

Summary of  
marine mammal observations  
during 1998 surveys

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Massachusetts Water Resources Authority

Environmental Quality Department  
Report ENQUAD 99-01



**SUMMARY OF MARINE MAMMAL OBSERVATIONS  
DURING 1998 SURVEYS**

*for*

**MWRA Harbor and Outfall Monitoring Project**

*submitted to*

**MASSACHUSETTS WATER RESOURCES AUTHORITY**

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Cover Photo: Carlton D. Hunt, 1998. Photograph taken August 1998 in Stellwagen Bank National Marine Sanctuary during a commercial whale watch cruise.

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## 1.0 INTRODUCTION

Several endangered and threatened species of whales and turtles are known to visit or inhabit the Massachusetts and Cape Cod Bay area (EPA, 1993). The whales include the right whale, humpback whale, finback whale, sei whale and blue whale. The turtles include the Kemp's ridley, leatherback, hawksbill, loggerhead, and green turtle. Although not presently on the endangered or threatened species list minke whales, harbor porpoise, several dolphin species, gray seals, and harbor seals are also found in Massachusetts and Cape Cod Bays.

Since 1995, Massachusetts Water Resources Authority (MWRA) has included endangered species observers on monitoring surveys to verify the presence and absence of right whales in the vicinity of the outfall. 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 document any incidental sightings of marine mammals.

Marine mammal observers were present on 21 of the 37 surveys conducted during 1998. As in previous years, observers were present on all of the Nearfield water column surveys to document throughout the year the occasional presence as well as the general absence of right whales in the Nearfield. Beginning in 1998, observers were also placed on the vessel during 3 (WF981, WF982, and WF984) of the 6 Farfield water column surveys, and 2 (PT981 and PT982) of the 4 fecal coliform surveys.

## 2.0 BACKGROUND

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

Right whales (*Eubalaena glacialis*) can be expected to visit Massachusetts and Cape Cod Bays during December through July, with peak abundance in February, March and early April. Recent studies have shown that 20 to 60 right whales, which represents 7 to 20 % of the present population, visit Cape Cod and Massachusetts Bay (Mitchell *et al.*, 1997). Although sightings of right whales by Kraus *et al.* (1987) for the years 1975-1986, and by Hamilton and Mayo (1990) for the year 1986 show general distribution patterns along Stellwagen Bank, Race Point, Provincetown, and central Cape Cod Bay, the presence of a right whale was documented near Boston Harbor on April 5, 1996 (Wennemer *et al.*, 1998).

Humpback whales (*Megaptera novaeangliae*) visit the Stellwagen Bank, Cape Cod Bay, and Jeffries Ledge areas from mid-April through November, with peak abundance in May and June (CeTAP, 1982; NMFS, 1991). In these areas, humpbacks are most abundant along the 100-meter depth contour and over Stellwagen Bank (CeTAP, 1982; Payne, 1991), and are often found in Massachusetts Bay. However, 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).

Finback whales (*Balaenoptera physalus*) are the most abundant and frequently sighted of the endangered great whales that visit Massachusetts and Cape Cod Bays (EPA, 1993). The portion of the northwest

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population that visits the Gulf of Maine ranges from about 3,000 individuals in the spring and summer to 200 individuals in the fall and winter (CeTap, 1982). During the winter, they remain near their summertime abundances in the area between Cape Ann and Cape Cod, particularly Stellwagen Bank, and along the eastern perimeter of Georges Bank (CeTap, 1982; Hain *et al.*, 1992). However, they largely abandon Jeffreys Ledge, and the area immediately east of Cape Cod (EPA, 1993).

Sei whales (*Balaenoptera borealis*) and blue whales (*Balaenoptera musculus*) are rarely sighted in Massachusetts and Cape Cod Bays (EPA, 1993). Both sei and blue whales typically remain in deeper waters (more than 100 meters) and further offshore (CeTAP, 1982).

Minke whales (*Balanoptera acutorostrata*) are a non-endangered species of whale that is frequently seen throughout the year (CeTAP, 1982). During the spring and summer, minke whales are often seen along the continental shelf, with highest densities in New England waters (CeTAP, 1982).

