Species Status Assessment

Common Name: Blue whale **Date Updated:** 10/10/2024

Scientific Name: *Balaenoptera musculus* **Updated by:** Meghan Rickard

Class: Mammalia

Family: Balaenopteridae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

The blue whale is the largest animal to have ever lived on Earth and can be found in all the world's oceans (Mizroch et al. 1984, Sears and Perrin 2018). There are 5 recognized blue whale subspecies (Cooke 2018). The northern subspecies *Balaenoptera musculus musculus* includes the blue whales found in New York waters. It remains unclear if blue whales in the eastern and western portions of the North Atlantic Ocean are the same population. Because of this, the International Whaling Commission (IWC) recognizes all North Atlantic blue whales to be one stock (or management unit) which is supported by the existence of only one blue whale song type in the North Atlantic (Donovan 1991, NMFS 2020a). Ten song types have been described globally and remain stable, which can be used to distinguish populations when there is no genetic data (McDonald et al. 2006). Photo identification further indicates blue whales in the Gulf of St. Lawrence, eastern Canada, New England, and Greenland belong to one population, with no known matches to the eastern population (Sears et al. 1990).

In the Western North Atlantic, blue whales are found from the Arctic to mid-latitude waters. Little is known about the population size except within the Gulf of St. Lawrence (Hayes et al. 2020). They have a wide distribution and are highly migratory in nature, spending summer in the high latitudes (narrow distribution, presence on feeding grounds) and traveling south to warmer water during the winter (more dispersed, calving areas). They spend most of their time far offshore and so are rarely encountered, though their occasional presence in the mid-Atlantic and Southern New England canyons is regular (Johnson et al. 2021). It is believed that blue whales are using waters of the U.S. mid-Atlantic primarily as part of their migration routes, and there is some speculation that their presence here in the winter might be linked to breeding or calving (Lesage et al. 2018). The species has been documented visually and acoustically in the NY Bight primarily in offshore waters greater than 25 miles from the coast and during fall, winter, and early spring (Sadove and Cardinale 1993, Muirhead et al. 2018, Zoidis et al. 2021, Estabrook et al. 2025). Recent sightings in the summer challenge the notion that blue whales are only present in New York at certain times of year.

I. Status

a. Current legal protected Status

i. **Federal:** Endangered **Candidate:** ______

ii. **New York:** Endangered

b. Natural Heritage Program

i. **Global:** G3G4

ii. **New York:** SNA **Tracked by NYNHP?:** Yes

Other Ranks:

-New York 2025 SGCN status: High Priority Species of Greatest Conservation Need

-IUCN Red List: Endangered

-CITES: Appendix I

-Northeast Regional SGCN: Highly imperiled migratory species; very high conservation concern

-Canada Species at Risk Act (SARA): Endangered

-Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Endangered

-Marine Mammal Protection Act (MMPA): Strategic

Status Discussion:

Blue whale stocks worldwide were severely depleted by modern industrial whaling throughout their range during the 19th and early 20th centuries. Blue whales delivered the most yield due to their large size, and as such, blue whales were among the first species to be diminished by modern industrial whaling. In the North Atlantic, blue whales were hunted off northern Norway, Svalbard, Iceland, the British Isles, and Newfoundland (Mizroch et al.1984). Typically, one location was targeted for 10 to 15 years, and when catches declined, whalers moved on to another location (Tonnessen & Johnson 1982).

Since the start of modern whaling in northern Norway in the 1860s, at least 11,000 blue whales were recorded killed throughout the North Atlantic, which is believed to have been approximately 70% of the population (Beauchamp et al. 2009, Jonsgard 1977, Sigurjónsson and Gunnlaugsson 1990). Over 2,000 blue whales were taken off Newfoundland, about 500 in the Gulf of St Lawrence, and nearly 1,000 around the Faeroes, Scotland, and Ireland (Sigurjónsson and Gunnlaugsson 1990, Yochem and Leatherwood 1985, Reeves et al. 1998, Sears and Calambokidis 2002, Reeves and Kenney 2003). These numbers do not account for the struck and lost rates during pre-industrial whaling (IWC 2017), nor any blue whales included in the additional 13,000 unspecified large whales that were recorded as caught in the late 19th and early 20th centuries (Allison 2017).

The 1946 moratorium on whaling declared by the International Whaling Commission went into effect for North Atlantic blue whales in 1955, though they were still hunted under exception by some countries such as Norway until 1960 (Best 1993). Estimates after this protection was granted put the population in the "very low hundreds, at most" in the western North Atlantic (Mitchell 1974). The last recorded direct catches were six blue whales taken off of Spain in 1978 (Allison 2017).

Blue whales were listed as Endangered under the U.S. Endangered Species Act in 1973 and were originally listed as "very rare and believed to be decreasing in numbers" on the IUCN Red List in 1965. Currently, they are listed as Endangered on the IUCN Red List. The blue whale U.S. Recovery Plan, as well as the 5-year Review, mandated under the ESA were revised in November 2020 (NMFS 2020a, NMFS 2020b). The most recent Stock Assessment Report, mandated under the Marine Mammal Protection Act (MMPA), was completed for 2019 (Hayes et al. 2020). All three of these U.S. management documents are due for updates in 2025. In Canada blue whales were listed as a species of special concern in 1983. The Canadian population was split into two stocks in 2002, and the North Atlantic stock was listed as endangered under the Species at Risk Act (SARA) that year. Its status was reviewed again in 2012 and confirmed endangered (COSEWIC 2012).

The current global mature population size is unknown, but it is estimated to be 5,000-15,000 individuals, which is an 89%-97% reduction of the 1926 global mature population estimate of at least 140,000 individuals (Cooke 2018). There are no precise estimates of original abundance in the North Atlantic and evidence of population increase is difficult to prove (Thomas et al. 2016).

Before whaling, there may have been as many as 15,000 blue whales in the North Atlantic (Yochem and Leatherwood 1985). Based on cumulative catches from 1898 to 1915, researchers have estimated that the pre-whaling western North Atlantic blue whale population was between 1,100 and 1,500 individuals (Sergeant 1966, Allen 1970) and there may be 1,000 – 3,000 individuals at the present time in the entire North Atlantic (Cooke 2018).

II. Abundance and Distribution Trends

Region	Present ?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown	Late 19th century to present		Choose an item.
Northeastern US	Yes	Unknown	Unknown		Endangered	Yes
New York	Yes	Unknown	Unknown		Endangered	Yes
Connecticut	Yes	Unknown	Unknown		Not listed	No
Massachusetts	Yes	Unknown	Unknown		Endangered	Yes
Rhode Island	Yes	Unknown	Unknown		Not listed	No
New Jersey	Yes	Unknown	Unknown		Endangered	No
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	Yes	Unknown	Unknown		Endangered	Choose an item.

Column options
Present?: Yes; No; Unknown; No data; (blank) or Choose an Item
Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item
SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*

Blue whales are difficult to study due to their low abundance and tendency to inhabit deep water and funding for visual surveys is extremely limited. Until 2016, monitoring of large whales in New York was very narrow in scope. Previous examples of surveys that included the New York area and recorded large whales were done coast-wide, seasonally, and/or focused on multiple taxa and were therefore not carried out at the most appropriate temporal or spatial scale for an assessment of large whale species in the New York Bight (CETAP 1982).

One of the first NYB-focused large whale surveys was a passive acoustic monitoring effort that took place from 2008 to 2009 (Muirhead et al. 2018). The 258-day project included 10 sites, with a line of moored receivers perpendicular to Long Island and 3 sites around the entrance to NY Harbor. The data was analyzed for blue, fin, humpback, and North Atlantic right whales only.

In 2010, the Atlantic Marine Assessment for Program for Protected Species (AMAPPS) joint program between the National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Ocean Energy Management (BOEM) began, with the goal of determining the abundance and distribution of protected species along the U.S East Coast. The NOAA Northeast Fisheries Science Center (NEFSC) Protected Species Branch leads the surveys which are conducted primarily by plane and ship. AMAPPS is a broadscale survey and therefore does not match the specific needs of New York Bight monitoring in time or space but has, however, recorded sightings of blue whales in and around New York. AMAPPS II (2015-2019) and AMAPPS III (2019-2024) have both been completed but AMAPPS was not picked up for continued funding by BOEM. Instead, the U.S. Navy plans to work with NOAA on similar surveys beginning in 2025 (US Navy 2024).

NOAA conducts regular, year-round monitoring focused on North Atlantic right whales (i.e., the North Atlantic Right Sighting Advisory System) that also collects data on other taxa including blue whales (Johnson et al. 2021). In addition, the New England Aquarium also conducts regular aerial surveys, and sometimes shipboard surveys, in the Southern New England area and records sightings of blue whales. Sightings of blue whales off the coast of New England are regular but at variable times, and the number of individuals is always small, usually one single animal.

In 2016, to support the state's commitment to offshore wind energy, the New York State Energy Research and Development Authority (NYSERDA) began a seasonal 3-year ultra-high resolution digital aerial survey of all marine taxa within the New York Bight (e.g., the offshore planning area delineated by NY Dept. of State; NYSERDA 2021). Also in 2016, the Woods Hole Oceanographic Institute (WHOI) deployed the first of an ongoing succession of real-time monitoring buoys, and later gliders, to record the presence of large whales in the New York Bight (WHOI 2025). This effort had first been introduced off the coast of Massachusetts and proved helpful for both data collection and real-time management of ship speeds to prevent collision with whales. Currently, the data shared publicly is limited to 4 large whale species (sei, humpback, fin, and North Atlantic right whales) and does not include blue whales.

