Summary of marine mammal observations during 2004 surveys

Massachusetts Water Resources Authority

Environmental Quality Department
Report ENQUAD 2005-03

Citation

Short LM, Schaub E. 2005. **Summary of marine mammal observations during 2004 surveys.** Boston: Massachusetts Water Resources Authority. Report ENQUAD 2005-03. 18 p.

SUMMARY OF MARINE MAMMAL OBSERVATIONS DURING 2004 SURVEYS

for

MWRA Harbor and Outfall Monitoring Project

submitted to

MASSACHUSETTS WATER RESOURCES AUTHORITY
Environmental Quality Department
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129
(617) 242-6000

prepared by

Lynda M. Short
Erika A. Schaub
Battelle

submitted by

Battelle
397 Washington Street
Duxbury, MA 02332
(781) 934-0571

March 14, 2005

Report No: 2005-03

Acknowledgements

Marine mammal observers were individually contracted to assist Battelle in collecting the data contained in this report. The dedication and professionalism of David Silvia is appreciated.

Special thanks are extended to Mason Weinrich, Director of the Whale Center of New England and Owen Nichols from the Center for Coastal Studies for their review and input of general whale sighting information in this report.

Thanks and appreciation are also extended to the captains, crews, and scientific personnel of the R/V *Aquamonitor,* F/V *Isabel S,* R/V *Merganser,* and F/V *Shanna Rose,* who assisted in the surveys.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 Introduction

At least five endangered species of whales are known to visit or inhabit the Massachusetts and Cape Cod Bay area (EPA 1993): the right whale, humpback whale, finback whale, sei whale (rarely observed) and blue whale (rarely observed). Several non-endangered species are also found: minke whales, harbor porpoise, several dolphin species, gray seals, and harbor seals.

Since 1995, Massachusetts Water Resources Authority (MWRA) has included marine mammal observers on monitoring surveys. The MWRA surveys are being conducted as part of the long-term Harbor and Outfall Monitoring Project designed to verify compliance with the discharge permit and to assess the potential environmental impact of treated sewage effluent discharge into Massachusetts Bay. These observers were included in response to a National Marine Fisheries Service (NMFS) request that MWRA provide observational data and set a positive example by using observers to minimize the chances of collision with a right whale. In addition to looking for right whales, observers conducted observations for other marine mammals. On surveys where observers were not present, the chief scientist and field crew documented any incidental sightings of marine mammals.

Marine mammal observers were present on 17 water quality surveys during 2004 (12 Nearfield, three Farfield, and two bacteria surveys). Throughout the year, observers were present on all of the Nearfield water column surveys (n=12) to document the sightings of right whales in the Nearfield. Observers were also placed on the vessel during other water quality surveys conducted between January to mid-May and in December. Included in these additional surveys were three (WF041, WF042, and WF044) of the six Farfield water column surveys, and one each (PC041 and PA041) of the fecal coliform and fecal adverse surveys.

2.0 Background

A brief description of when marine mammals are expected to be found in Massachusetts and Cape Cod Bays is presented and discussed below.

The right whale (*Eubalaena glacialis*) is critically endangered. Based on historical sightings made, right whales can be expected to visit Massachusetts and Cape Cod Bays throughout the year (Brown *et al.* 2002), with peak abundance in February, March and early April (Hamilton and Mayo 1990). Over the past four decades, 72% of the catalogued population of right whales has visited Cape Cod Bay and Massachusetts Bay (Brown *et al.* 2002). For the period of 1978 through 1986, using photographed sightings of right whales collected from whale watch boats and research cruises, the total number of individually identified right whales in Cape Cod Bay ranged from a single animal in 1978 to 47 individuals in 1986 (Hamilton and Mayo 1990). Within the last five years, the use of the eastern portion of Stellwagen Bank/Wildcat Knoll by right whales has been noted during extended surveys by the Center for Coastal Studies (Brown *et al.* 2002).

The humpback whale (*Megaptera novaeangliae*) is an endangered species of whale known to feed within the Gulf of Maine in the spring, summer and fall (Waring *et al.* 1999). Historic records indicate that humpbacks have been documented on Stellwagen Bank from mid-April through November, with a peak abundance in May and June (CeTap 1982; NMFS 1991). However, distribution appears to correlate with prey densities (Waring *et al.* 1999). In 1992-1993, humpbacks were most abundant in offshore waters of Cultivator Shoals and the Northeast Peak of Georges Bank and less abundant in the nearshore areas

(Langton *et al*. 1994). In 1996-1997, an increase in humpback whale sightings correlated with an abundance of sandlance (*Ammodytes dubius*) in the Stellwagen Bank area (Waring *et al.* 1999).

The finback whale (*Balaenoptera physalus*) is considered to be an endangered species and is the most abundant and frequently sighted of the endangered whales that visit Massachusetts and Cape Cod Bays (EPA 1993). Finbacks are sighted year round in the Stellwagen Bank area with a peak abundance occurring between the spring and fall (Pett and McKay 1990).

The sei whale (*Balaenoptera borealis*) and blue whale (*Balaenoptera musculus*) are endangered species rarely sighted in Massachusetts and Cape Cod Bays (EPA 1993). Both blue and sei whales typically remain in deeper water (more than 100 meters) and further offshore (CeTap 1982). However, sightings of these species in coastal areas may correspond to changes in prey distribution (Payne *et al.* 1990, Wenzel *et al.* 1988).

The minke whale (*Balaenoptera acutorostrata*) is a non-endangered species typically seen in the Stellwagen Bank area during the spring, summer and fall (CeTap 1982; Pett and McKay 1990). During the winter, minke whale sightings in New England appear to decline dramatically (Waring *et al.* 1999).

The Atlantic white-sided dolphin (*Lagenorhynchus acutus*) is a species of dolphin found from central west Greenland to North Carolina (Waring *et al.* 1999). The Gulf of Maine stock of Atlantic white-sided dolphins is classified as strategic by the National Marine Fisheries Service (Waring *et al.* 1999). Sightings of these dolphins in the Stellwagen Bank and Cape Cod Bay areas are common in the spring and, to a lesser extent, the fall (Pett and McKay 1990).

The Atlantic pilot whale or long-finned pilot whale (*Globicephala melaena)* is the largest species of dolphin found in cool temperate waters off Labrador, Newfoundland, and in the St. Lawrence River with sporadic sightings as far south as Maryland and Virginia (Bulloch 1993). Pilot whales form schools of a few to many hundreds of individuals and are mainly found relatively close to shore. Pilot whale distribution and abundance appear to be linked to the topography of the sea floor and the abundance of their primary food source, squid (Harrison and Bryden 1989).

The gray seal (*Halichoerus grypus*) is a non-endangered species of pinniped found from Maine to Long Island Sound (Rough 1995). A small, year round breeding population is known to occur on outer Cape Cod and Nantucket Island (Waring *et al.* 1999). The majority of gray seal sightings in Cape Cod Bay and the Stellwagen Bank area occur during the winter and spring, although periodic sightings have been recorded in the summer (Center for Coastal studies unpublished data).

Harbor porpoises (*Phocoena phocoena*) of the Gulf of Maine/Bay of Fundy stock are classified as strategic by the National Marine Fisheries Service (Waring *et al.* 1999). Historic data indicate that harbor porpoises can be found in the Stellwagen Bank area and Cape Cod Bay from December through June (Pett and McKay 1990).