Atlantic White-sided Dolphins (*Lagenorhynchus actus*) are a non-endangered dolphin found from about Cape Cod to Davis Strait and Greenland (Katona *et al.*, 1993). These dolphins can be seen singly or in groups around Cape Cod Bay from spring through autumn (Katona *et al.*, 1993).

Gray seals (*Halichoerus grypus*) are a non-endangered species of pinniped found from Maine to Long Island Sound (Rough, 1995).

Harbor seals (*Phoca vitulina concolor*) are the most common seal found in near-shore waters around New England (Katona *et al.*, 1993).

The leatherback turtle (*Dermochelys coreacea*) is a temperate, pelagic species that occasionally wanders into Cape Cod/Massachusetts Bays in small numbers to feed on gelatinous zooplankton (jellyfish, salps, ctenophores). Leatherback turtles are sighted in Cape Cod and Massachusetts Bays most frequently in late summer (Shoop *et al.*, 1981; CeTAP, 1982). Although leatherbacks are seen in the Bays, it is not an important foraging habitat.

Kemp's ridley turtles (*Lepidochelys kempfi*) are infrequent visitors to the bays, probably wandering into Cape Cod Bay during a slow migration up the coast during the summer in search of their preferred benthic prey. Often, they become trapped by the hook of Cape Cod during their southward migration and are killed by the rapidly declining water temperature (NOAA, 1991). The turtles that enter the bay are usually considered lost to the Atlantic coast populations.

Loggerhead turtles (*Caretta caretta*) also are infrequent visitors to the bays, probably wandering into Cape Cod Bay during a slow migration up the coast during the summer in search of their preferred benthic prey. Like the Kemp ridley turtle they, often become trapped by the hook of Cape Cod during their southward migration and are killed by the rapidly declining water temperature. The turtles that enter the bay are usually considered lost to the Atlantic coast populations.

Hawksbill (*Eretmochelys imbricata*) and green turtles (*Chelonia mydas*) are not frequently sighted in Massachusetts Bay (EPA, 1993).

### 3.0 METHODS

Observations were performed for marine mammals during Nearfield water column surveys (Figure 1), and while the vessel was on-station for sampling operations. Additionally, during 3 winter/spring Farfield surveys and 2 winter/spring Fecal coliform surveys (Figure 2) observations were also performed as above.

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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 are 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 which influenced the position of the observer on board the vessel. Three survey vessels were used as observation platforms during the course of the year. The *F/V Isabel S* was used on WF981, WF982, and WF984. The *M/V Seabreeze* was used on WN983 and the *R/V Aquamonitor* (formerly *Haley's Comet II*) was used for WN985 through the end of the year. The observer's eye-height above the sea surface was approximately 5 meters on the *F/V Isabel S*, and at 2.5 meters aboard the *M/V Seabreeze* and *R/V Aquamonitor*. 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.

#### 4.0 RESULTS

All marine mammal sightings recorded during the course of MWRA's 1998 Harbor and Outfall Program are summarized in Table 1. This observation record includes sightings by trained observers and incidental sightings recorded by Battelle personnel. Whale sighting distributions are presented in Figure 3.