Beginning in 2017, DEC launched the first three years of a long-term monitoring program for large whales. Using monthly visual aerial surveys and 24/7 passive acoustic monitoring, the NYS Whale Monitoring Program gathered enough data to estimate large whale abundance in the NYB and identified probable discreet periods of space and time that blue whales are likely to be found. The NYS Whale Monitoring Program will conduct another three years of visual aerial surveys for a total of 18 surveys beginning in November 2024.

Marine mammal stranding response is performed by two federally permitted groups in New York: the New York Marine Rescue Center (NYMRC) and the Atlantic Marine Conservation Society (AMSEAS). For all live and dead large whale events, AMSEAS is the lead response team. The DEC has supplied funding for stranding response in New York since the program began in 1980. Strandings provide valuable data, making stranding response an essential component of monitoring. To date, there are no records of a stranded blue whale in New York.

Currently, the only active monitoring effort appropriate for the assessment of blue whales in the New York Bight are: DEC large whale aerial surveys (2024-2027).

Trends Discussion *(insert map of North American/regional distribution and status):*

Overall, blue whale abundance and distribution trends have shifted over the past decade, matching shifts seen in other large whale species. When the CETAP surveys were active in the late 1970s and early 1980s, the expected distribution of blue whales began at the border of the US and Canada in the Gulf of Maine (CETAP 1982). Now, blue whales have been recorded regularly as far south as offshore Brunswick, Georgia (Palka et al. 2021). Importantly, despite the increase in NY- and/or large whale-focused research over the past ten years, data continues to be insufficient to determine trends in abundance (Hayes et al. 2020).

Historical blue whale sightings indicate a wide distribution in warmer latitudes during the winter and a smaller northern distribution in the summer (Reeves et al. 2004). Passive acoustic tracking of individuals suggests that blue whales move over vast distances, likely covering most of the North Atlantic basin (Clark 1994). This wide distribution and highly migratory nature complicate arriving at a reasonable estimate. Sigurjónsson and Gunnlaugsson (1990) noted that North Atlantic blue whales appeared to have been depleted by commercial whaling to such an extent that they remained rare in some formerly important habitats. However, there are still no recent estimates of abundance available throughout the North Atlantic (Cooke 2018).

A long-term decline of western North Atlantic blue whales followed whaling of the species and by 1955 the population was severely depleted. Based on compiled survey and photo identification data, it is likely that the number of blue whales throughout the entire North Atlantic Ocean now ranges from 600 to 1,500 animals (Sears and Calambokidis 2002). Mitchell (1974) estimated that the blue whale population in the western North Atlantic may number only in the low hundreds and there has been some suggestion that 400 to 600 individuals may be found in the western North Atlantic (Hayes et al. 2020).

However, accurate pre- and post-whaling blue whale abundance and trends are currently unknown. Minimal trend information is available for western North Atlantic blue whales in the Gulf of St. Lawrence, where most sightings and research have occurred. Long-term studies (1980 to 2008) have photographically identified over 400 individual blue whales (Beauchamp 2009, Ramp and Sears 2013). Each year, 20 to 105 blue whales are identified and about 40% return to the Gulf of St. Lawrence regularly, while others have been seen for less than three seasons between 1979 – 2002 (COSEWIC 2012). Some studies say there is likely only 250 mature individuals in Canada (COSEWIC 2012). Based on sightings from 1979 to 2002, the annual adult survival rate is estimated to be 0.975 for whales in the Gulf of St. Lawrence region (Ramp 2006). Researchers in the Gulf of St. Lawrence report that only 21 calves have been recorded in over 32 years of annual sighting effort and, although blue whales are present off Newfoundland and Nova Scotia, no cow-calf pairs have been sighted there (COSEWIC 2012). Regardless of any potential trends, these studies cannot be used to infer for blue whales in areas out the Gulf of St. Lawrence.

In Iceland prior to 1990 there was enough consistent survey effort over a short period of time to show 5% annual growth (Sigurjónsson and Gunnlaugsson 1990), but such growth has not been confirmed elsewhere or in Iceland since. Christensen et al. (1992) noted that despite the apparent population increase in Iceland prior to 1990, all other North Atlantic area abundance was still very low at the time and brought into question whether the previously established migratory patterns of the species were still true. Indeed, there have been more frequent visual and/or acoustic recordings of blue whale presence outside of what was once considered their range, specifically, in the US Mid-Atlantic. Wenzel (1988) published the first documented sightings in U.S. continental shelf waters in the Gulf of Maine from whale watch boats in the late summer and early fall months. These seemingly rare sightings indicated at that time that the US Northeast was likely part of the southernmost extent of the range.

Data gaps highlight the importance of long-term monitoring to understand the trends in abundance (NMFS 2020a). More data is needed to understand blue whale habitat use in the Western North Atlantic and in the New York Bight. Overall, it remains difficult to determine population estimates and trends for this species (Ramp and Sears 2013) The small sampling area and low detections do not produce an estimate with a minimum degree of certainty and should not be extrapolated to other areas (Sears et al. 1987, Sears et al. 1990, Cooke 2018, Beauchamp 2009). However, the most recent IUCN Red List assessment indicates that the species is increasing with no continued decline of mature individuals. Per the assessment: “the global population size in 2018 is plausibly in the range 10,000-25,000 total or 5,000-15,000 mature, compared with a 1926 global population of at least 140,000 mature. The current mature population would therefore be between 3 and 11% of the 1926 level” (Cooke 2018). The assessment also states that “there are no complete estimates of recent or current abundance for the other regions, but plausible total numbers would be 1,000-3,000 in the North Atlantic” (Cooke 2018). In the U.S., surveys from June to September 2016 resulted in an abundance estimate for Central Virginia to the lower Bay of Fundy of 39 individuals. Currently, the Gulf of St. Lawrence catalogue count of 402 recognizable individuals is considered NOAA Fisheries’ best population estimate for the Western North Atlantic Stock (Hayes et al. 2020).

Figure 1. Conservation status of blue whale in North America (NatureServe 2024).

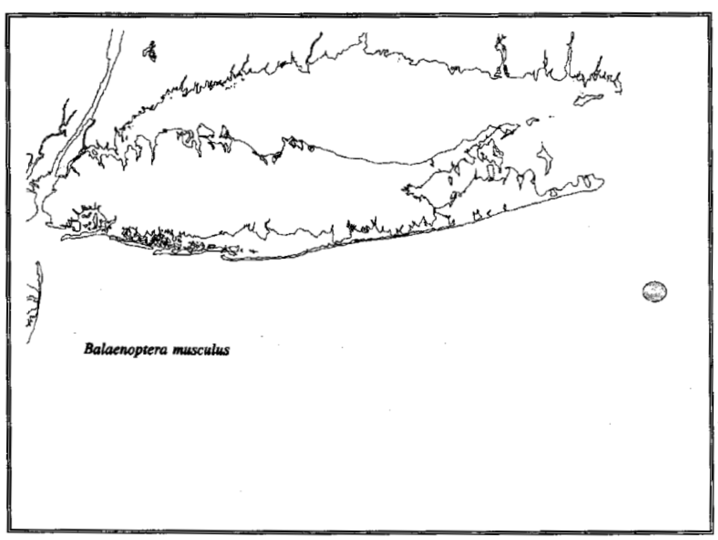


Figure 2. Blue whale sighting area,1970s-1990s (Sadove & Cardinale 1993).

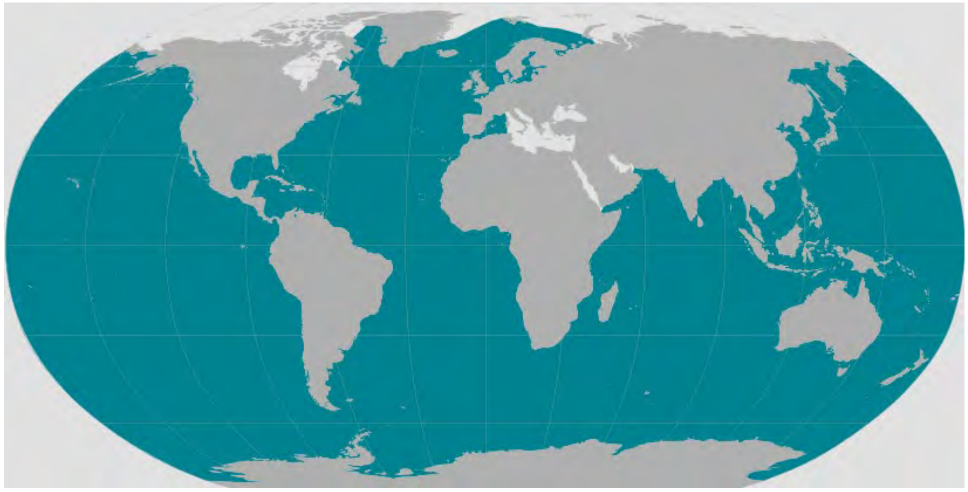


Figure 3. Geographic range of the blue whale (NMFS 2023).