The harbor seal (*Phoca vitulina*) is a non-endangered species of pinniped commonly found in the near shore waters around New England (Katona *et al.* 1993). Harbor seals are most frequently seen in the Stellwagen Bank and Cape Cod Bay areas in the winter and early spring with sightings beginning in late September (Pett and McKay 1990).

3.0 Methods

Marine mammal observations were performed during all daylight hours while transiting during Nearfield water column surveys (Figure 1), and while the vessel was on-station for sampling operations. Additionally, marine mammal observers were present during three winter/spring Farfield surveys (Figure 2), and two Fecal Coliform/Adverse Condition surveys (Figure 3) during the 2004 survey year. During vessel transits, the observer continuously scanned the sea surface from directly ahead to 90 degrees abeam on either side of the vessel. Initial sightings were made by eye with confirmation and identification aided by binoculars. While on-station, the observer scanned 360 degrees around the vessel. The observer was typically positioned at the highest and most secure vantage point of the survey vessel. Weather conditions, safety of the observer, and limiting interference with the operation of the vessel and sampling team were all factors that influenced the position of the observer on board the vessel. Four survey vessels were used as observation platforms during the course of the year. The observer's eye-height above the sea surface was approximately 5 meters on the F/V *Isabel S* and 2.5 meters aboard the R/V *Aquamonitor,* R/V *Merganser, and* F/V *Shanna Rose.* Observations were conducted 40 minutes out of every hour and were suspended when visibility was reduced to zero or when darkness occurred.

Vessel track, station sequence, and number of stations varied among cruises, due to the constraints of weather, special survey requirements, or both.