**Table 1. Marine Mammal Observer Sightings during MWRA 1998 Water Quality Monitoring Program<sup>1</sup>**

| Survey ID/<br>Vessel Name                     | Date\Time    | Number | Mammal              | Location              | Sighting Comments                 |
|-----------------------------------------------|--------------|--------|---------------------|-----------------------|-----------------------------------|
| WF981/WN981<br><i>F/V Isabel S.</i>           | 2/3/98 1157  | 1      | Harbor Seal         | 41 51.82'N/70 23.96'W | During transit from F01 to F32    |
|                                               | 2/3/98 1229  | 1      | Unidentified Phocid | 41 52.77'N/70 20.45'W | At station F32                    |
|                                               | 2/3/98 1234  | 1      | Harbor Seal         | 41 52.77'N/70 20.45'W | At station F32                    |
|                                               | 2/4/98       |        | No Sightings        |                       |                                   |
|                                               | 2/7/98 0913  | 2      | Harbor Seals        | 42 20.98'N/70 50.38'W | Between stations N11 and N10      |
|                                               | 2/7/98 1140  | 2      | Harbor Seals        | 42 18.58'N/70 55.81'W | Departing station F31             |
|                                               | 2/9/98       |        | No Sightings        |                       |                                   |
|                                               | 2/10/98      |        | No Sightings        |                       |                                   |
| WF982/WN982/<br>AV981<br><i>F/V Isabel S.</i> | 2/27/98 1500 | 1      | Minke Whale         | 42 10.81'N/70 19.32'W | Between stations F29 and F12      |
|                                               | 2/28/98      |        | No Sightings        |                       |                                   |
|                                               | 3/1/98 0655  | 1      | Harbor Seal         | 42 20.35'N/70 56.49'W |                                   |
|                                               | 3/1/98 0704  | 1      | Harbor Seal         | 42 20.35'N/70 56.45'W |                                   |
|                                               | 3/1/98 0715  | 1      | Harbor Seal         | 42 20.30'N/70 56.45'W |                                   |
|                                               | 3/1/98 0722  | 2      | Harbor Seals        | 42 20.73'N/70 56.28'W |                                   |
|                                               | 3/2/98 1135  | 1      | Harbor Seal         | 42 06.96'N/70 37.83'W | Between stations F05 and F06      |
|                                               | 3/2/98 1220  | 1      | Harbor Seal         | 42 00.14'N/70 33.83'W |                                   |
| WN983<br><i>M/V Seabreeze</i>                 | 3/23/98      |        | No Sightings        |                       | Survey aborted due to bad weather |
|                                               | 3/24/98 0809 | 1      | Harbor Seal         | 42 17.02'N/70 55.81'W |                                   |
|                                               | 3/24/98 0932 | 1      | Harbor Seal         | 42 19.14'N/70 47.34'W |                                   |
|                                               | 3/24/98 1053 | 1      | Harbor Seal         | 42 21.10'N/70 47.77'W |                                   |
|                                               | 3/24/98 1158 | 1      | Harbor Seal         | 42 23.53'N/70 48.51'W |                                   |

