Northeast Fisheries Science Center Reference Document 11-06

NOAA NEFSC Stellwagen Bank National Marine Sanctuary Program 2009 Aerial Survey Results Summary

by Jennifer Gatzke, Christin Khan, Tim Cole, Peter Duley, Allison Henry, Sophie Van Parijs, and David Wiley

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Editorial Treatment: To distribute this report quickly, it has not undergone the normal technical and copy editing by the Northeast Fisheries Science Center's (NEFSC's) Editorial Office as have most other issues in the NOAA Technical Memorandum NMFS-NE series. Other than the four covers and first two preliminary pages, all writing and editing have been performed by the authors listed within. This report was reviewed by the Stock Assessment Review Committee, a panel of assessment experts from the Center for Independent Experts (CIE), University of Miami.

Information Quality Act Compliance: In accordance with section 515 of Public Law 106-554, the Northeast Fisheries Science Center completed both technical and policy reviews for this report. These predissemination reviews are on file at the NEFSC Editorial Office.

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INTRODUCTION

During the summer of 2009 the NEFSC Right Whale Aerial Survey Team flew two aerial surveys within the Stellwagen Bank National Marine Sanctuary (SBNMS) in order to quantify vessel traffic and marine animal abundance. An initial test flight was conducted on July 23, 2009 which was aborted prematurely due to weather. Two complete surveys were conducted, on July 25, 2009 and October 20, 2009, which provide a seasonal snapshot of the sanctuary usage, and demonstrate the utility of aerial surveys in providing vessel and animal abundance data.

METHODS

Randomized systematic track lines were flown using NOAA 57, a DeHavilland Twin Otter. Sea state, visibility, cloud cover, glare, and the quality of the observer's overall sight ability (excellent-good-moderate-poor) were recorded. Survey effort focused on the area over the acoustic buoy array deployed at the time of the survey flight in order to ground truth the acoustic with visual data (Figure 1). Survey effort focused on the southern half of the sanctuary where the buoy array was deployed.

Scientists documented the presence of animals, vessels, and fishing gear. All marine mammals, sea turtles, sharks and large sport fish were recorded following normal distance sampling methods; survey effort on track lines was continuous, with no breaks in effort for photographing whales. Documented vessels included commercial fishing, merchant, and military (including coast guard) vessels, whale watching boats, ferries and research vessels. All small recreational vessels within 2.16 nm (sightings with a declination angle of less than 87 degrees) were recorded. In addition to vessels, any unspecified fixed fishing gear or unattached 'ghost' gear was recorded. In areas of higher gear concentrations, where continuously recording single pieces of fixed gear was not feasible or distracted from marine animal sighting effort, fishing gear was recorded as "gear field" and categorized as light (1 piece of gear visible on one or both sides of the plane), moderate (5 pieces) or heavy (10 or more pieces) gear fields. A "piece" of gear was defined as a sighting of gear at the surface, i.e. a buoy (typically).

Given high densities of marine mammal and vessel sightings during the July survey, it was found to be impossible to accurately record both animal and vessel sightings during one pass (Figure 2). Therefore, the survey effort focused on animal sightings. However, vessel and gear sightings were recorded from the first pass of the first three track lines. The first three track lines were duplicated, recording only marine animals for the remainder of the survey. Due to time restrictions, the northern third of the sanctuary was not surveyed during July. On October 20, NOAA57 surveyed both vessels and marine animals throughout the entire survey area and then resurveyed the southernmost six lines recording only marine animals (Figure 3).

RESULTS

In total, 11.6 hours and 616.8 miles of track line were flown during the Stellwagen flights in 2009. No right whales were sighted on these surveys.

On July 25, flying from south to north, 4.6 hrs of flight time resulted in 269.8 mi of track line surveyed. There were 61 animal sighting, 3 fixed gear sighting and 59 vessel sighting events. No gear fields were observed. Sport fishing vessels and research vessels were more numerous during the July survey than during the October survey (Table 1). Fin and Minke whales were only sighted during the July survey (Table 1). Vessel and gear data were collected on the first 3

track lines only (Figure 2). The northern third of the sanctuary was not surveyed due to time restrictions.