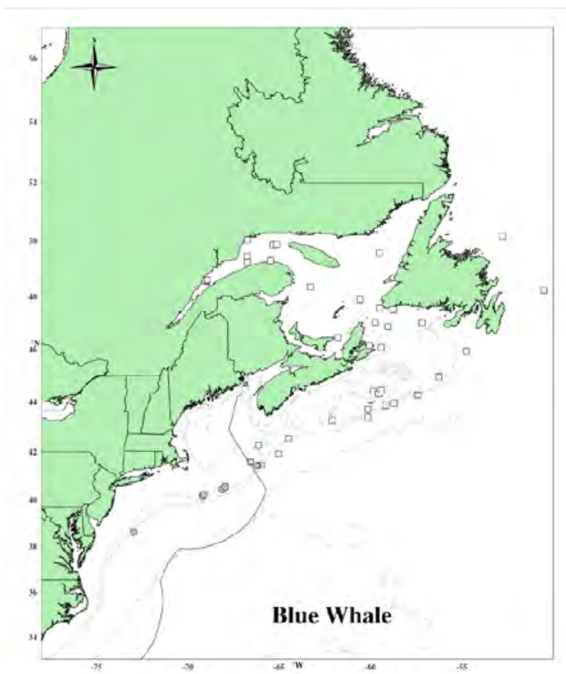
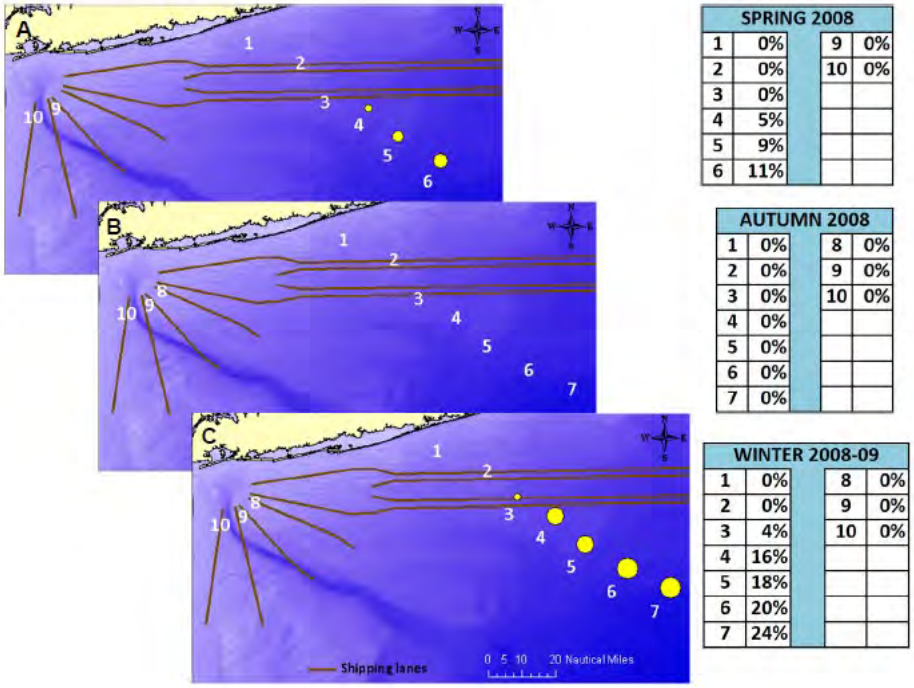


Figure 4. Distribution of blue whale sightings from NEFSC and SEFSC shipboard and aerial surveys during the summers of 1998, 1999, 2002, 2004, 2006, 2007, 2010, 2011, 2013, and 2016 and DFO's 2007 TNASS and 2016 NAISS surveys. Circle symbols represent shipboard sightings and squares are aerial sightings (Hayes et al. 2020).



SPRING 2008			
1	0%	9	0%
2	0%	10	0%
3	0%		
4	5%		
5	9%		
6	11%		

AUTUMN 2008			
1	0%	8	0%
2	0%	9	0%
3	0%	10	0%
4	0%		
5	0%		
6	0%		
7	0%		

WINTER 2008-09			
1	0%	8	0%
2	0%	9	0%
3	4%	10	0%
4	16%		
5	18%		
6	20%		
7	24%		

Figure 5. Seasonal presence of blue whales in the New York Bight region. A) blue whale presence during spring (1 March – 14 May 2008), B) presence during autumn (31 August – 2 Dec 2008), and C) presence during winter (5 December 2008 – 3 March 2009). Tables to the right of each plot show the actual percentages of days with blue whale song during each season (BRP 2010).

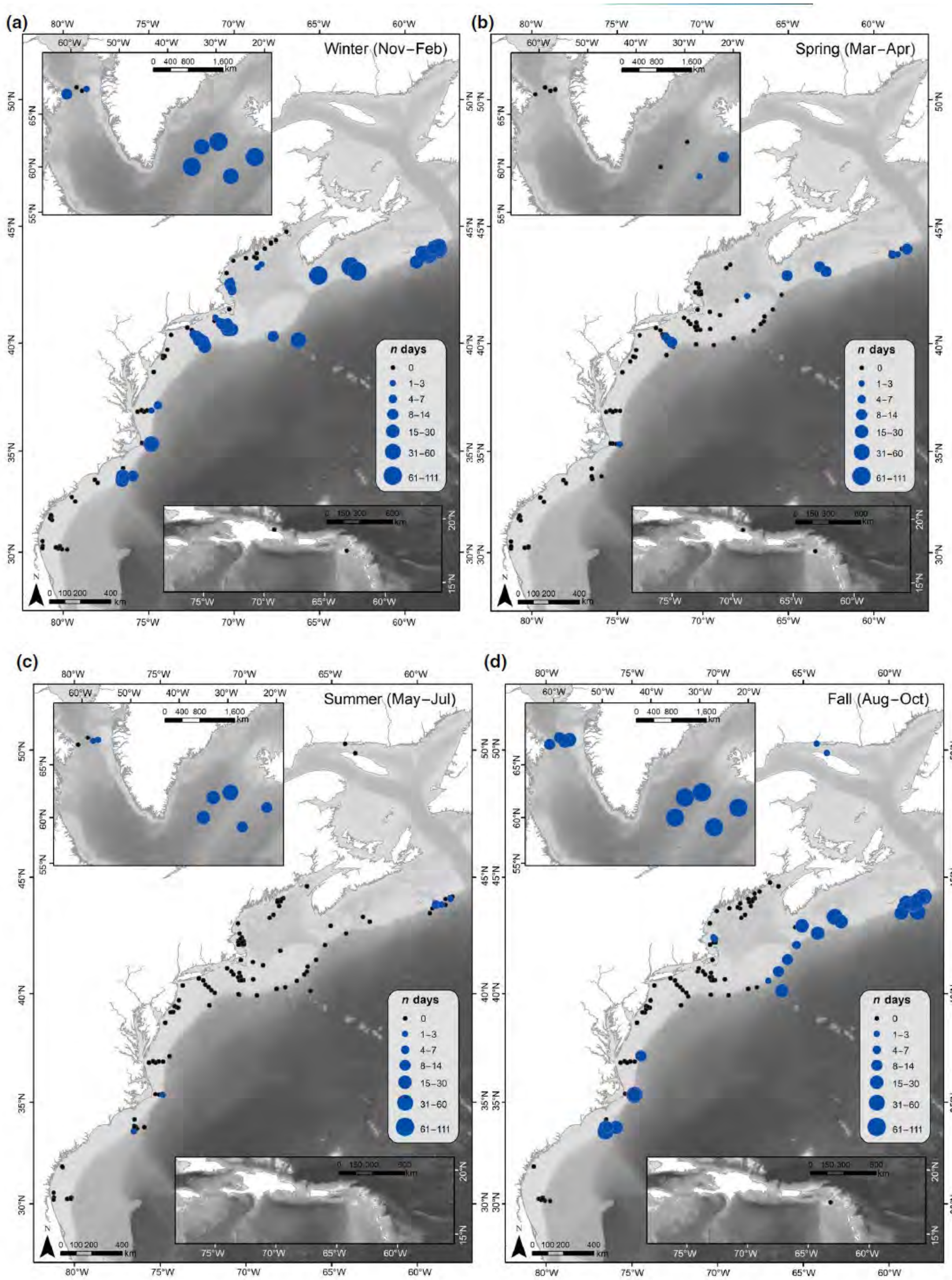


Figure 6. Blue whale seasonal occurrence maps. The number of days per season with confirmed North Atlantic blue whale acoustic detections, summarized for all available recording locations (2004-2014). Filled blue circles indicate blue whale acoustic presence, and circle size indicates the number of days with blue whale acoustic detections during a season. Black dots indicate recorder locations with no blue whale acoustic presence for any year during that season (defined as: (a) Winter (November-February); (b) Spring (March-April); (c) Summer (May-July); and (d) Fall (August-October) (Davis et al. 2020).