**Table 1. Marine Mammal Observer Sightings during MWRA 1998 Water Quality Monitoring Program<sup>1</sup>**

| Survey ID/<br>Vessel Name                     | Date\Time     | Number             | Mammal                        | Location              | Sighting Comments                                                    |
|-----------------------------------------------|---------------|--------------------|-------------------------------|-----------------------|----------------------------------------------------------------------|
| PT981<br><i>M/V Seabreeze</i>                 | 3/25/98       |                    | No Sightings                  |                       |                                                                      |
| WF984/WN984/<br>AV982<br><i>F/V Isabel S.</i> | 3/31/98 1222  | 1                  | Unidentified Baleen Whale     | 41 54.54'N/70 13.76'W |                                                                      |
|                                               | 3/31/98 1440  | 1                  | Right Whale                   | 42 11.20'N/70 19.60'W |                                                                      |
|                                               | 3/31/98 1638  | 1                  | Unidentified Baleen Whale     | 42 22.56'N/70 25.84'W |                                                                      |
|                                               | 3/31/98 1640  | 1                  | Right Whale                   | 42 22.80'N/70 25.86'W |                                                                      |
|                                               | 4/1/98        |                    | No Sightings                  |                       |                                                                      |
|                                               | 4/2/98 0720   | 1                  | Harbor Seal                   | 42 20.02'N/70 57.99'W |                                                                      |
|                                               | 4/3/98 0910   | 1                  | Minke Whale                   | 42 23.59'N/70 37.05'W |                                                                      |
| WN985<br><i>R/V Aquamonitor</i>               | 5/1/98 0725   | 1                  | Harbor Seal                   | 42 15.89'N/70 51.39'W | During transit from Hull to N04                                      |
|                                               | 5/1/98 0941   | 1                  | Harbor Seal                   | 42 24.22'N/70 46.29'W |                                                                      |
| WN986/PT982<br><i>R/V Aquamonitor</i>         | 5/19/98       |                    | No Sightings                  |                       |                                                                      |
|                                               | 5/20/98       |                    | No Sightings                  |                       |                                                                      |
| WN987<br><i>R/V Aquamonitor</i>               | 6/22/98       |                    | No Sightings                  |                       |                                                                      |
| WN988<br><i>R/V Aquamonitor</i>               | 7/8/98 1327   | 1                  | Minke Whale                   | 42 20.54'N/70 47.54'W |                                                                      |
|                                               | 7/13/98 1625  | 1                  | Minke Whale                   | 42 22.15'N/70 42.57'W | During transit from N06 to N07                                       |
|                                               | 7/13/98 1634  | Group size unknown | Unidentified Baleen Whale(s)  | 42 21.40'N/70 42.37'W | Either humpback or finback                                           |
|                                               | 7/13/98 1638  | Unknown            | Unidentified Whale(s)         | 42 21.38'N/70 42.37'W | Blows and splashes seen                                              |
|                                               | 7/13/98 1640  | Group size unknown | Unidentified Baleen Whale(s)  | 42 21.40'N/70 42.37'W | Either humpback or finback                                           |
|                                               | 7/13/98 1653  | 1                  | Minke Whale                   | 42 21.40'N/70 42.37'W | School of Tuna                                                       |
|                                               | 7/13/98 1720  | 1                  | Humpback Whale                | 42 21.75'N/70 44.85'W | During transit from N17 to N08                                       |
|                                               | 7/13/98 1724  | Group size unknown | Unidentified Baleen Whale(s)  | 42 20.89'N/70 44.96'W | Either humpback or finback                                           |
| WN989<br><i>R/V Aquamonitor</i>               | 7/23/98       |                    | No Sightings                  |                       |                                                                      |
| WN98A<br><i>R/V Aquamonitor</i>               | 8/7/98        |                    | No Sightings                  |                       |                                                                      |
| WN98B<br><i>R/V Aquamonitor</i>               | 8/20/98 1129  | 2                  | Unidentified Whales           | 42 32.73'N/70 26.85'W |                                                                      |
|                                               | 8/20/98 1302  | 2                  | Humpback Whales               | 42 23.36'N/70 26.50'W |                                                                      |
|                                               | 8/20/98 1307  | 2                  | Minke Whales                  | 42 22.17'N/70 26.66'W |                                                                      |
| WN98C<br><i>R/V Aquamonitor</i>               | 9/3/98        |                    | No Sightings                  |                       |                                                                      |
| WN98D<br><i>R/V Aquamonitor</i>               | 9/24/98       |                    | No Sightings                  |                       |                                                                      |
| WN98E<br><i>R/V Aquamonitor</i>               | 10/7/98 1210  | 1                  | Unidentified Baleen Whale     | 42 23.27'N/70 47.12'W |                                                                      |
| WN98F<br><i>R/V Aquamonitor</i>               | 11/4/98       |                    | No Sightings                  |                       |                                                                      |
| WN98G<br><i>R/V Aquamonitor</i>               | 11/25/98 1520 | 2                  | Unidentified Baleen Whales    | 42 19.80'N/70 25.40'W |                                                                      |
|                                               | 11/25/98 1525 | 4-8                | Atlantic White Sided Dolphins | 42 19.80'N/70 25.40'W |                                                                      |
| WN98H<br><i>R/V Aquamonitor</i>               | 12/16/98 1355 | 1                  | Right Whale                   | 42 16.15'N/70 36.49'W | Reported to New England Aquarium by the observation team on 12/18/98 |