Five hours of flight time were recorded on October 20, resulting in 347 miles of track line surveyed. Gear fields are prevalent in the sanctuary, as are unspecified fixed fishing gear (Figure 3). There was no ghost gear recorded and 51 animal sighting, 36 gear sighting, and 218 vessel sighting events. Tuna, Harbor porpoise and Common white-sided dolphin were only sighted during the October survey (Table 2). Vessel and gear data were collected throughout the completed survey area (Figure 5 and Figure 6).

DISCUSSION

While little fixed fishing gear and no gear fields were recorded in July, vessel and gear data were collected only during the first pass of the first three track lines.

Sport fishing vessel and research vessel activity were much higher during the July survey than during the October survey, as evidenced by the data shown (Table 1). This was to be expected as summer recreational boating activity off Provincetown is known to be heavy (Figure 2). The needed modification in survey methodology in response to high densities of both marine mammals and vessels in July was one important finding of these surveys. In order to achieve both a quality marine mammal survey and a comprehensive vessel survey in the SBNMS, particularly during the summer, the survey should be flown twice with marine animals being recorded during one pass and vessels being recorded during another.

While it appears that commercial fishing vessels appeared to be more abundant in October (Table 1), it is important to recognize that in July we did not survey the northern third of the area, where the commercial fleet was likely to be found (Figure 2 and Figure 5).

These data will be integrated with the rest of NEFSC's aerial survey data set and could be used in future analyses for: ground truthing the acoustic data from the NOPP (National Oceanographic Partnership Program) buoy array, evaluating and modeling animal distribution and density based on actual positions of sighted animals, exploring historical patterns in conjunction with data from surveys conducted with the overlapping SBNMS and the Stellwagen and Jeffries Ledge aerial survey boxes (see Figure 7).

REFERENCES CITED

Cole TVN, Gerrior P, Merrick RL. 2007. Methodologies and preliminary results of the NOAA National Marine Fisheries Service aerial survey program for right whales (*Eubalaena glacialis*) in the northeast U.S., 1998-2006. U.S. Dep. Commer., *Northeast Fish. Sci.Cent. Ref. Doc.* 07-02; 11 p. Available from: http://rwhalesightings.nefsc.noaa.gov.

Table 1. Summary of the number of vessel type sighted on each flight, including the overall total number of vessels sighted for the day. Note: the northern third of the survey area was not covered in July, so some of the commercial fishing vessel numbers may be lower due to this discrepancy, if not the seasonality of the fishing seasons.

VESSEL TYPE	NUMBER VESSELS JULY 25, 2009	NUMBER VESSELS OCTOBER 20, 2009
Fishing vessel – unspecified	1	107
Fishing vessel – lobster	3	73
Fishing vessel – trawler	0	25
Fishing vessel – gill netter	0	6
Fishing vessel – long liner	0	2
Merchant vessel – large	1	7
Merchant vessel - tanker	1	1
Research vessel – large	7	0
Research vessel – small	1	0
Sport fishing vessel	62	8
Recreational vessel	0	3
Sailing vessel	6	7
Whale watch vessel	5	13
Total vessels	**87**	**252**

Table 2. Summary of the number and species of animals sighted during each of the two SBNMS 2009 survey flights. One of the "Unidentified large whales" in October was recorded as a "possible right whale" (*Eubalaena glacialis*), but otherwise, no right whales were noted. Note: the northern third of the SBNMS area was not surveyed in July.

COMMON NAME	SCIENTIFIC NAME	NUMBER ANIMALS JULY 25	NUMBER ANIMALS OCTOBER 20
Humpback whale	*Megaptera novaeangliae*	39	33
Fin whale	*Balaenoptera physalus*	8	0
Minke whale	*Balaenoptera acutorostrata*	6	0
Common / white-sided dolphin	*Delphinis* sp. */ Lagenorhynchus* sp.	3	0
Harbor porpoise	*Phocoena phocoena*	0	22
Tuna	*Thunnus* sp.	0	52
Unidentified large whale	N/A	11	10
Unidentified dolphin	N/A	0	16
Unidentified animal	N/A	2	2
TOTAL		69	168