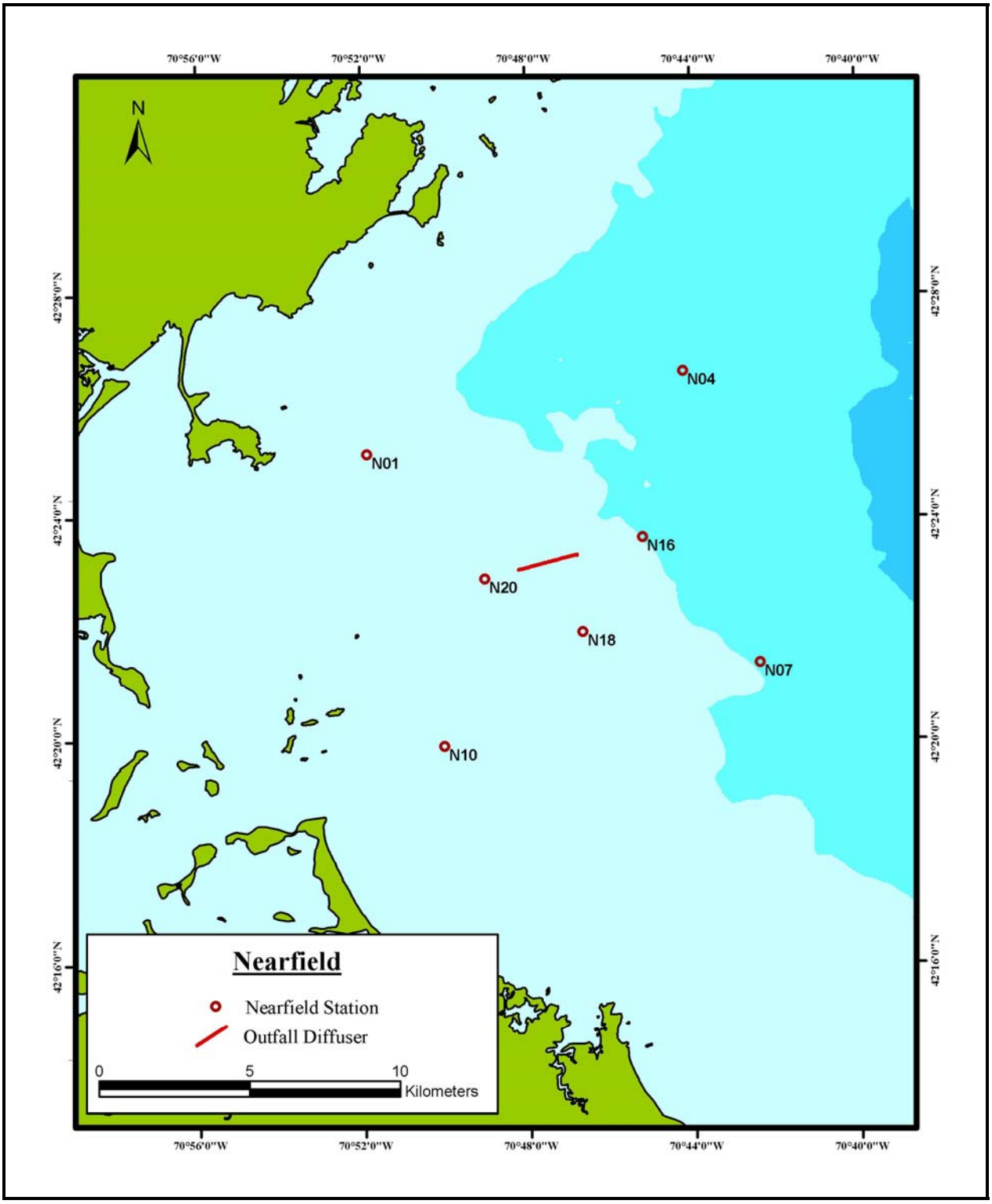

Figure 1. Location of Nearfield Stations

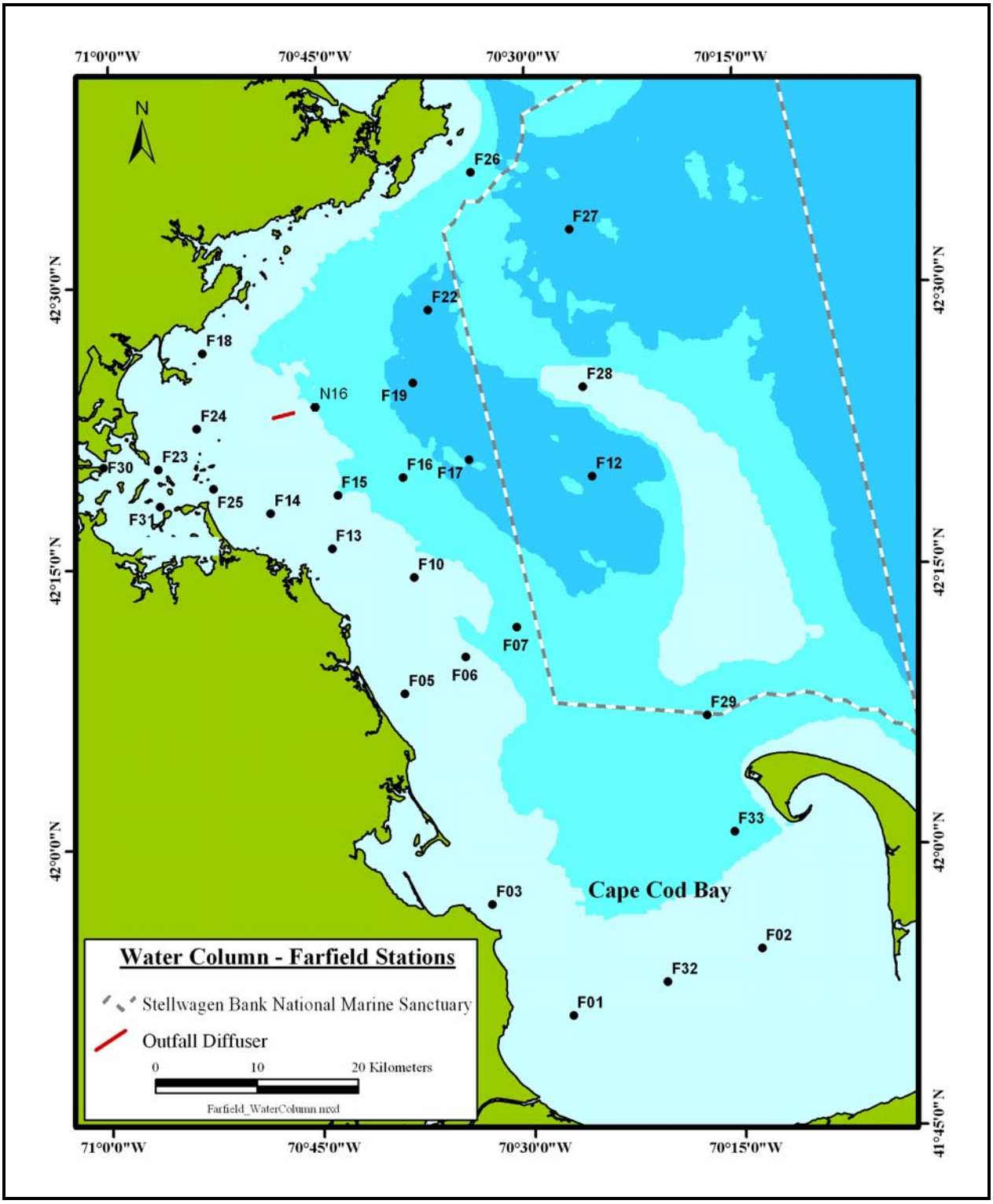

Figure 2. Location of Farfield Stations

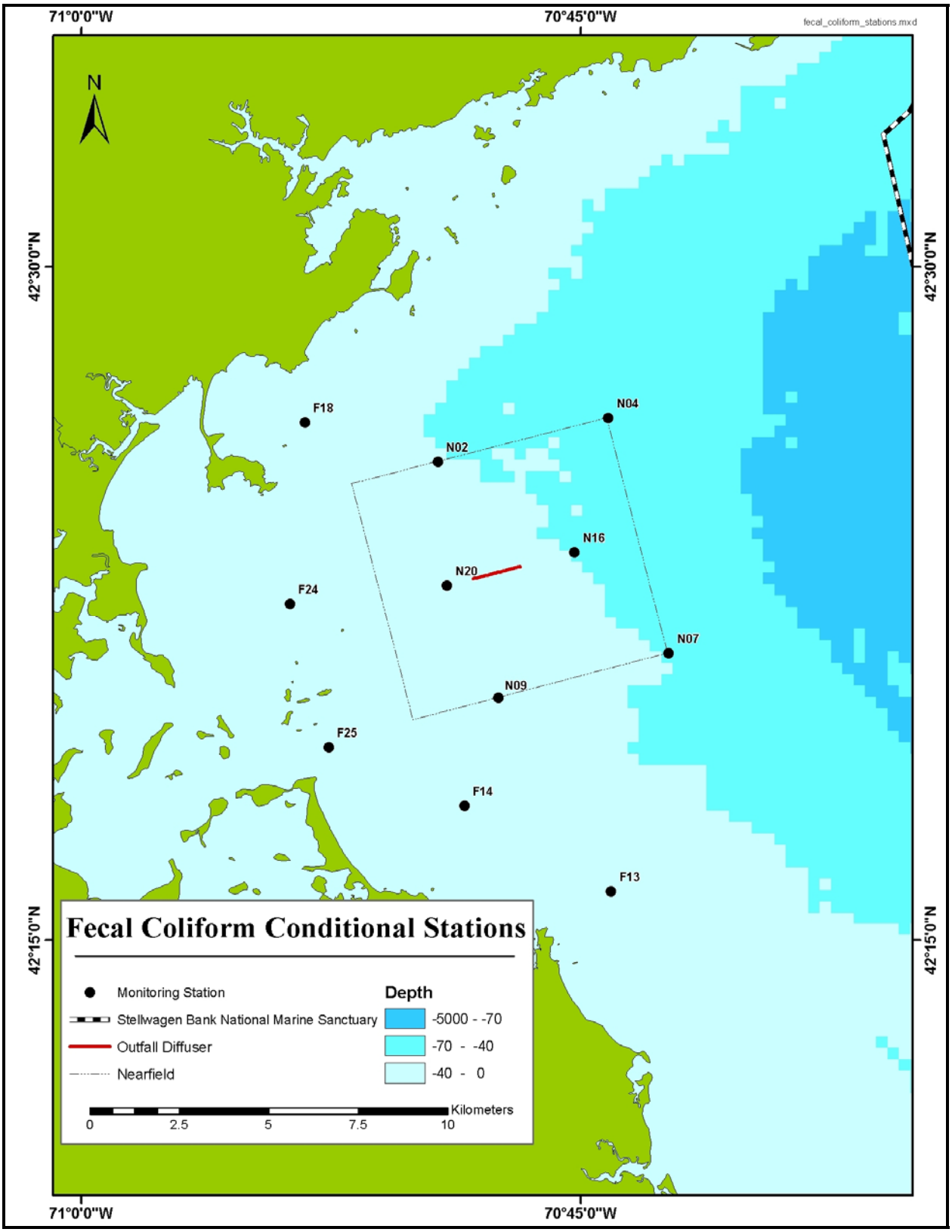

Figure 3. Location of Fecal Coliform/ Adverse Conditional Stations

4.0 Results

Observation of marine mammals on surveys designed and operated for the collection of water quality data places limitations and constraints on the method of observation and on the conclusions that may be drawn from the data. Standard line transect methodology is not possible on such surveys, and four different vessels (which vary the characteristics of the survey platform) were used during the year. Based on these factors, the ability to extrapolate from observation data to abundance estimates is severely limited and is not advisable. The utility of this data set is thus limited to documentation of the time, location and particulars for each individual occurrence of a sighting and provides useful qualitative information concerning seasonal patterns and relative abundance within the same study area.

During the 2004 monitoring year, 11 individual whales, 14 harbor porpoise, one unidentified porpoise, and 27+ Atlantic white-sided dolphins were directly observed by the marine mammal observers, Battelle survey team members, or MWRA survey team members. Included in these sightings were three North-Atlantic right whales, three finback whales, two minke whales, and three instances of unidentifiable whales (possibly two minke whales and one humpback whale). MWRA whale sightings in 2004 were concentrated mainly in Massachusetts Bay with other sightings noted in Cape Cod Bay (Figure 3). Four whales were sighted in the vicinity of the Nearfield. The total number of whales (11) sighted during 2004 was smaller than during the previous years (2003, 15 sightings; 2002, 16 to 19 sightings; 2001, 20 sightings), and considerably less than sightings during prior years (2000, 53+ sightings; 1999, 59 sightings) (Short *et al.* 2004). Similar to previous years (except 2003), right whales were observed during 2004 water column surveys. It should also be noted that whales were observed on other types of surveys in addition to the water column surveys. Both the Benthic Farfield and Nearfield (BN/BF) and surveys conducted for the Stellwagen Bank National Marine Sanctionary (SW) are included in the observations in Table 1. In addition to the whales, 301 harbor seals and two unidentified seals (possibly gray seals) were also sighted during the year.