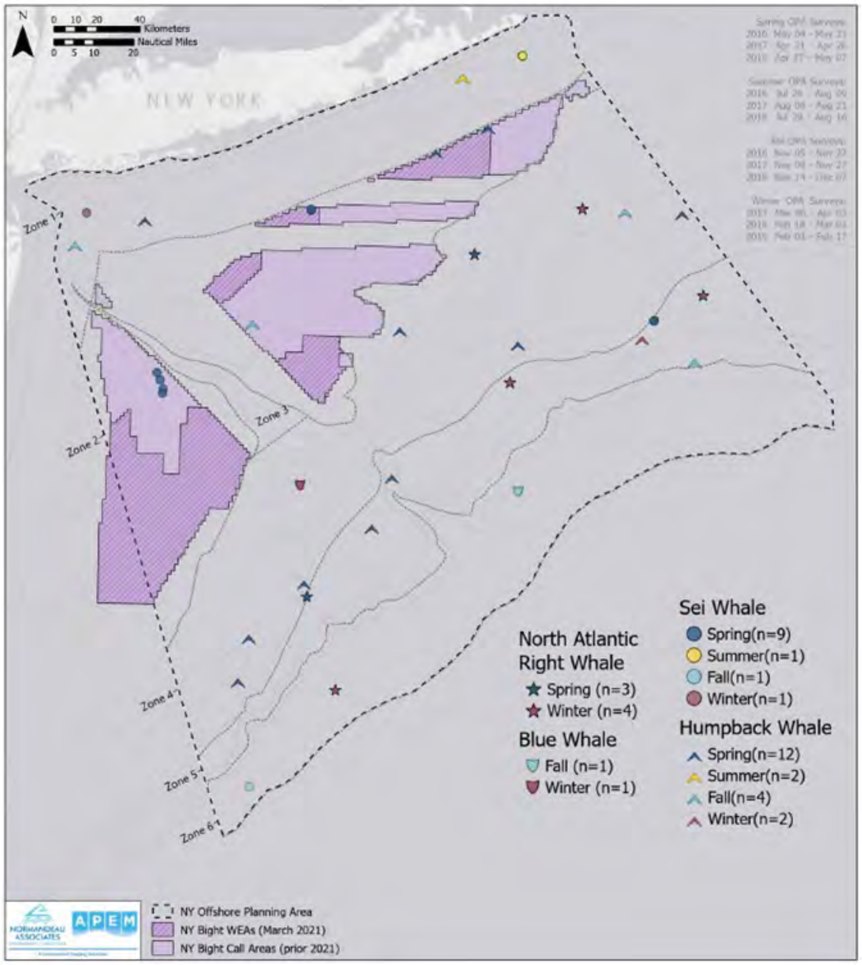


Figure 7. Spatial distribution of low-frequency cetacean species with fewer than 30 occurrences across all surveys (NYSERDA 2021).

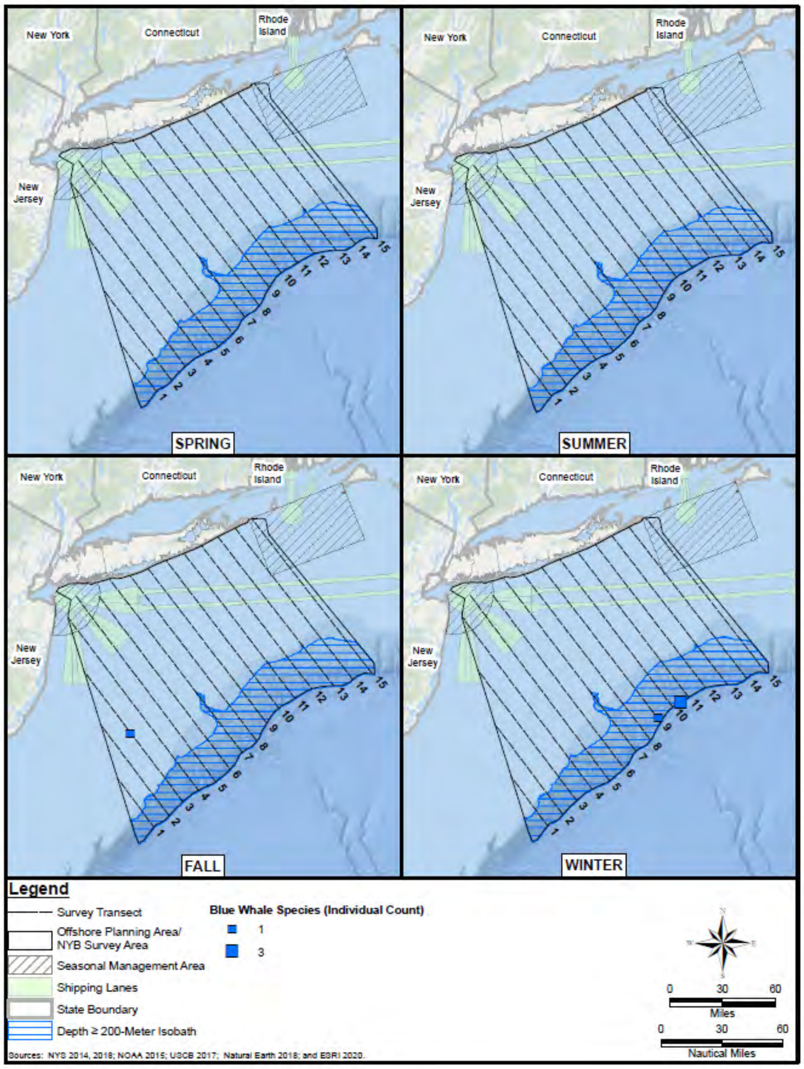


Figure 8. Locations of all blue whale sightings by count and season – Years 1, 2, and 3 (Tetra Tech and LGL 2020).

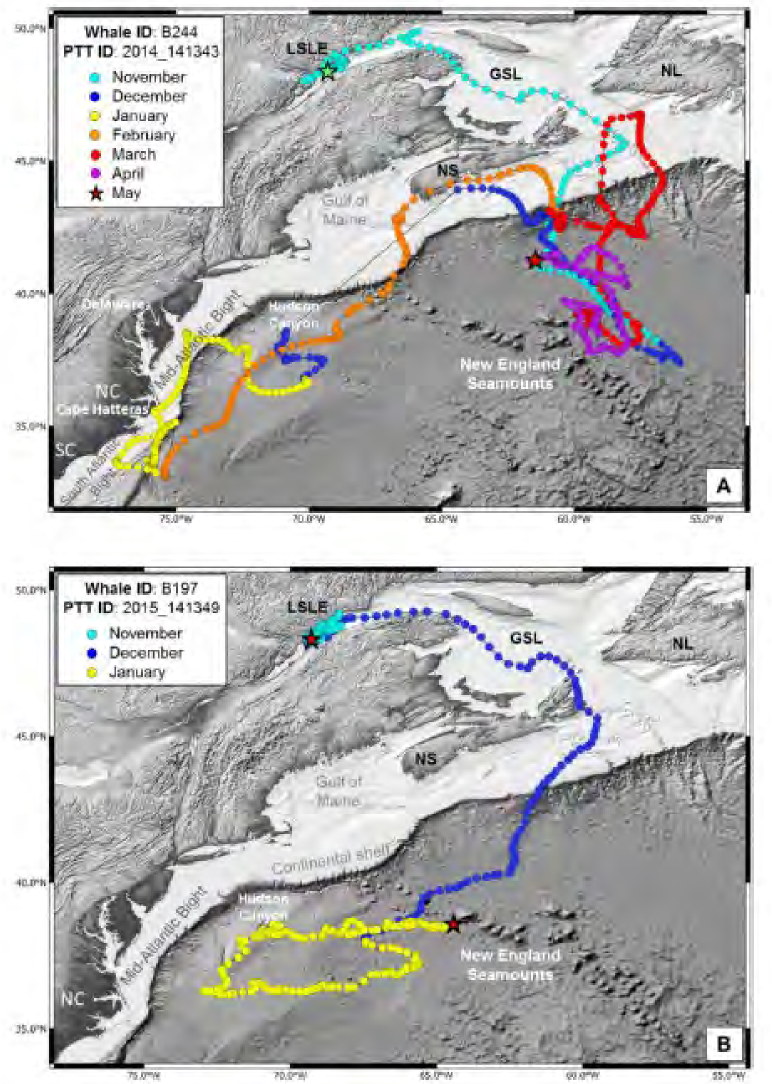


Figure 9. Switching state-space model estimated positions for 2 female blue whales: (a) whale B244 and (B) whale B197. Stars indicate where tags were deployed in the St. Lawrence Estuary, Canada and where transmissions ceased in the North Atlantic (Lesage et al. 2017).