**Table 1. Marine Mammal Observer Sightings during MWRA 1998 Water Quality Monitoring Program<sup>1</sup>**

| Survey ID/<br>Vessel Name                  | Date\Time     | Number  | Mammal                           | Location              | Sighting Comments |
|--------------------------------------------|---------------|---------|----------------------------------|-----------------------|-------------------|
| WN98H<br><i>R/V Aquamonitor</i><br>(con't) | 12/16/98 1430 | 1       | Grey Seal                        | 42 12.13'N/70 28.14'W |                   |
|                                            | 12/16/98 1500 | 2       | Humpback Whales                  | 42 07.00'N/70 17.40'W |                   |
|                                            | 12/16/98 1505 | 6       | Atlantic White-sided<br>Dolphins | 42 08.35'N/70 20.07'W |                   |
|                                            | 12/16/98 1507 | 1       | Harbor Seal                      | 42 08.35'N/70 20.07'W |                   |
|                                            | 12/16/98 1544 | 6       | Atlantic White-sided<br>Dolphins | 42 03.71'N/70 16.58'W |                   |
|                                            | 12/16/98 1554 | 5-10    | Atlantic White-sided<br>Dolphins | 42 01.60'N/70 15.63'W |                   |
|                                            | 12/16/98 1602 | 6-10    | Atlantic White-sided<br>Dolphins | 41 59.44'N/70 15.15'W |                   |
|                                            | 12/16/98 1615 | Unknown | Atlantic White-sided<br>Dolphins | 41 58.02'N/70 14.77'W |                   |

1- A dedicated marine mammal observer was present during these surveys. No sightings means that the marine mammal observer did not see any mammals on that day.

**Table 2. Incidental Sightings during MWRA 1998 Water Quality Monitoring Program<sup>a</sup>**

| Survey ID                       | Date\Time     | Number | Mammal        | Location              | Sighting Comments       |
|---------------------------------|---------------|--------|---------------|-----------------------|-------------------------|
| AV986<br><i>R/V Aquamonitor</i> | 12/17/98 0955 | 1      | Unknown Whale | 42 19.61'N/70 36.31'W | Observed by the Captain |

a – Dedicated marine mammal observers were not present on these surveys. Sightings were incidental observations by field staff. Therefore, all marine mammals may not have been sighted during the survey.

## 5.0 DISCUSSION

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 three different vessels were used during the year which vary the characteristics of the survey platform. 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 1998 monitoring year, 23 individual whales, 5 groups of whales, and over 32 Atlantic White-sided dolphins were directly observed by the marine mammal observers or Battelle survey team members. Included in these sightings were 3 right whales, 5 humpback whales, 5 minke whales, and 9 instances of unidentifiable whale(s). As seen in Figure 3, the whale sightings were distributed throughout Massachusetts and Cape Cod Bay area. Eight of the sightings were within the boundary of the Stellwagen Bank National Marine Sanctuary and 6 whales were sighted in the vicinity of the Nearfield. In one instance a right whale, sighted in December, was observed skim feeding along the surface.

In addition to the whales, marine mammal observers on the surveys observed 19 Harbor seals and 1 Grey seal during the winter and spring seasons.

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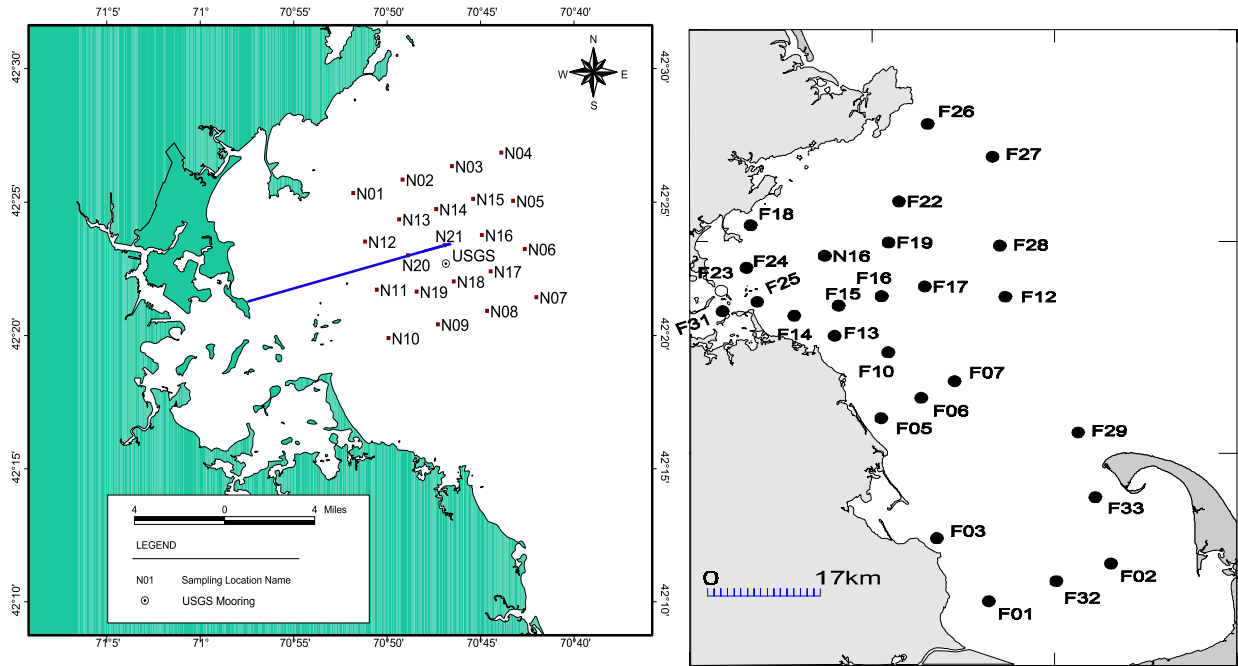