All sightings recorded by a dedicated marine mammal observer or other survey personnel are summarized in Table 1. Whale sighting distribution is presented in Figure 4.

Table 1. Marine Mammal Observer Sightings During MWRA 2004 Water Quality Monitoring Program

Survey ID	Date\Time	Number	Mammal	Location	Sighting Comments	Observer Present
PC041 F/V *Shanna Rose*	01/21/04		No sightings			Yes
PC042 R/V *Merganser*	02/09/04		No sightings			No
WF041/WN041 F/V *Isabelle S.*	02/02/04		No sightings			Yes
	02/03/04 0710	1	Harbor seal	42º19.26'N/70º55.15'W	Hauled out on ice flow.	Yes
	02/03/04 0715	2	Harbor seals	42º18.65'N/70º55.57'W	Hauled out on Toddy Rocks off of Hull.	Yes
	02/03/04 0720	2	Harbor seals	42º18.40'N/70º56.22'W	Observed by Station F31.	Yes
	02/03/04 1330	3	Harbor seals	42º18.69'N/70º49.00'W	Hauled out on ice flows 3 miles east of Hull Point.	Yes
	02/03/04 1340	25+	Harbor seals	42º18.09'N/70º48.57'W	Hauled out on ice by Station F14.	Yes
	02/03/04 1420	82+	Harbor seals	42º17.66'N/70º47.44'W	Animals in small groups on ice around Harding's Ledge.	Yes
	02/03/04 1610	65	Harbor seals	42º17.46'N/70º47.21'W	Same animals as 1420.	Yes
	02/04/04 0950	2	Finback whales	42º20.41'N/70º36.08'W	Mother-calf pair.	Yes
	02/04/04 0950	2	Atlantic white-sided dolphins	42º20.41'N/70º36.08'W	Observed with Finback whales.	Yes

Table 1. Marine Mammal Observer Sightings During MWRA 2004 Water Quality Monitoring Program

Survey ID	Date\Time	Number	Mammal	Location	Sighting Comments	Observer Present
	02/05/04		No sightings			Yes
WF042/WN042 F/V *Isabelle S.*	02/23/04 1245	2	North Atlantic right whales	41º56.89'N/070º14.93'W		Yes
	02/23/04 1255	1	North Atlantic right whale	41º57.79'N/070º14.60'W		Yes
	02/24/04 1120	1	Harbor seal	42º18.71'N/070º45.04'W		Yes
WF042/WN042 F/V *Isabelle S* cont.	02/25/04 1215	1	Harbor seal	42º22.02'N/070º49.60'W		Yes
PC043 R/V *Merganser*	03/01/04 0906	2	Harbor seals	42º16.10'N/070º44.10'W	Observed by Station F13.	No
	03/01/04 0906	2	Harbor porpoises	42º16.10'N/070º44.10'W	Observed by Station F13.	No
	03/01/04 1015	1	Harbor seal		Observed between Stations N04 and N20.	No
WN043 R/V *Aquamonitor*	03/23/04 0725	5	Harbor seals	42º16.68'N/070º55.81'W		Yes
	03/23/04 0745	8	Harbor seals	42º19.25'N/070º52.94'W		Yes
	03/23/04 0945	1	Harbor porpoise	42º26.25'N/070º52.94'W	Porpoise was deceased, retrieved by survey crew & delivered to NE Aquarium.	Yes
WN044/WF044 R/V *Aquamonitor*	04/07/04 0640	2	Harbor seals	42º59.70'N/070º36.15'W	Hauled out on rocks at Gurnet Point.	Yes
	04/08/04 0720	3	Harbor seals	42º15.32'N/070º55.84'W	Hauled out on rocks west side of Grape Island.	Yes
	04/08/04 0730	10	Harbor seals	42º18.61'N/070º55.69'W	Hauled out on rocks west side of Hull Point.	Yes
	04/08/04 0735	12	Harbor seals		Hauled out on rocks east side of Hull Point.	Yes
	04/08/04 0735	2	Harbor seals		Hauled out on rocks west side of Hull Point.	Yes
	04/08/04 0740	8	Harbor seals	42º20.39'N/070º56.49'W	Hauled out on rocks north and south sides of Gallop Island.	Yes
	04/08/04 0750	8	Harbor seals	42º20.44'N/070º56.35'W	Observed by Station F23.	Yes
	04/09/04 0740	5	Harbor seals	42º16.37'N/070º55.81'W	Hauled out on rocks north side of Grape Island.	Yes
	04/09/04 0800	6	Harbor seals	42º18.26'N/070º56.39'W	Hauled out on Toddy rocks north of Hull.	Yes
	04/09/04 0805	20	Harbor seals	42º19.21'N/070º55.17'W	Hauled out on rocks south side of George's Island.	Yes
	04/09/04 0810	9	Harbor seals	42º20.20'N/070º55.04'W	Hauled out on rocks north side of Lovell's Island.	Yes
	04/09/04 1010	1	Harbor or gray seal	42º28.78'N/070º37.07'W	Looked more like a gray seal, dark color and large body & head.	Yes
	04/09/04 1310	1	Harbor porpoise	42º18.95'N/070º39.12'W		Yes
PC044 R/V *Merganser*	04/21/04		No sightings			No
WN046 R/V *Aquamonitor*	05/14/04		No sightings		Reduced visibility due to fog may have impacted the sighting report.	Yes
PC045 R/V *Merganser*	05/20/04		No sightings			No
PC046 R/V *Merganser*	06/16/04		No sightings			No

Table 1. Marine Mammal Observer Sightings During MWRA 2004 Water Quality Monitoring Program