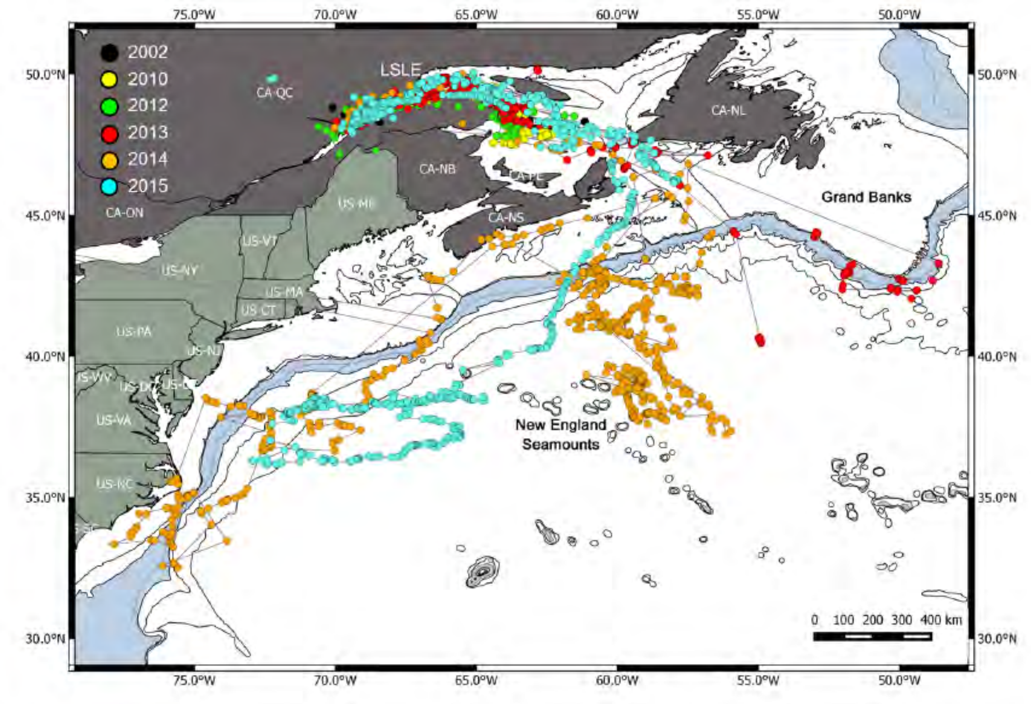


Figure 10. Argos raw satellite tracks from 23 blue whales tagged in the Estuary and Gulf of St. Lawrence, Quebec in 2002 (n=1), 2010 (n=2), 2012 (n=5), 2013 (n=8), 2014 (n=2), and 2015 (n=5). Shaded blue polygon depicts the continental shelf slope (depth 500-2500; Lesage et al. 2016).

III. New York Rarity *(provide map, numbers, and percent of state occupied)*

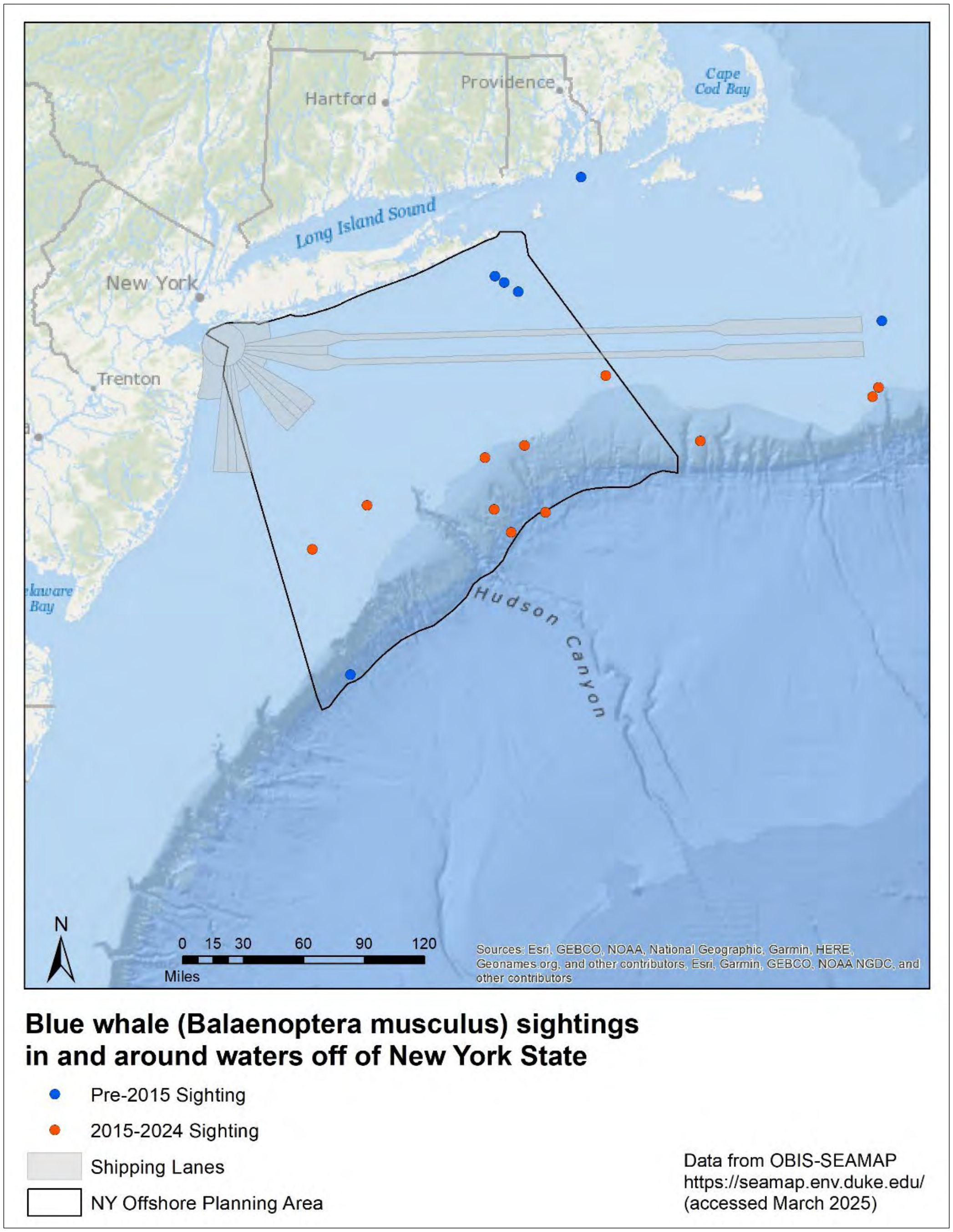


Figure 11. Blue whale sightings in and around the New York Bight. Data downloaded from OBIS-SEAMAP and mapped in ArcMap 10.2.

Details of historic and current occurrence:

Prior to 1988 there were no documented sightings of blue whales on the US continental shelf and the only published record was a stranding in Maryland in 1891 (Wenzel 1988). However, Edwards and Rattray (1932) reported a blue whale stranding in Sagaponack, Long Island. Kenney and Vigness-Raposa (2010) compiled available data for cetaceans in Rhode Island waters that included 5 reported sightings of blue whales: 3 in summer, 1 in spring, and 1 at an unknown time.

Three of the sightings were by whale-watchers south of Montauk Point, NY, between the 30- and 50-m isobaths over a one-week period in July and August 1990; it's believed to have been the same animal each time (Kenney and Vigness-Raposa 2010). By 1993, Sadove & Cardinale (1993) had reported less than a dozen blue whale sightings during 15 years of boat-based surveys. All sightings occurred at least 25 miles offshore, were in waters at least 30 m deep, and were of single animals with groups of fin whales that were probably feeding but could not be confirmed. All individuals were adults, over 19 m long. Additionally, a 63-foot male blue whale was found dead on the bow of a tanker heading into Providence, Rhode Island in 1998; it's likely to have been hit during transit near New York (Kenney and Vigness-Raposa 2010).

Acoustic detections of blue whales were recorded in New York in 2008, and since that time, visual sightings and further acoustic detections continue to establish the NYB as a likely portion of the present-day Northwest Atlantic blue whale population's habitat. During the 2008-2009 passive acoustic monitoring effort funded by NYSDEC, blue whales were detected on 11% of the 258-day period (Muirhead et al. 2018). Detections increased with distance from shore, and most detections were recorded during January, February, and March, though some were recorded during spring. Detections occurred in short periods spanning 1 to 11 days during the winter and early spring months. No detections were recorded at sites within 25 km of shore.

While blue whales are detected relatively rarely compared to the number of recorded days (16%), acoustic presence is still recorded every year (PACM 2025). One buoy anchored at the shelf break in Babylon Canyon (just west of Hudson Canyon) has detected blue whales from December 2016 to March 2017, December 2017 to March 2018, and November 2018 to March 2019 (Palka et al. 2022). Other sites across multiple deployment years continuously detect blue whales in the Southern New England area stretching west into the New York Bight from at least December through March (PACM). Davis et al. (2020) found that after 2010, blue whales increased the amount of time spent in the northern latitudes and were present in the NYB in the winter, December through March. It's important to note that only blue whale song is used to determine detections in passive acoustic data, and song is only produced by males, so presence according to passive acoustic data is a minimum presence.

AMAPPS visual surveys by plane and ship have also recorded sightings, the nearest being 1 documented sighting southeast of Montauk (Palka et al. 2021, Palka et al. 2022). Interestingly, the northeast blue whale sightings occurred during the summer and fall. During NYSERDA's digital aerial surveys, which were flown seasonally from 2016-2020, there were 2 sightings of blue whales, one in November 2016 just beyond the shelf break and one in March 2017 on the continental shelf about 100 km south of Long Island. The DEC's 2017-2020 NYB Whale Monitoring Program's aerial and acoustic surveys have, to date, produced the most blue whale data in New York. Zoidis et al. (2021) summarizes the visual aerial findings: "Blue whales were observed 3 times: 2 groups totaling 4 individuals sighted in the plain zone in winter (in January and February) of Year 1, and a single individual in the fall (September) seen on the slope in Year 3." We concluded that, while rare, blue whales may be regularly occurring in the NYB in low numbers. The September sighting was of a confirmed juvenile blue whale, the first juvenile blue whale recorded in the Mid-Atlantic, suggesting that the NYB is indeed part of blue whale habitat and should continue to be monitored. The PAM effort detected blue whales on 5% (50) of the recorded days, only at sites near the shelf edge and only between November and February (Estabrook et al. 2025).