JULY

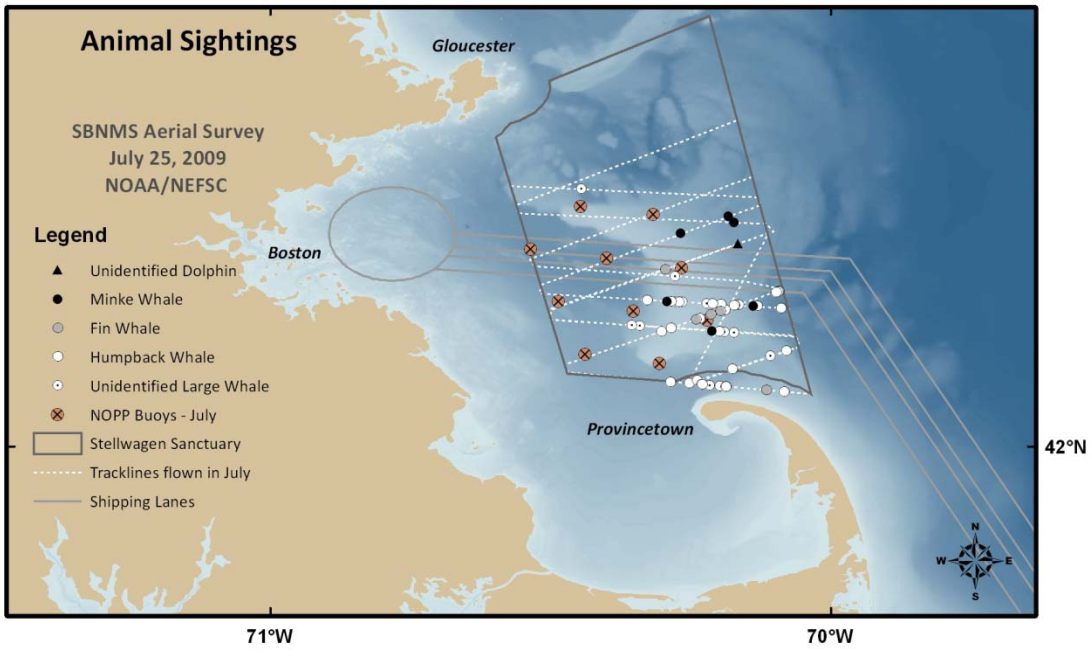

Figure 1. All animal sightings during the July 25 2009 SBNMS flight overlaid with the NOPP acoustic buoys.

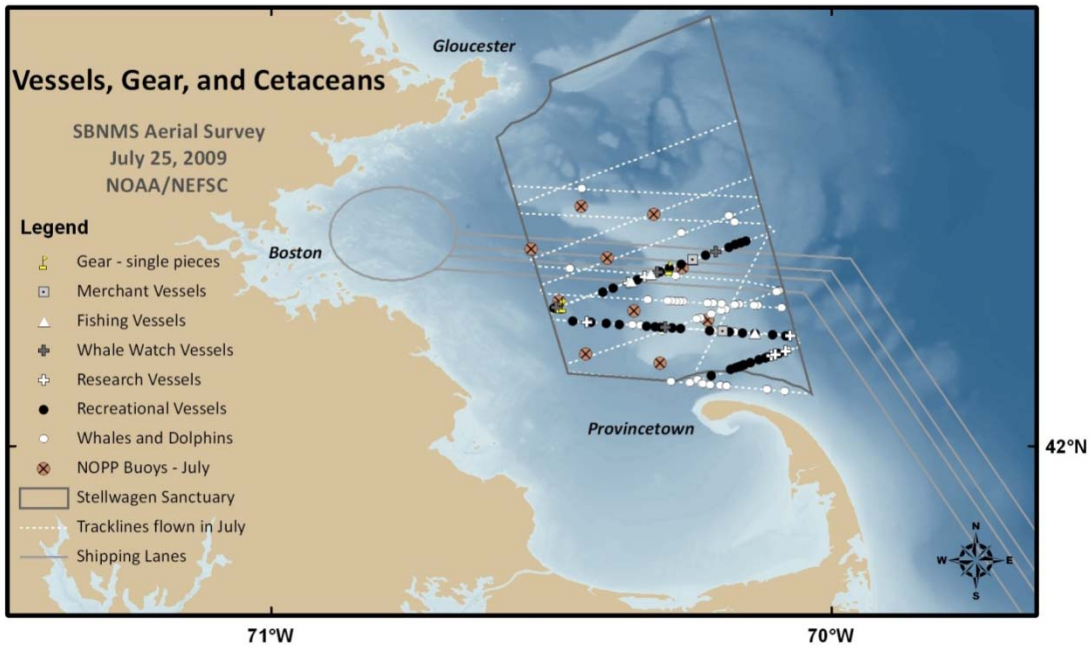

Figure 2. All vessels, gear and cetaceans sighted during the July 25 2009 SBNMS flight overlaid with the NOPP acoustic buoys. Note: vessel and gear data were only collected on the second pass of the first three track lines, as shown.