Survey ID	Date\Time	Number	Mammal	Location	Sighting Comments	Observer Present
WF047/WN047 R/V *Aquamonitor*	06/14/04		No sightings			No
	06/16/04		No sightings			No
	06/17/04		No sightings			Yes
PC047 R/V *Merganser*	07/06/04		No sightings			No
WN049 R/V *Aquamonitor*	07/20/04		No sightings		Reduced visibility due to fog may have impacted sighting report.	Yes
BF041/BN041 R/V *Aquamonitor*	08/04/04	1	Unidentified porpoise	42°17.30'N/70°25.50'W	Observed by Station FF04.	No
PC048 R/V *Merganser*	08/09/04		No sightings			No
WN04B/WN04B/ PA041/SW041 R/V *Aquamonitor*	08/17/04		No sightings			Yes
	08/18/04	1	Unidentified whale (possibly a minke whale)	42º31.48'N/070º18.57'W	Observed at Station SW2.	No
	08/19/04		No sightings			No
WN04C R/V *Aquamonitor*	09/01/04 0720	1	Harbor seal	42º18.65'N/070º54.83'W		Yes
	09/01/04 0850	1	Minke whale	42º25.24'N/070º44.02'W		Yes
	09/01/04 1050	1	Minke whale	42º23.64'N/070º45.21'W	Observed by Station N16.	Yes
	09/01/04 1050	1	Atlantic white-sided dolphin	42º23.64'N/070º45.21'W	Observed by Station N16.	Yes
PC049 R/V *Merganser*	09/07/04 1244	1	Whale, possibly minke	42º25.65'N/070º49.31'W	Observed by Station N02.	No
WN04D R/V *Aquamonitor*	09/27/04		No sightings			Yes
PA042 R/V *Merganser*	09/30/04		No sightings			No
PC04A R/V *Merganser*	10/04/04		No sightings			No
WF04E/WN04E R/V *Aquamonitor*	10/18/04 0800	4	Harbor seals	42º18.70'N/070º54.80'W	Hauled out on Toddy rocks north of Hull	Yes
	10/19/04		No sightings			No
WF04F/WN04F R/V *Aquamonitor*	11/10/04 1130	12+	Atlantic white-sided dolphins	42º33.00'N/070º26.90'W	Observed by Station F27.	No
	11/10/04 1305	12+	Atlantic white-sided dolphins	42º33.36'N/070º17.86'W	Observed by Station SW2.	No
	11/17/04 0715	2	Harbor seals	42º16.74'N/070º55.81'W	Hauled out on rocks north of Grape Island.	Yes
	11/17/04 0725	5	Harbor seals	42º18.65'N/070º54.87'W	Hauled out on rocks north of Grape Island.	Yes
	11/17/04 0735	4	Harbor seals	42º19.36'N/070º52.96'W	Hauled out on rocks north of Grape Island.	Yes
	11/17/04 1135	1	Harbor seal	42º25.43'N/070º50.79'W	Observed in the vicinity of Debris Tow #1	Yes
	11/18/04 0930	3	Harbor porpoises	42º10.30'N/070º34.60'W	Observed by Station F06.	No
	11/18/04 1055	1	Harbor seal	42º07.00'N/070º17.50'W	Observed by Station F29.	No

Table 1. Marine Mammal Observer Sightings During MWRA 2004 Water Quality Monitoring Program

Survey ID	Date\Time	Number	Mammal	Location	Sighting Comments	Observer Present
WF04F/WN04F R/V *Aquamonitor* cont.	11/18/04 1120	1	Finback whale	42º03.30'N/070º15.40'W	Observed south of Station F29.	No
WF04F/WN04F R/V *Aquamonitor* cont.	11/18/04 1140	1	Unidentified seal (possibly a gray seal)	41°54.49'N/070°13.70'W	Observed by Station F02.	No
PC04B R/V M*erganser*	11/18/04 0855	1	Whale, possibly humpback	42º20.39'N/070º47.48'W	Observed east of Station N09.	No
	11/18/04 0945	2	Harbor porpoise		Observed between Stations N07 and N16.	No
PC04C R/V M*erganser*	12/16/04 0920	5	Harbor porpoises		Observed between Stations F13 and N07.	No

"No sightings" means that the marine mammal observer, Battelle survey team members, or MWRA survey team members did not see any animals on that day.

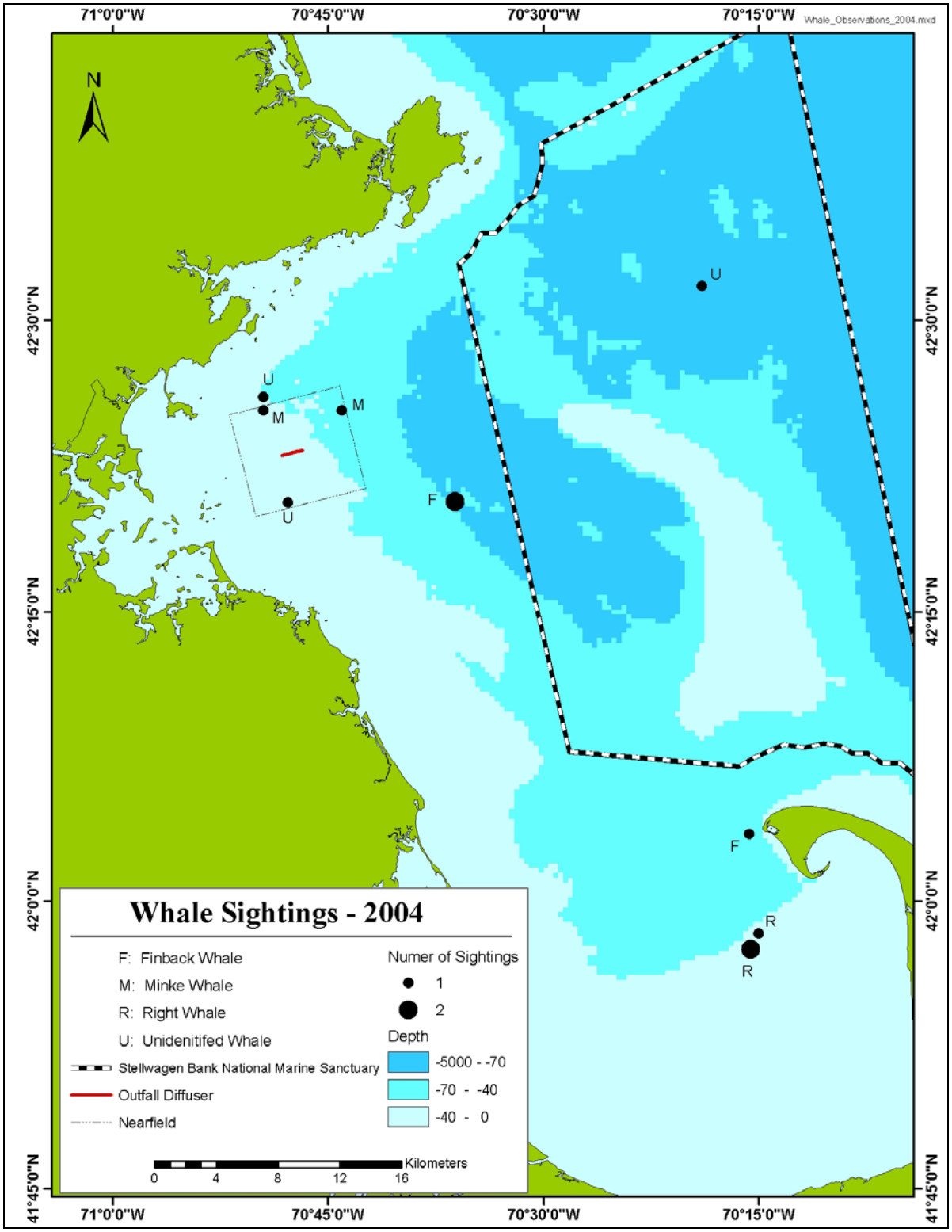

Figure 4. Approximate Locations of Whale Sightings during 2004 MWRA Water Quality Surveys

Note: The data displayed in this figure come from Table 1 of this report.

5.0 Discussion

Unlike statistically based programs or programs that are specifically designed to search for whales, the MWRA sightings are opportunistic and do not follow dedicated and systematic line transect methodology (as mentioned in Section 4.0). However, some generalizations can be made.

