

Key Site 79: Nantucket Sound and Shoals, Massachusetts

Location: 41°9'35"N, 70°19'57"W

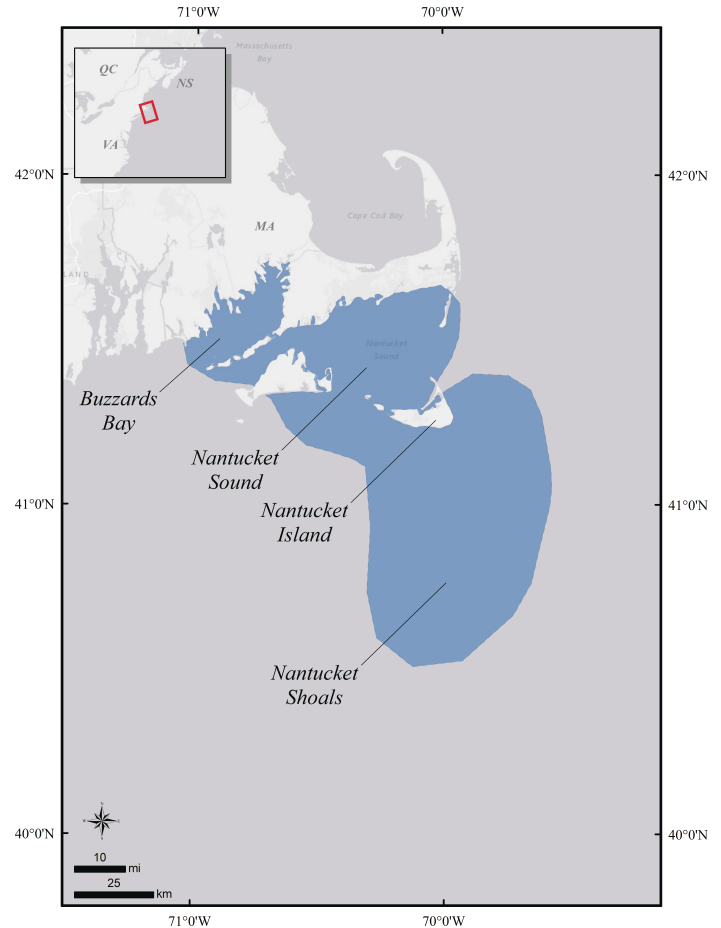
Size: 7855 km²

Description: Nantucket Sound is located between Cape Cod, Martha's Vineyard, and Nantucket Island. It is approximately 48 km long and 40 km wide. The sound is located at the confluence of the cold Labrador currents and the warm Gulf Stream, which creates a coastal habitat broadly representing the southern extent of northern Atlantic marine species and the northern extent of Mid-Atlantic marine species. This area also includes the Nantucket Shoals, a 2000 km² expanse of shallow (4 to 35 m deep), sandy-bottom habitat extending from Nantucket Island eastward for 37 km and southwestward for 64 km. In some places water depth can be as shallow as 1 m, though depth is unpredictable due to shifting bottom sediments caused by strong currents. Air temperatures range from a mean high of 3°C to a mean low of -5°C in winter and a mean high of 26°C to a mean low of 17°C in summer.

Precision and Correction of Abundance

Estimates Presented: Abundance estimates are based on data from the Atlantic Coast Wintering Sea Duck Survey, January to March 2009–2014 (see Silverman et al. 2012 for methods; also see Methods section in this atlas) and related surveys (Mid-Winter Survey [MWS; Eggeman and Johnson 1989] or Atlantic Marine Assessment Program for Protected Species [AMAPPS 2015]). Abundance estimates presented for this key habitat site have not been adjusted to account for incomplete detection or other biases. Abundance estimates should, therefore, be treated as minimum estimates.

Biological Value: Expansive seagrass beds in Buzzards Bay and Nantucket Sound provide critical nursery habitats for fish, shellfish, and crustaceans (Costello and Kenworthy 2011). The shallow waters of Nantucket Shoals create perfect conditions for seasonal phytoplankton blooms, which serve as the base of the marine food web (Saba et al. 2015). The shoals support high concentrations of benthic amphipods and mollusks (Avery et al. 1996), which are important seasonal prey items for several sea duck species (Brown and Fredrickson 1986, Benoit et al. 1996, Haszard and Clark 2007, White et al. 2009).



Nantucket Shoals have been identified through extensive aerial surveys as having a high density of wintering sea ducks and other sea birds (Veit et al. 2016). Silverman et al. (2012; see Methods section in this atlas) estimated a minimum of 73,000 scoters (*Melanitta* spp.), 117,000 Common Eiders (*Somateria mollissima dresseri*), and 159,000 Long-tailed Ducks (*Clangula hyemalis*) in the key site.