OCTOBER

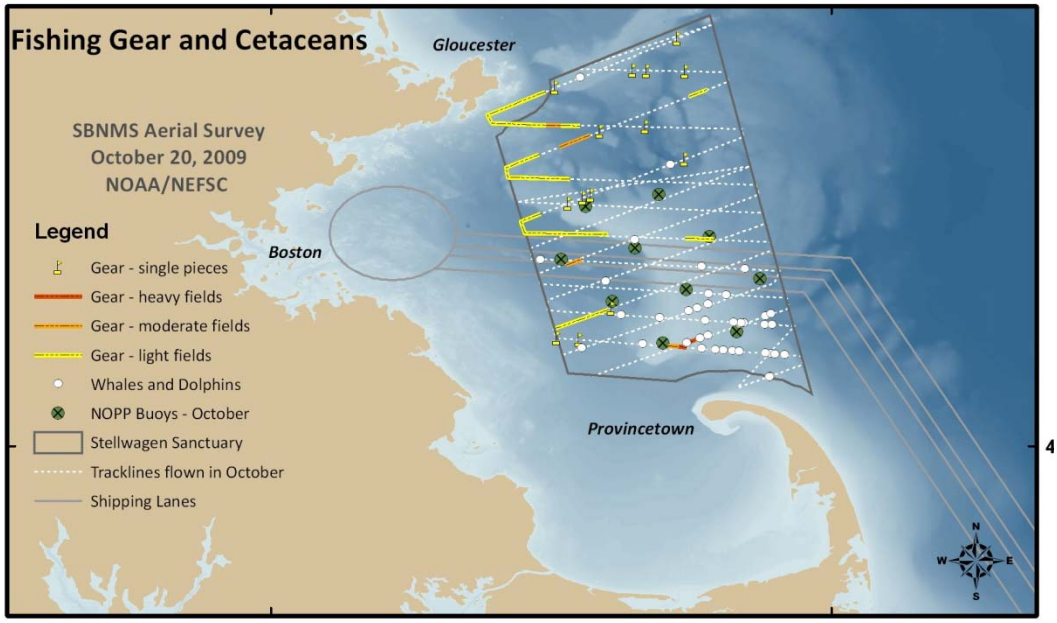

Figure 3. All fishing gear (including single pieces and gear fields) and cetaceans sighted during the October 20 2009 SBNMS flight overlaid with the NOPP acoustic buoys.