Of the 11 whales sighted on the surveys, seven whales were sighted by a dedicated observer, which were considerably less than 2003 (n=13), however 2004 dedicated observer sightings were greater than 2002 (n=6). Furthermore, 2004 sightings were less than the previous four years (1998 – 2001, n between 16 and 31). During 2004, more than 303 pinnipeds were sighted, an increase in number compared to sightings in 2001 and 2002, when 138 pinnipeds were noted each year and 105 noted in 2003. Furthermore, in years prior to 2001, only 20 to 60 pinniped sightings were made throughout the survey area.

Dolphin sightings in 2004 totaled approximately 27+, the second lowest number of sightings since 2002 (10-13). For the years; 1999, 2000, 2001, and 2003, dolphin sightings averaged between 50 and 112+, with 2003 recording the highest number of dolphins ever sighted for these surveys. However, 1998 had only 32 dolphins sighted, which is only slighter higher number of sightings than 2004.

In general, the low number of baleen whale sightings on MWRA cruises reflected the paucity of whales as a whole throughout the Massachusetts Bay/Stellwagen Bank vicinity. Whale Center of New England sighting records for the season show that other than a brief aggregation of feeding humpback whales near Cape Cod during late April and early May, and an increase in humpback sightings during October and November, sightings were as few as any season since the late 1970's. Finback whales were also relatively uncommon throughout the range. During late August and throughout September, a handful of juvenile humpbacks were seen more regularly. Behavioral observations showed that these animals were most likely near-surface feeding on plankton, but the exact prey is unknown. Right whales were seen occasionally during the summer and early fall as well. This represented the third straight year that baleen whale use was unusually low throughout the Massachusetts Bay/Stellwagen Bank area, save for a six week period when adult humpback whales fed on the south-eastern edge of Stellwagen Bank during summer 2003. The Whale Center's sightings database comes from a variety of platforms, including whale watch boats operating out of Provincetown, Boston, and Gloucester, MA, and a dedicated research vessel operating out of Gloucester, MA. Their sightings are generally a result of dedicated searches with some survey effort as well (Mason Weinrich, Director of the Whale Center of New England, January 2005).

Over the last seven years, the Center for Coastal Studies has conducted systematic surveys of Cape Cod Bay from January through mid-May. In 2004, right whales were present in the Cape Cod Bay Critical Habitat area for at least 90 days between February 10, 2004 and May 10, 2004 (Mayo *et al*. 2004). A total of 367 right whale sightings were recorded from aerial surveys and research cruises, of which 297 were photographed. Of those 297 photographed sightings, 296 were in Cape Cod Bay, and one was in an area east of the Cape. To date, 263 (89%) of the photographed sightings have been matched to 55 known right whales. These results are preliminary because most of the matches have yet to receive final confirmation. There was a minimum of 54 different right whales identified in Cape Cod Bay, and one outside of Cape Cod Bay. The number of right whales identified in Cape Cod Bay and adjacent waters in 2004 is a minimum estimate because 11% of the sightings have not yet been matched to an individual in the catalogue. The spatiotemporal distribution, numbers, and demographic profile of right whales in Cape Cod Bay in 2004 more closely resembled observations during the first four years of the CCS surveys (1998 – 2001) than in 2002 or 2003. A late-season scattered distribution of right whales north of Provincetown was reminiscent of near-shore aggregations of feeding whales seen northeast of Provincetown in 2002 and a few miles east of Cape Cod in 2003 (Mayo *et al.* 2004).

Furthermore, in September, the Cape Cod Times reported the lack of whale sightings from whale watch boats during the summer season (Fraser, 2004). Another notable sighting worth discussing occurred during the Flounder Survey, FF041. The survey crew came in contact with "Poco", a beluga whale, while fishing in the area of Deer Island Flats. "Poco" was spotted in waters from Maine to Boston by mariners and divers in 2003 and 2004. In November "Poco's" carcass was pulled from waters in Maine. It is not apparent as to what caused the whale's death but it was noted that it was not human caused trauma.

6.0 Summary of Whale Sightings 1998 through 2004

For the past 10 years, MWRA has collected and reported on the yearly sightings of whales made during program surveys. The same methods have been used to collect whale sighting data over the years, but other factors such as platforms used, areas surveyed and time at each site prevent the data from being used for quantitative statements regarding whale populations in Massachusetts and Cape Cod Bays. The most consistent aspect of the program is that stations were surveyed around the same time of the year for approximately the same number of days. The following text provides a summary and comparison of the MWRA whale sighting data over the last seven years (1998 through 2004). Data prior to 1998 have not been included in this report due to possible differences in data collection methods, changes in survey teams, and variations in time spent in each area.

For this comparison, the whale sightings were grouped into four areas:

- Nearfield (NF; all nearfield stations),
- Stellwagen Bank National Marine Sanctuary (SBNMS; stations F12, F27, F28, and F29),
- Cape Cod Bay (CCB; stations F01, F02, F03, F32, and F33), and
- Farfield (FF; all stations not in other areas).

During 2004, 64 survey days were spent in Massachusetts and Cape Cod Bays throughout the year. The Nearfield area was visited at least 12 times during 2004 with a total of seven stations sampled. The survey normally was for one day with vessel time exceeding eight hours per day (approximately 96 hours/year). In previous years, the Nearfield area was visited at least 17 times with 21 stations sampled during the survey. The remaining areas are visited during six or more surveys covering 1 to 3 days in an area, depending on the planned vessel track and weather.

During these MWRA surveys, more than 201 whales of at least four identified species were seen over the past seven years (Table 2). The highest number of whales (59) was sighted in 1999, due in part to 27 finback whales being observed on Stellwagen Bank. In the following year (2000), more than 29 humpback whales were noted on Stellwagen Bank bringing the total number of whales sighted in the year to more than 53. The lowest number of whales (11) was sighted in 2004; the cause of fewer sightings could be due to fewer survey days and decrease in survey time in the four areas.

Table 2. Sightings by Area, Species, and Year

Area	1998	1999	2000	2001	2002	2003	2004	Total Sightings
Right Whale Observations								
SBNMS	2	1			2			**5**
FF	1							**1**
CCB	1	1		7			3	**12**
NF								
Totals	**4**	**2**		**7**	**2**		**3**	**18**
Humpback Whale Observations								
SBNMS	4	12	29+	1	2-5			**48+**
FF				3	4			**7**
CCB					1	2		**3**
NF	1							**1**
Totals	**5**	**12**	**29+**	**4**	**7-10**	**2**		**59+**
Finback Whale Observations								
SBNMS		27	4		1			**32**
FF					1		2	**3**
CCB							1	**1**
NF					1	1		**2**
Totals		**27**	**4**		**3**	**1**	**3**	**38**
Minke Whale Observations								
SBNMS	3		1					**4**
FF	1	3		3		1		**8**
CCB			1					**1**
NF	2	1	1	1	1	5	2	**13**
Totals	**6**	**4**	**3**	**4**	**1**	**6**	**2**	**26**
Unidentified Whale Observations								
SBNMS	5	7	5-6	1	1	2	1	**22-23**
FF	1	2	1	1	2			**7**
CCB	1	4	11	3		2		**21**
NF	5+	1				2	2	**10+**
Totals	**12+**	**14**	**17-18**	**5**	**3**	**6**	**3**	**60+**
Year Totals	**27+**	**59**	**53-54+**	**20**	**16-19**	**15**	**11**	**201+**

Blank cell denotes no whales observed.