Figure 1. Location of Nearfield (Left) and Farfield Stations (Right)

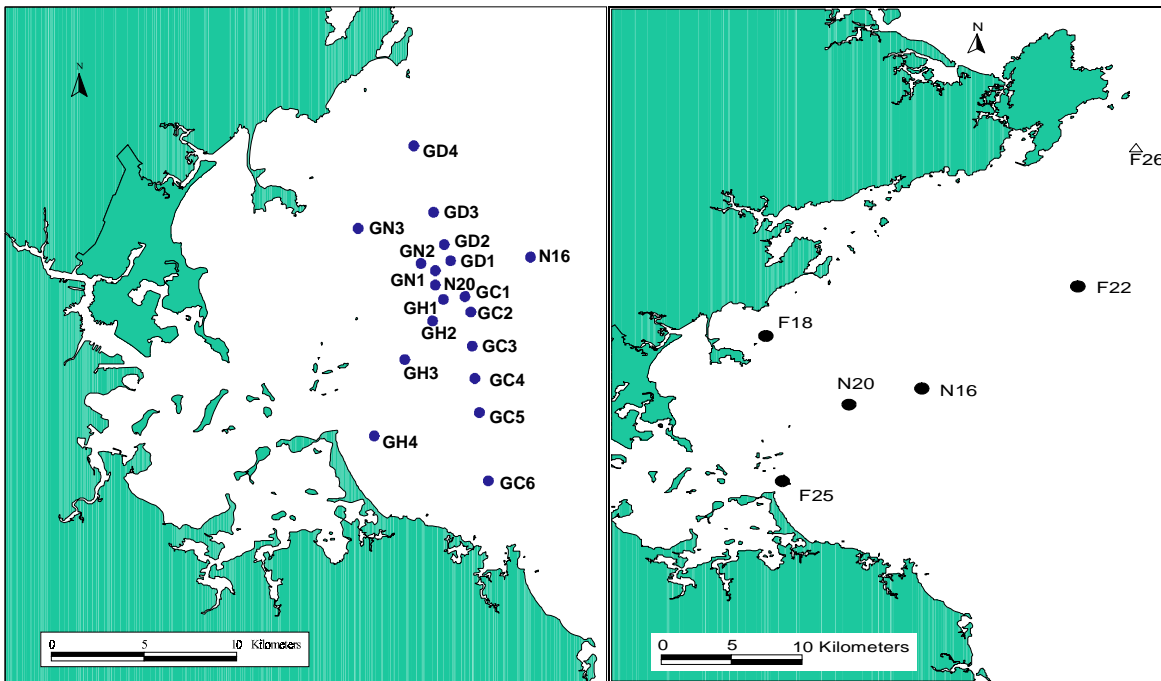


Figure 2. Location of Fecal Coliform (Left) and Anthropogenic Virus Stations (Right)