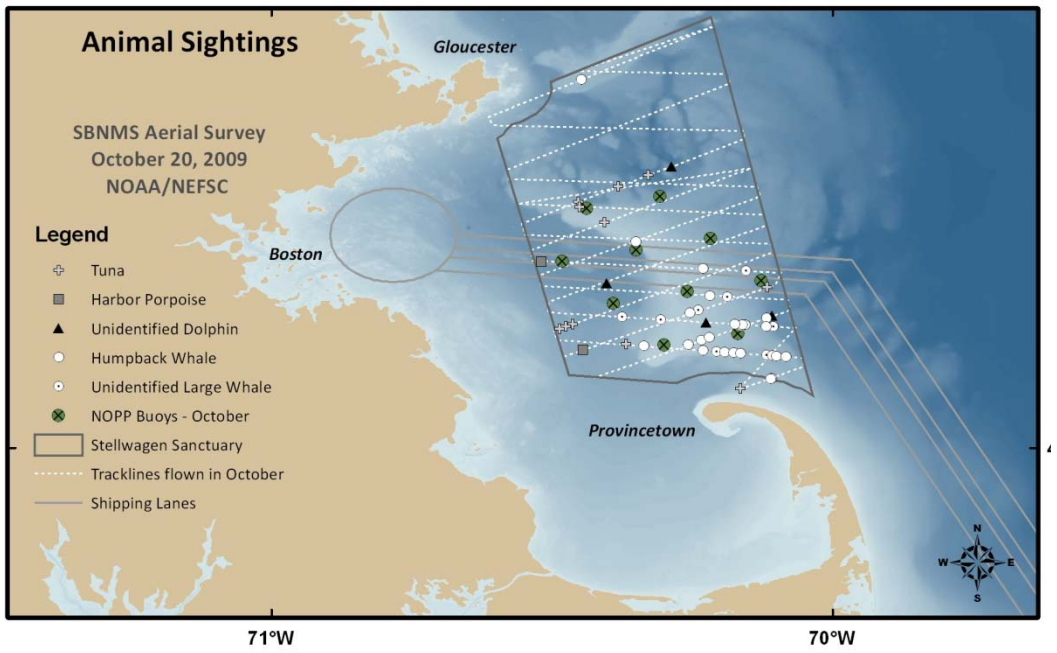

Figure 4. All animals sighted during the October 20 2009 SBNMS flight overlaid with the NOPP acoustic buoys.

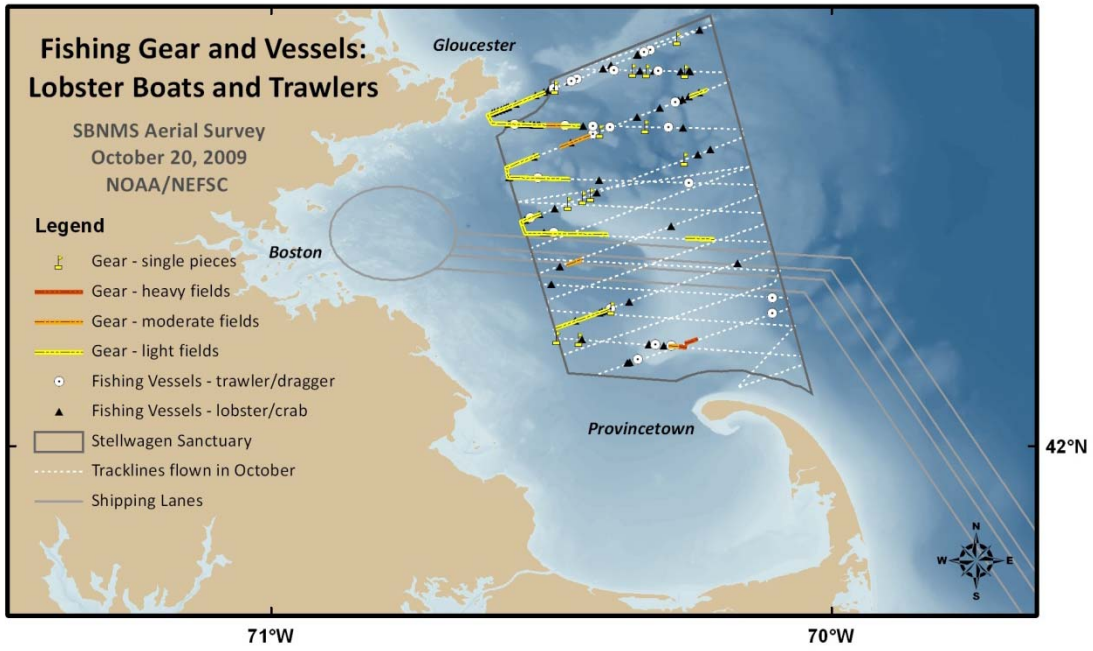

Figure 5. Fishing gear (including single pieces and gear fields) and vessels (lobster boats and trawlers) sighted during the October 20 2009 SBNMS flight.