Over half of the overall sightings (55% of the 201) were made within the boundary of Stellwagen Bank (Figure 5 and 6). The area with the second highest whale sightings from 1998 to 2003 was Cape Cod Bay (19% of the 200), which was dominated by right whale sightings. An additional 13% were sighted just outside its western boundary (listed as Farfield). The Nearfield area, which lies over and around the outfall also had only 13% of the total whale sightings, with minke whales being the dominant species. An interesting caveat of the Nearfield sightings is that this area receives the most concentrated effort towards sighting whales relative to the other 3 areas.

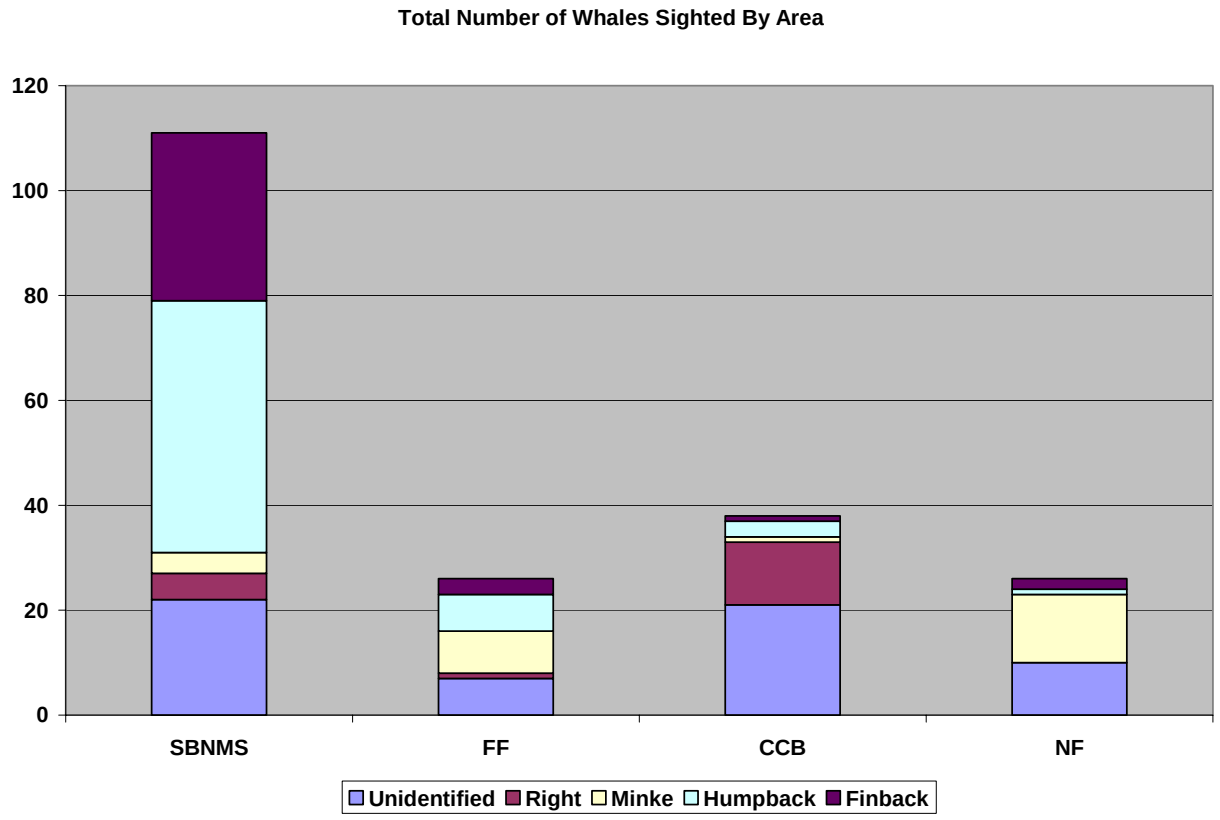

Figure 5. Distribution of Sightings by Species and Area, 1998-2004

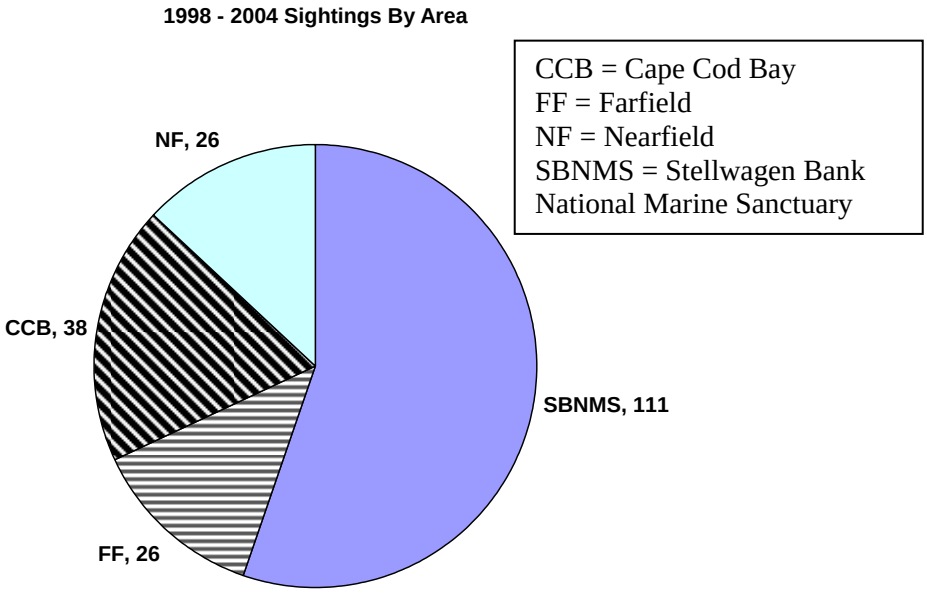

Figure 6. Total Sightings of Whales by Area, 1998-2004

The most abundant identified whale species noted during the surveys was the humpback whale (though even more were unidentified) (Figure 7). The second most abundant identified whale was the finback whale with 19% of the sightings. The total humpback (59) and finback whale (38) sightings on Stellwagen Bank represent 82% of the sightings for these whales and 48% of the sightings of all whales throughout all of the areas over the years.

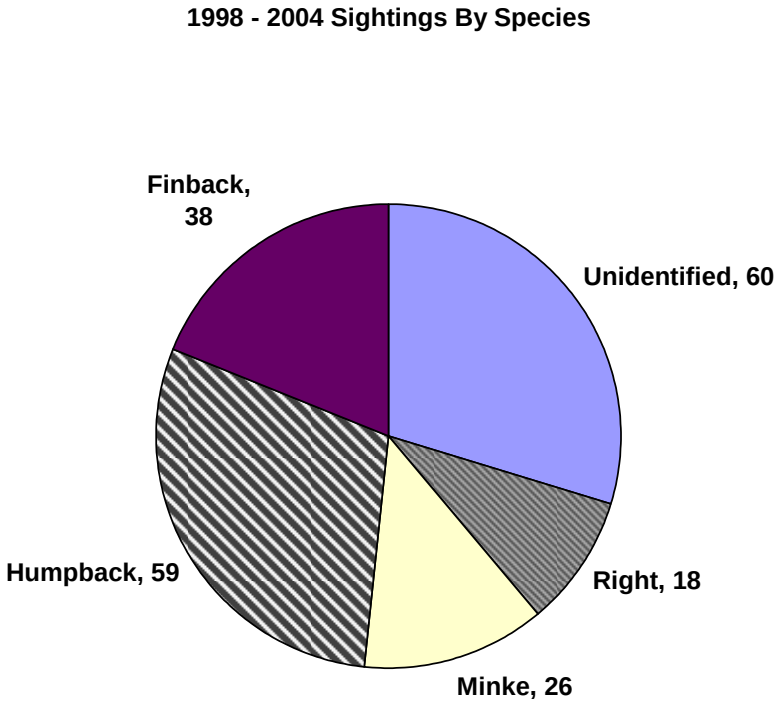

Figure 7. Distribution of Sightings within the Four Identified and Unidentified Species Categories

Cape Cod Bay had the highest number of right whale sightings (12 out of 18), with the highest concentration of sightings occurring in February 2001 when seven were noted in Cape Cod Bay. Unlike previous years, minke whales were not sighted in all four areas. With the exception of the humpback and finback whales noted on Stellwagen Bank, the minke whale in the Nearfield area was the only other whale species consistently sighted in an area each year under the MWRA program.