As previously noted, while not abundant, sightings of blue whales in Southern New England (e.g., Great South Channel and south of the islands Martha's Vineyard and Nantucket) are regular. In recent years, multiple blue whale sightings have been recorded at the shelf break off Virginia (Engelhaupt et al. 2020). Other acoustic deployments along the US East Coast detect blue whales annually, including off Georgia where detections are most common from August through January (PACM 2025). Confirming presence south of the NYB, Engelhaupt et al. (2020) reported two documented sightings of individuals about 100 km off the Virginia coast, one in April 2018 and one in February 2019. These sightings support the theory that the U.S. Mid-Atlantic is the southernmost extent of the species' range. Satellite tags deployed on blue whales in the Gulf of St. Lawrence confirmed movement to the Mid-Atlantic, which is now identified as a probable wintering, and possibly breeding or calving, area (Lesage et al. 2017). The most recent sightings of blue whales in New York have occurred in both fall and summer, in October 2023, July 2024, and September 2024. All sightings occurred offshore at the continental slope and shelf edge (Johnson et al. 2021).

New York's Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Core	

Column options
Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item
Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

a. Pelagic

b. Marine, Deep Subtidal

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
No	No	Increasing	2015 to present

Column options
Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Habitat use by blue whales in New York waters is not well understood. Likewise, overall migration patterns are not well understood and vary. Blue whales are highly mobile and generally migrate seasonally from the Arctic to at least the mid-latitudes between feeding areas in the summer and mating and calving areas in the winter. Historically, blue whales were known to stay in subtropical waters throughout fall and winter (Reeves et al. 2004). While in Canada they can occur relatively close to shore, there is a strong offshore (e.g., open ocean) presence off the US East Coast. Preference for shelf breaks, seamounts, and other highly productive areas has been reported (Clark and Gagnon 2004).

Re-sightings within years in the Gulf of St. Lawrence indicate they have varying levels of site fidelity, and multiple instances of traveling more than 400 km in two weeks have been documented (Sears et al. 1990). However, both wintering and summering areas appear to be occupied at some level throughout the year. Some individuals may reside year-round in habitats of high productivity, while others undertake long migrations from tropical waters to high-latitude feeding grounds, but possibly stopping to feed in areas of high productivity on route, while yet others may undertake more limited migrations (Lesage *et al.* 2017). Year-round occurrence off Atlantic Canada has been further confirmed through additional passive acoustic monitoring (Wingfield et al. 2022, Delarue et al. 2022).

The Gulf of St. Lawrence is mainly used to feed in the summer but blue whales can occur there year-round. Most leave by early winter when ice cover becomes a threat. Blue whales were observed an average of two days per season with an average occupancy of 22 days (Ramp and Sears 2013). Blue whales have been tracked from the Gulf of St. Lawrence to the New England Seamounts and coasts of North and South Carolina in the winter (Lesage et al. 2017). Acoustic detections of blue whales have been recorded as far south as Savannah, Georgia at offshore locations, indicating presence of blue whales along the US East Coast that is not likely detected (Kowarski et al. 2022).

The drivers of blue whale distribution and habitat use are deep water and prey aggregations (Beauchamp 2009). Blue whales travel to where krill abundance is greatest, which is typically associated with bathymetric features, such as continental shelf edges, underwater canyons, and deep channels, where upwelling occurs, creating highly productive areas (Beauchamp 2009).

Because blue whales are lunge feeders, foraging is energetically expensive and prey concentration needs to meet a minimum threshold (Goldbogen et al. 2011); when krill density is high, feeding is efficient (Donoil-Valcroze et al. 2007). Blue whales feed on krill (up to 40 million pounds, or 6 tons, per day) at the surface and at depth (100 m to 300 m), sometimes in small groups (Yochem and Leatherwood 1985, Sears and Perrin 2009). Blue whales seen in surveys by the Okeanos Foundation (all single individuals) were associated with large groups of feeding fin whales and therefore were possibly feeding (Sadove and Cardinale 1993).

Okeanos Foundation surveys were always in water greater than thirty meters deep (Sadove and Cardinale 1993). Observations also came from areas 25 or more miles south of Montauk Point. Offshore distribution, only furthest receivers detected calls (Muirhead et al. 2018). Shelf breaks and canyons are important, thought there are winter and spring detections on the shelf in the New York Bight (Davis et al. 2020).

If blue whales are feeding while migrating through New York they may be found in areas where their prey could be expected to be concentrated. Further research is needed to be able to determine which areas of New York waters are most frequently used by this species. Also, research is needed to determine if blue whales are feeding while in this area.

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Choose an item.	Choose an item.	Unknown	Choose an item.	Choose an item.	Choose an item.

Column options
First 5 fields: Yes; No; Unknown; (blank) or Choose an item
Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

The life history of blue whales is not well understood. The oldest known blue whale, aged using the ear plug, was around 110 years old. Life span is estimated to be around 80 to 90 years (Yochem and Leatherwood 1985) and annual survival rate for adults based on sightings from 1979 to 2002 was estimated to be 0.975 for individuals in the Gulf of St. Lawrence region (Ramp et al. 2006). The average life span is believed to be 70 to 90 years old (Yochem and Leatherwood 1985, DFO 2020) and generation time is estimated to be 31 years (Taylor et al. 2007).

Blue whales can weigh more than 150,000 kilograms (165 tons) and reach 32 meters in length. There are geographic differences in size: North Atlantic blue whales are generally smaller, reaching a maximum of 27 m in length, than Southern Ocean blue whales (NMFS 2020a). In addition, baleen whales exhibit sexual dimorphism so female blue whales are slightly larger than males (Lockyer 1984, Yochem and Leatherwood 1985). At birth, blue whales are 7 meters and 3 tons. Not only are blue whales the largest animals on Earth, they are also the loudest, with calls measuring up to 186 decibels (louder than a jet) (DFO 2020). Blue whales can swim at speeds of up to 36 kilometers per hour but have a typical cruising speed of 2 to 8 kilometers per hour (DFO 2020).

Like other species of baleen whales, blue whales are solitary animals. They may be found associating with one another in the short-term on occasion, even migrating or feeding in pairs or small groups, but in general the only true bond is between mothers and young calves (Sears et al. 1990, Reeves et al. 1998, Sears and Calambokidis 2002). Concentrations of 20 to 40 blue whales have been documented in areas with lots of food (Beauchamp et al. 2009). The blue whale diet consists primarily of euphausiids (i.e., krill). In the Western North Atlantic their diet consists of two main species: *Thysanoessa inermis* and *Meganyctiphanes norvegica*. Blue whales have to meet a threshold of very high krill concentrations in order to increase body fat and store reserves (Lockyer 1984). One whale may eat up to 4 tons per day (DFO 2020). The reserves accumulating during the feeding season are needed for winter migration and reproduction (Lockyer 1984). Through summer, foraging pregnant females eat 60% of their body weight (Lockyer 1984). Without reserves, migration and/or reproduction may be significantly hampered.

Reproductive activity, including mating and calving, takes place in winter. The breeding grounds for the northwest Atlantic population are still unknown but are likely to occur in warmer southern waters (NMFS 2020a). Little is known about the blue whale mating system but anatomy and behavior during the breeding season point to a polygynous, antagonistic male-male competition strategy (Brownell and Ralls 1986, Sears et al. 2013). It's estimated that males and females reach sexual maturity at approximately 10 years of age (Rice 1963) though some sources say there is a range of 5-15 years (Mizroch et al. 1984, Yochem and Leatherwood 1985, Sears et al. 2013). Taylor et al. (2007) estimated age at first reproduction for blue whales to follow at age 11 years and estimated the proportion of mature individuals to be 72% for a stable population or 48% for an increasing population, with an increase rate of 5%. The average calving interval is 2 to 3 years, depending on the female's ability to gain weight during lactation (Lockyer 1984). It is unknown if the calving interval has changed due to the cessation of whaling pressure on the species. Females give birth after a 10 to 12 month gestation period and calves are nursed for 6 to 7 months before being weaned en route to or on summer feeding grounds (Mackintosh and Wheeler 1929).

Blue whales are known to hybridize with other large whale species like fin and humpback whales and these events have been reported since the 19th century (Berube and Aguilar 1998, Reeves et al. 2002, Pampoulie et al. 2021). Though instances of hybridization are still believed to be relatively rare, albeit underestimated, it's likely that the biodiversity and biomass lost during industrial whaling distributed blue whale reproduction and facilitated hybridization events (Pampoulie et al. 2021). Pampoulie et al. (2021) analyzed 8 samples collected in Iceland and found that all but one had a blue whale mother, suggesting unidirectional hybridization. They also presented for the first time the existence of a second-generation adult male hybrid resulting from a female hybrid and a male fin whale (Pampoulie et al. 2021). The existence of a second-generation adult hybrid proves that a first-generation fin-blue hybrid is not only able to breed with one of the parent species, but that their offspring can survive into adulthood. The hypothesis for this phenomenon proposes that females from the rarer species (e.g., blue whales) reject males from the more common species but eventually mate with the common species due to lack of conspecifics (Pampoulie et al. 2021). Evidence suggests that there is directionality of hybridization, that female blue whales are the maternal hybrids that male fin whales sire. Hybridization events do not come without concern: they are considered a potential threat to recovery of blue whales through loss of blue whale reproductive output or through overestimation of the population size, since hybrids aren't likely to be visually discernable. In an already compromised population, where recovered has been hindered by resource competition and climate change, hybridization presents an additional complicating factor (Thomas et al. 2016, Reeves et al. 1998, Pampoulie et al. 2021). Further evidence exists in the first reported fin-blue hybrid in the Mediterranean Sea in 2022 (Fiorvanti et al. 2022).