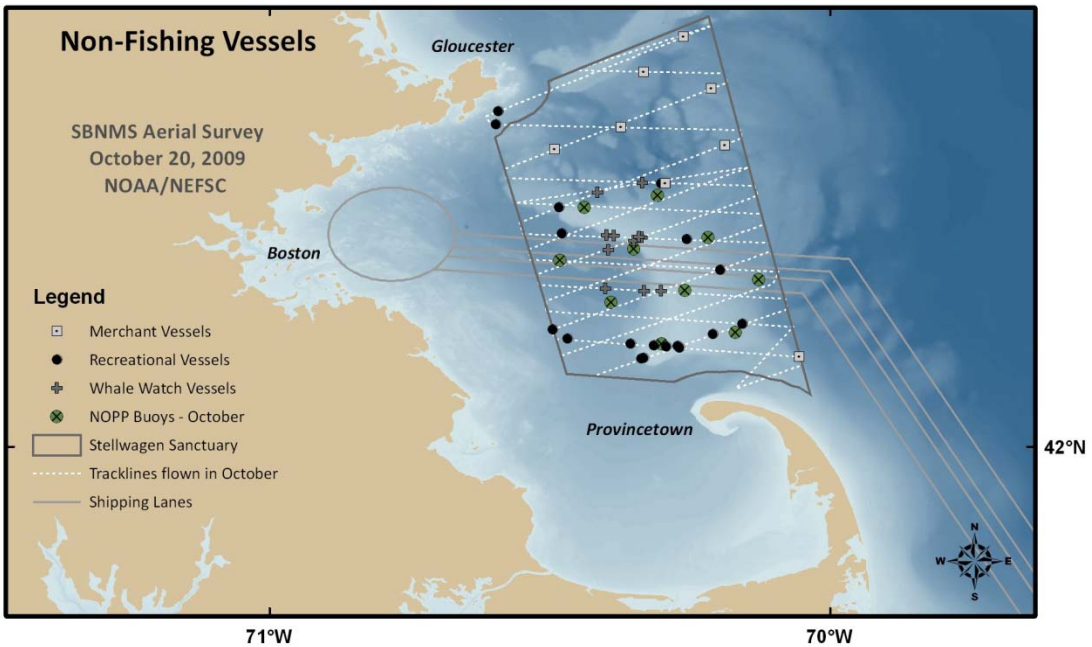

Figure 6. All noncommercial fishing vessels sighted during the October 20 2009 SBNMS flight overlaid with the NOPP acoustic buoys.

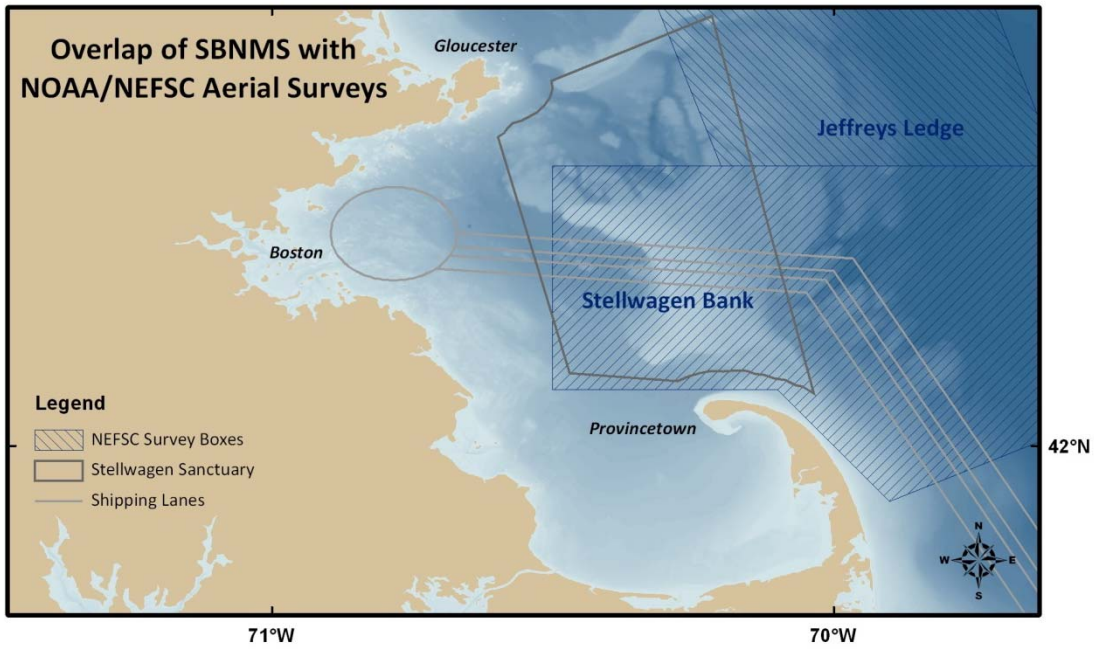

Figure 7. Overlay of Stellwagen Bank National Marine Sanctuary with standard NOAA NEFSC Aerial Survey Areas.

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