Over the years, the highest numbers of whale sightings were observed during the month of April (30%), followed by the months of August (23%) and February (18%). Both May and November had the lowest recorded whale sightings of 2% each. Figure 8 provides a distribution of whale sightings by month for all years.

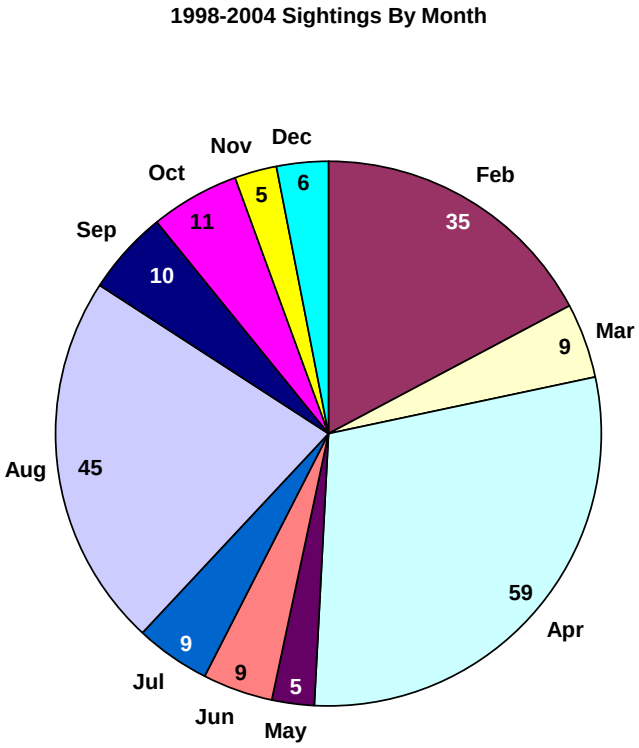

Figure 8. Distribution of Sightings by month, 1998-2004

7.0 References

Brown MW, O Nichols, MK Marx, and JN Ciano. 2002. Surveillance monitoring and management of North Atlantic right whales (*Eubalaena glacialis*) in Cape Cod Bay, Massachusetts: 2002. Final report to Division of Marine Fisheries, Commonwealth of Massachusetts, and Massachusetts Environmental Trust, September, 2002. 28 pp.

Bulloch DK. 1993. The Whale-Watcher's Handbook: A Field Guide to the Whales, Dolphins, and Porpoises of North America. Lyons & Burford, New York, NY. 114 pp.

CeTAP. 1982. A Characterization of Marine Mammals and Turtles in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf. Final Report of the Cetacean and Turtle Assessment Program, University of Rhode Island, Kingston, RI. U.S. Dept. of the Interior, Bureau of Land Management, Washington, DC. Contract AA551-CT-48. 450 pp.

Environmental Protection Agency. 1993. Assessment of Potential Impact of the MWRA Outfall on Endangered Species. Boston, MA: U.S. Environmental Protection Agency.

Fraser, D. 2004. Cape Cod Times.

Hamilton PK, CA Mayo. 1990. Population characteristics of right whales, *Eubalaena glacialis*, in Cape Cod Bay and Massachusetts Bay, 1978-1986. In: Hammond, P.S. et al. (eds.), Individual Recognition and

Estimation of Cetacean population Parameters. Report of the International Whaling Commission Special Issue 12:203-208.

Harrison R, MM Bryden. 1989. Whales, Dolphins and Porpoises. Weldon Owen Pty Limited, McMahons Point, Australia. 240 pp.

Katona SK, V Rough, DT Richardson. 1993. A Field Guide to Whales, Porpoises, and Seals from Cape Cod to Newfoundland. Smithsonian Institution Press. Washington, DC. 316 pp.

Kraus SD, AR Knowlton, JE Harrison. 1987. Right Whale Occurrence and Demographics in Massachusetts Waters. New England Aquarium. Boston, MA. 21 pp.

Langton RW, JB Pierce, JA Gibson. 1994. Selected Living Resources, Habitat Conditions, and Human Perturbaions of the Gulf of Maine. NOAA Tech. Memo NMFS-NE-106; 70 pp.

Mayo, C.A., O.C. Nichols, M.K. Bessinger, M.K. Marx, C.L. Browning, and M.W. Brown. 2004. Surveillance, monitoring and management of North Atlantic right whales in Cape Cod Bay and adjacent waters - 2004. Final report submitted to the Division of Marine Fisheries, Commonwealth of Massachusetts. December 2004.

NMFS (National Marine Fisheries Service). 1991. Recovery Plan for the Humpback Whale (*Megaptera novaeangliae*). Report prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Springs, MD. 105 pp.

Payne PM, DN Wiley, SB Young, S Pittman, PJ Clapham, JW Jossi. 1990. Recent fluctuations in the abundance of baleen whales in the southern Gulf of Maine in relation to changes in selected prey. Fishery Bulletin 88:687-696.

Pett, S, CJ McKay. 1990. Technical report on the resources and uses of Stellwagen Bank. In: The Resources and Uses of Stellwagen Bank. J.H. Archer (ed.). Urban Harbors Insititute, University of Massachusetts, Boston. 66pp.

Rough V. 1995. Gray seals in Nantucket Sound, Massachusetts, winter and spring, 1994. Final report prepared for the U.S. Marine Mammal Commission. Contract No. T10155615. NTIS No. PB95-191391.

Short, LM, C Gagnon, N. Morse 2004. Summary of marine mammal observations during 2003 surveys. Boston: Massachusetts Water Resources Authority. Report ENQUAD 2004-01. 20 p.

Waring GT, DJ Lalka, PJ Clapham, S Swartz, MC Rossman, TVN Cole, KD Bisack , LJ Hansen. 1999. U.S. Atlantic marine mammal stock assessments-1998. NOAA Technical memorandum NMFS-NE-116.

Wenzel, F, DK Matilla, PJ Clapham. 1988. *Balaenoptera musculus* in the Gulf of Maine. Mar. Mamm. Sci. 4(2):172-175.

Weinrich, M. 2004. Director. Whale Center of New England. Personal communication via e-mail January 2004.

Massachusetts Water Resources Authority
Charlestown Navy Yard
101 First Avenue
Boston, MA 02129
(617) 242-6010
http://www.mwra.state.ma.us