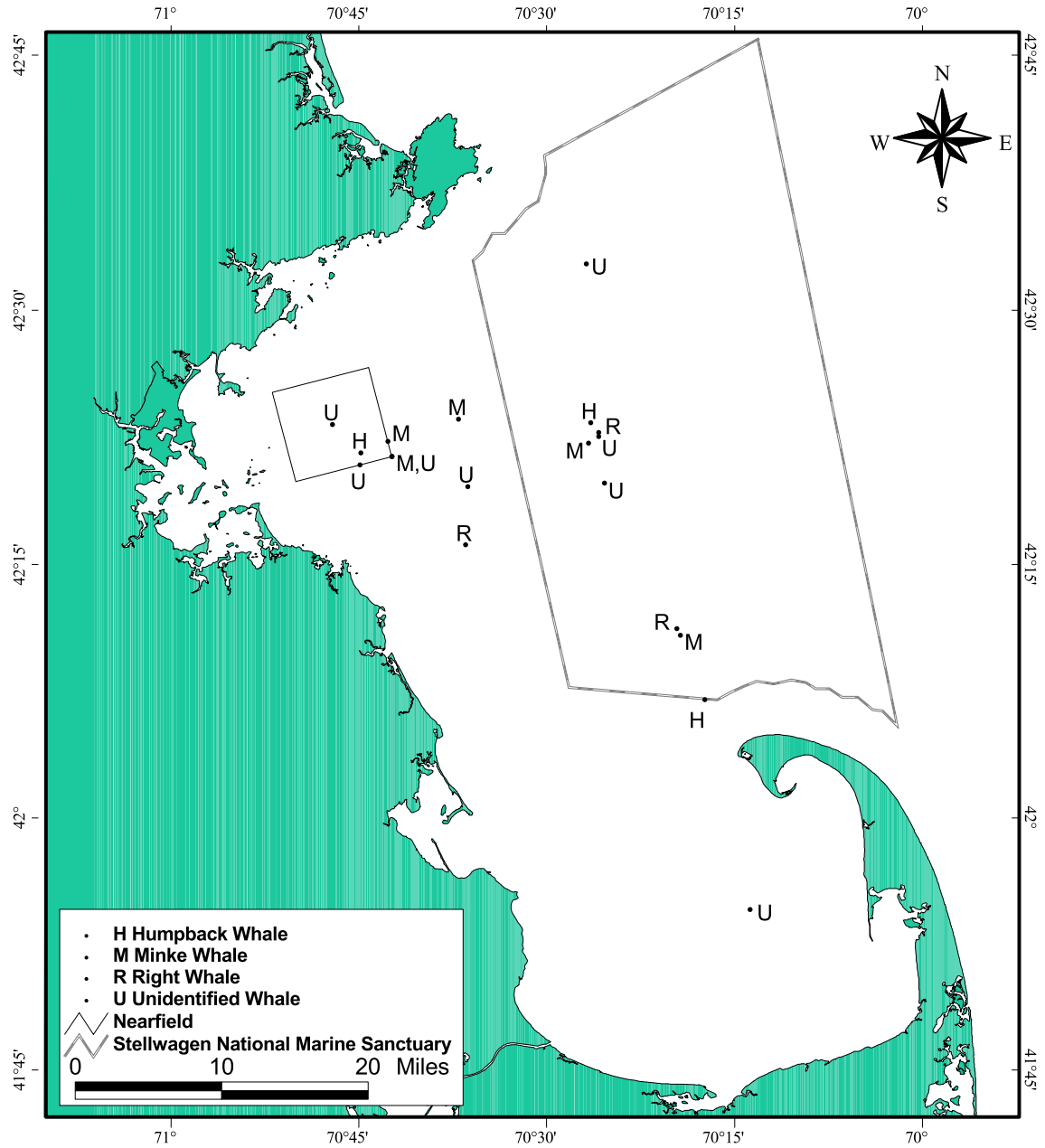


Figure 3. Approximate Locations of Whale Sightings during 1998 MWRA Water Quality Surveys



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