The western North Atlantic population of blue whales is known to be far-ranging. Only 13 calves were observed from 1979 to 2002 in the Gulf of St. Lawrence (Ramp et al. 2006), suggesting there are unknown areas where whales of all demographics frequent. Whales photographically identified in the Gulf of St. Lawrence have been seen in New England waters, off the coast of Greenland and over the Scotian Shelf (Beauchamp 2009). At least some portion of the population remains in these waters year-round while others travel to lower latitude breeding grounds in the winter. Lesage discovered evidence of possible wintering in the US Mid-Atlantic that is likely for breeding or calving. Blue whales in the North Atlantic in recent years have begun to recolonize whaling-era habitat. For example, Covelo et al. (2017) reported the first record of a blue whale at the Iberian peninsula in over three decades.

With a low birth rate, late sexual maturity, and specific, limited food resources, blue whales may be significantly impacted by climate change. While there are multiple anthropogenic threats, there are two sources of natural mortality for blue whales: ice entrapment and predation by sharks and orcas. Animals that become caught in ice can die from physical injury by the ice or can drown if their breathing holes freeze over, though ice entrapment events occur only in the Gulf of St. Lawrence or further north (Sears et al. 1990, Stenson et al. 2003). Due to their size, blue whales are an unlikely target for orcas and sharks but calves and sick individuals are occasionally killed (Sears and Perrin 2018).

VI. Threats *(from NY 2015 SWAP or newly described)*

In general, threats to blue whales are not well understood (NMFS 2020a, NMFS 2020b), in part because most carcasses are not detected. Redfern et al (2013) estimated blue whale carcass detection and recovery off Southern California to be less than or equal to 17%. And, because of the Northwest Atlantic population's small size, activities affecting even a small number of individuals can have a significant impact on the species' survival in the Atlantic.

As previously mentioned, natural mortality may occur via ice entrapment or predation (NMFS 2020a). A small percent of individuals seen in the Gulf of St. Lawrence have scars from ice (Sears et al. 1990). From 1868 to 1992, 23 ice entrapment events between March and April involving 41 individuals (1 to 4 individuals per event) were reported southeast of Newfoundland. Of the 41 involved, 28 died, 5 escaped, and 8 were unaccounted for. Most individuals that died were examined and found to be mature and one was pregnant (Stenson 2003). Predation events usually include very young or sick individuals that are vulnerable to sharks and killer whales, are infrequent, and may or may not be fatal (Reeves et al. 1998; Totterdell et al. 2022).

Most threats to the species are anthropogenic and include vessels strikes, entanglement in marine debris and fishing gear, anthropogenic noise, and loss of prey due to climate change (NMFS 2020a). It remains unknown whether and to what extent these threats are putting the species at risk. Two of the most significant known anthropogenic threats to large whale populations, including blue whales, are vessel strikes and entanglement in fishing gear. It is believed that both vessel collisions and entanglements occur more frequently than observational studies would suggest, as many events are most likely not reported and as previously mentioned, carcasses are infrequently detected (Heyning and Lewis 1990; Redfern et al. 2013). Ship strikes involving blue whales appear to be less common than with other baleen whale species (Laist et al. 2001). From 1975 to 2002 in the U.S., there were eight reported vessel strikes involving a blue whale (Jensen and Silber 2004). All of the strikes resulted in death; however, only one took place in the North Atlantic. The one documented event that occurred in the North Atlantic involved a juvenile blue whale in Rhode Island (Jensen and Silber 2004). Unfortunately, it is extremely difficult to determine where the vessel strike occurred because, as in this instance, the reported location indicates where the carcass (or injured whale) was discovered, not where the actual collision took place. In the Gulf of St. Lawrence, 16% of the blue whales in the photo identification catalogue have scars or wounds resulting from vessel strikes (Sears and Calambokidis 2002). Blue whale behavior may play a significant role in their vulnerability to vessel strikes; McKenna et al. (2015) found that blue whales do not demonstrate effective avoidance behavior when ships are close by. It is not known what impact ship strikes have on blue whale populations despite global vessel traffic steadily increasing in recent decades (NOAA 2020a). However, changes in the extent of Arctic sea ice could effect the number of vessels blue whales contend with. The opening of the Northwest Passage and Northern Sea Route is likely to increase the volume of vessel traffic transiting blue whale habitat, particularly polar waters (NOAA 2020a). Recreational vessels also pose the threat of vessel strike though are unlikely in New York to encounter blue whales due to their offshore distribution (Zoidis et al. 2021).

Because reports of entangled blue whales are rare, there is an assumption that entanglements are not common (Ramp et al. 2021). Ramp et al. (2021) compared photo-identification photographs from between 2009 and 2016 to drone images from 2018 and 2019, all collected in the Gulf of St. Lawrence. The study found that 13.1% of blue whales showed entanglement scars from photo-ID photos and that the more the caudal peduncle (e.g., tail area) was in the photo, the more scars there were – up to 60% for blue whales. Only one blue whale was encountered in both 2018 and 2019 and both showed entanglement scars. Additionally, both were already in the photo-identification catalogue and neither whale's scars were apparent. This study reveals the importance of full-body documentation in scar assessments and highlights the deficit of information for blue whales due to the fact that the majority of their dives are non-fluking (e.g., there is no view of the caudal peduncle area). It also indicates that entanglements and their impacts may be more significant than previously thought, even though there are no entanglement mortality or serious injuries of Western North Atlantic blue whales have been documented in U.S. fisheries (Hayes et al. 2020). A similar case can be made for marine debris, since whales may become entangled in it or may ingest it accidentally, but there have been no documented cases of blockage by debris in blue whales.

Long term changes in climate and oceanographic processes due to climate change could have numerous effects on blue whales (MacLeod 2009). Blue whales feed almost exclusively on euphausiids and are dependent on high concentrations of this prey source to survive (Beauchamp et al. 2009). Climate change could alter the suitability of certain areas for euphausiids. For example, one of the primary types of krill (*Thysanoessa raschi*) consumed by blue whales depends on a cold intermediate layer, which very well may be lost with the trend towards increasing water temperature that has been observed in the North Atlantic (Beauchamp et al. 2009, Simard et al. 1986). Oceanographic conditions might become less favorable to species such as krill in higher latitudes like the Gulf of St. Lawrence (Hays et al. 2005). Between 1750 and 1994, ocean surface pH decreased with a corresponding 26% increase in acidity, particularly at high latitudes (Bindoff et al. 2007). Increasing ocean acidity will likely significantly impact krill availability in time and space, and krill quality (Kawaguchi *et al.* 2011). The blue whale's relatively specialized diet might make them more vulnerable to climate change impacts on their prey, compared to species that practice prey switching. Because blue whales rely mostly on stored energy reserves for reproduction, they seek the highest densities of krill to feed efficiently (Guilpin et al. 2019). However, modeling results show that reduced krill densities and/or repeated interactions with vessels (e.g., the closest approach distance) lead to a decrease in the net energy gained during feeding (Guilpin et al. 2020).

As stated in the U.S. Recovery Plan: "The effects of climate-induced shifts in productivity, biomass, and species composition of prey on the foraging success of blue whales have received little attention and more research is needed to understand possible impacts and the extent to which these impacts might impede blue whale recovery" (NMFS 2020a). Distribution shifts in blue whales as they follow their prey to novel areas is of particular concern, due to the possible lack of management measures to protect blue whales in these new areas. Redfern et al. (2020) found that blue whales off the California coast have exhibited a broad-scale shifts northward, likely in response to changing oceanographic conditions, and that these shifts were associated with an increased risk of vessel strike. The same northward shift has also been detected in North Atlantic blue whales (Kowarski et al. 2022). Szesciorka et al. (2020) concluded that while krill is the driving force behind blue whale movements, blue whales have a plastic response to prey availability, meaning they may arrive and/or leave feeding grounds earlier or later depending on conditions. The ability to respond to interannual variability in oceanographic conditions is essential for climate change, though longer times at feeding grounds may also increase risk to anthropogenic activities due to lack of existing mitigation measures (Szesciorka et al. 2020). Recent analysis of passive acoustic monitoring data revealed that during a marine heatwave, there was reduced foraging effort in blues followed by reduced reproductive effort, showing the cascading effects of climate change on the species (Barlow et al. 2023). It's unclear if certain blue whale populations have different adaptive capabilities, as one study in Iceland found that blue whales did not show evidence of adapting to shifts in prey availability (Garcia-Vernet et al. 2021).

