <u>Location</u> | <u>Date Tagged</u> | <u>Approximate Straight Line Distance From Nearest Tag Site</u> |
|-----------------------|------------------|--------------------|---|
| <u>1984</u> | | | |
| 6/10/84 | Jericho Bay, ME | 6/9/84 | < 1 km |
| 6/11/84 (2 pups) | Jericho Bay, ME | 6/9 or 6/10/84 | < 1 km |
| 7/6/84 | Digby, N. S. | 6/23/84 | 230 km |
| <u>1983</u> | | | |
| 1/29/84 | Race Pt. MA | 6/5 to 6/9/83 | 248 km |
| 3/15/84 | Race Pt. MA | 6/5 to 6/9/83 | 248 km |
| May 1984 | Shelburne, N. S. | 6/5 to 6/9/83 | 248 km |
| 6/27/84 | Jericho Bay, ME | 6/2 to 6/22/83 | 2 km |
| <u>UNID</u> | | | |
| 10/29/84 | Manomet, MA | ? | 268 km |



LETTER OF EXEMPTION