The other major threat of development and other human activities is noise pollution. Cetaceans, including blue whales, rely primarily on sound in the marine environment. Blue whale calls are the loudest animal sound at the lowest frequency; Stafford et al. (1998) reported that the fundamental frequency for blue whale vocalizations ranged from 8 to 25 Hz. Like all cetaceans, blue whale vocalizations can vary by region, season, behavior, and time of day. Barlow et al. (2023) confirmed that vocalization types are correlated with oceanographic variables and mating season, though Clark (1994) found that blue whale song in different parts of the North Atlantic does not vary significantly. Increasing levels of anthropogenic noise in the ocean could limit a blue whale's acoustic environment. Ross (1987, 1993) estimated that the ambient noise level in the oceans rose 10 dB from 1950 – 1975 because of shipping and background noise has been estimated to be increasing by 1.5 dB per decade at the 100 Hz level since propeller-driven ships were invented (NRC 2003). Large vessels generate loud noise at low frequencies, which degrades the acoustic environment and changes blue whale behavior (DFO 2020). Behavioral changes can include more calls, longer calls, or different frequency of calls (Di Iorio & Clark 2009). In the Gulf of St. Lawrence, where the greatest concentration of Northwest Atlantic blue whales exist, is Eastern Canada's main shipping route, the St. Lawrence Seaway. Because shipping noise overlaps with the low frequency vocalizations of baleen whales, calls are masked near shipping lanes, essentially cutting the blue whale's acoustic environment into pieces (Aulanier et al. 2016). Several species of large whales have been found to increase the amplitude of their calls in response to high levels of noise, which can decrease the energy available to feed (Holt et al. 2008, Parks et al. 2011). Above a certain level of noise, some whale species are known to stop vocalizing (Melcón et al. 2012), and there is also the potential for masking of calls if background noise occurs within the frequencies used by calling whales (BRP 2010). In a large, solitary species, this could lead to difficulty finding other whales, including potential mates. Seven of the ten blue whale song types identified worldwide have shifted linearly downward in tonal frequency (Nieukirk et al. 2005, McDonald et al. 2009). There are several hypotheses including increasing population due to recovery.

The effects of other anthropogenic activities, such as offshore energy development are also largely unknown. Pre-construction, construction, operation, and decommissioning encompass a wide range of underwater sound in addition to pile driving noise in an already noisy ocean (Ruppel et al. 2022) and offshore wind development is often in areas that are important for cetacean species (Van Parijs et al. 2023). Oil spills threaten marine mammals including the blue whale. If blue whales are nearby, oil spills could result in skin contact with the oil, baleen fouling, ingestion of oil, respiratory distress from hydrocarbon vapors, contaminated food sources, and displacement from feeding areas (Geraci 1990). Actual impacts would depend on the extent and duration of contact, and the characteristics (age) of the oil. Most likely, the effects of oil would be irritation to the respiratory membranes and absorption of hydrocarbons into the bloodstream (Geraci 1990).

Because blue whales feed at lower trophic levels, there is less chance of bioaccumulation of toxins that occurs in many of the odontocetes (toothed whales) and contaminants are unlikely to be impeding the recovery of the population (O'Shea and Brownell 1994). While no significant effects of contaminants have yet been documented, it is possible that exposure has long-term effects such as reduced reproductive success. In the Gulf of St. Lawrence, the concentrations of PCBs, DDT, and other organochlorine compounds were found in higher concentrations in the blubber of males, indicating there is maternal transfer of contaminants from females to their calves (Metcalfe et al. 2004).

There has been considerable discussion of interspecific competition among baleen whales (Aguilar and Lockyer 1987). The substantial dietary overlap among these species establishes the potential for interference competition but no conclusive evidence exists that interspecific competition among baleen whales is affecting population recovery rates (Clapham and Brownell 1996). However, more research is needed to determine if competition exists, if it might exist in the near-future, and how species may or may not adapt. One recent study of baleen whales off of Iceland found blue and fin whale niche overlap which suggests strong interspecific competition (Garcia-Vernet et al. 2021). As the authors note, “in a scenario of increasing environmental variability associated to global warming, the overlap between ecological niches may have to decrease to allow long-term coexistence” (Garcia-Vernet et al. 2021).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent*	Severity*	Immediacy*	Trend	Certainty
3. Energy Production & Mining	3.1 Oil & Gas Drilling	Choose an item.	Large	Slight	Near-term	Unknown	Choose an item.
3. Energy Production & Mining	3.3 Renewable Energy	3.3.2 Wind farms	Restricted	Slight	Near-term	Intensifying	Choose an item.
4. Transportation & Service Corridors	4.3 Shipping Lanes	4.3.1 Shipping	Pervasive	Moderate	Immediate	Intensifying	Choose an item.
4. Transportation & Service Corridors	4.3 Shipping Lanes	4.3.2 Dredging of shipping lanes	Small	Slight	Immediate	Unknown	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.1 Recreational or subsistence fishing	Restricted	Slight	Immediate	Stable and ongoing	Choose an item.
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing	Large	Slight	Immediate	Intensifying	Choose an item.
6. Human Intrusions & Disturbance	6.1 Recreational Activities	6.1.4 Recreational boating	Restricted	Slight	Immediate	Intensifying	Choose an item.
6. Human Intrusions & Disturbance	6.2 War, Civil Unrest & Military Exercises	6.2.3 Military exercises	Restricted	Slight	Immediate	Unknown	Choose an item.
8. Invasive & Other Problematic Species	8.2 Problematic Native Plants & Animals	8.2.6 Increased predation by large predators	Small	Slight	Immediate	Intensifying	Choose an item.
8. Invasive & Other Problematic Species	8.4 Pathogens	Choose an item.	Restricted	Slight	Immediate	Unknown	Choose an item.
8. Invasive & Other Problematic Species	8.5 Intrinsic Biological Limitations	8.5.1 Loss of genetic diversity	Pervasive	Moderate	Long-term	Unknown	Choose an item.
9. Pollution	9.1 Domestic & Urban Wastewater	Choose an item.	Restricted	Slight	Near-term	Stable and ongoing	Choose an item.

9. Pollution	9.2 Industrial & Military Effluents	Choose an item.	Restricted	Slight	Near-term	Unknown	Choose an item.
9. Pollution	9.4 Garbage & Solid Waste	9.4.4 Drifting plastic and entanglement rubbis	Pervasive	Slight	Immediate	Intensifying	Choose an item.
9. Pollution	9.6 Excess Energy	9.6.3 Noise pollution	Pervasive	Moderate	Near-term	Intensifying	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	11.1.2 Phenological mismatch	Large	Moderate	Near-term	Intensifying	Choose an item.
11. Climate Change	11.2 Changes in Geological Regimes	Choose an item.	Large	Moderate	Near-term	Intensifying	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	Choose an item.	Large	Moderate	Near-term	Intensifying	Choose an item.

Table 1. Threats to blue whales.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: __X__ **No:** _____ **Unknown:** _____

If yes, describe mechanism and whether adequate to protect species/habitat:

The blue whale is protected in the United States by its status as a federally endangered species under the Endangered Species Act (ESA). In addition, the blue whale (along with all other marine mammals) receives federal protection under the Marine Mammal Protection Act (MMPA). The blue whale is protected internationally from commercial hunting under the International Whaling Commission's (IWC) global moratorium on whaling. The moratorium was introduced in 1986 and is voted on by member countries (including the United States) at the IWC's annual meeting.

At the state level, blue whales are also protected under the Environmental Conservation Law (ECL) of New York, where the blue whale is listed as an endangered species. Section 11 – 0535 protects all state-listed endangered and threatened species and makes it illegal to take, import, transport, possess, or sell any listed species or part of a listed species. In addition, Article 17 of the ECL works to limit water pollution, and Article 14 presents the New York Ocean and Great Lakes Ecosystem Conservation Act. Whether these protections are adequate to protect is currently unknown. There is not currently enough information about distribution and abundance to assess this adequately.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

It is still largely unknown how frequently blue whales utilize New York waters. Long-term surveys and monitoring strategies are being developed and implemented. Better information about abundance and distribution can assist with management and conservation decisions. Additionally, studies to determine behavior of blue whales when they are in the area could help determine whether they are feeding as they are migrating. This information is helpful because, as previously stated, vessel traffic and climate change are already putting pressure on this slowly reproducing species.

Some potential protective measures such as seasonal vessel speed restrictions in high use areas could be put into effect, and/or seasonal area closures on certain fisheries where the gear poses an entanglement threat. Another possible measure could be the establishment of a near real-time acoustic monitoring of large whales, such as that being used for North Atlantic right whales in Massachusetts to reduce the threat of vessel collisions.

Finally, little is known about general life history and demography of this species, and the actual impact of the threats in New York waters are unknown. Further research into the effects of anthropogenic threats such as climate change on blue whales is warranted. In addition, education on this species and the importance of reporting sightings and interactions would be helpful.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection):
https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Action Category	Action	Description
C.8 Research and Monitoring	C.8.1.5.7 Designing and developing inventory or monitoring protocols	Long term survey strategies should be developed
C.8 Research and Monitoring	C.8.1.1.0 Field Research	Research on blue whale behavior to determine if they are feeding while migrating (feeding behaviors make them more vulnerable to strikes)
A.1 Direct Habitat Management	A.2.1.5.0 Prevent mortality or injury from humans	-Implement seasonal speed restrictions on vessels in high use areas

Table 2. Recommended conservation actions for the blue whale.

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