Winter distributions of Long-tailed Duck and White-winged Scoter (*Melanitta deglandi*) have been found to closely associate with prey aggregations at Nantucket Shoals (White and Veit 2020). The highest densities of White-winged Scoter along the Atlantic coast occur between Cape Cod and Long Island Sound (Silverman et al. 2013), accounting for approximately 94% of the entire U.S. Atlantic coast wintering population (Silverman et al. 2012). Similarly, a high proportion of scoters radio-tagged during both the wintering and molting periods in southern New England and the St. Lawrence estuary (Quebec) have spent roughly half of the annual cycle in the vicinity of Nantucket Sound and the shoals

(Meatley et al. 2018, Lepage et al. 2020). Aerial surveys from 2011 to 2015 documented high densities of White-winged Scoter along the western edge of the Nantucket Shoals during the spring period (Veit et al. 2016). Several White-winged Scoters tagged with satellite transmitters during the winter period staged at Nantucket Shoals for one to two weeks before spring departure (Meatley et al. 2019). This suggests that the shoals are a seasonally important area for sea ducks, likely due to high densities of high-quality prey (e.g., the pelagic amphipod *Gammarus annulatus*) that sea ducks may rely on for reserve-building before long-distance migration (White et al. 2009). Annual Christmas Bird Counts from Nantucket Island commonly estimate hundreds of thousands of Long-tailed Duck commuting between nighttime roosts on Nantucket Sound and foraging areas on Nantucket Shoals (White et al. 2009). Sea ducks commonly form extensive foraging rafts around Nantucket, numbering in the thousands to tens of thousands of birds. A recent study also suggests that Long-tailed Duck and White-winged Scoter distributions on Nantucket Shoals may be associated in such a way that each species may benefit from noting the foraging locations or aggregations of the other, even though there is little overlap in preferred prey species (White and Veit 2020).

Sensitivities: Nantucket Sound, Nantucket Shoals, and Buzzards Bay are vulnerable to the same host of threats as other Atlantic coastal habitats. Human population growth in Massachusetts has caused an increase in nutrient runoff and subsequent eutrophication events in the bays. These events result in massive fish die-offs and large-scale declines in seagrass meadows (Short and Burdick 1996), which can be important habitats for sea ducks. Commercial shipping also increases the chances of introduction of non-native species and accidental pollution events. For example, first introduced in New Jersey in 1988 through the release of ballast water from a commercial vessel, the invasive Japanese Shore Crab is now common in Buzzards Bay and Nantucket Sound (Ledesma and O'Connor 2001). Climate change also has multiple effects on this region. Sea-level rise is a concern in areas of low elevation near the coast, while changes in water circulation patterns due to slowing of the Gulf Stream may significantly affect nutrient turnover and the overall productivity of the region (Bryden et al. 2005).

The fragile benthic community of Nantucket Shoals and the shallow water make this region particularly sensitive to ecologically destructive fishing methods and climate change. Coastal tourism is a vital part of the year-round economy, and boating is an important recreational activity. Recreational boating can cause resuspension of bottom sediments (Hansen et al. 2019), which can decrease water clarity and negatively impact seagrass productivity (Short and Wyllie-Echeverria 1996, Koch 2002). Coastal development and population growth has significant impacts on water quality, increasing incidences of coastal nutrient loading and nonpoint source pollution (Center for Coastal Studies 2005).

Potential Conflicts: Buzzards Bay and Nantucket Sound fall within a region of heavy commercial activities, recreational beaches and fishing spots, residential development, and state and federal land. Such diverse land ownership creates potential conflicts in resource use and conservation. The largest port in Buzzards Bay is home to a fishing fleet with approximately 270 vessels. Extensive sandy beaches in Cape Cod and Buzzards Bay, as well as the islands of Martha's Vineyard and Nantucket, attract thousands of tourists annually. There are currently several state forests, national wildlife refuges, and other protected lands, but rapid human population growth and expanding development is encroaching on these areas and limiting wildlife habitat.

Nantucket Shoals is rich with natural resources, and potential conflicts arise among competing interests. Oil and gas exploration has historically occurred in this region and the growing demand for energy will likely increase pressure on state and federal agencies to sign new leases for these activities in the shoals, although drilling for oil and gas in federal waters off the Atlantic coast is currently banned until 2022. There are currently approximately 4000 km² of commercial offshore wind energy leases and planning areas off the coasts of Massachusetts, Rhode Island, and New York (BOEM 2022). Several of these lease areas have been designated in the waters south of Nantucket Sound and adjacent to Nantucket Shoals. Recent tagging studies suggest that current offshore wind energy lease areas in southern New England do not overlap significantly with White-winged Scoter high-use wintering areas (Meatley et al. 2019). However, White-Winged Scovers often traversed proposed wind energy areas, thus the potential

for displacement and obstruction could have compounding effects on the ability of sea ducks to use their entire wintering area (Meatley et al. 2019).

Status: There are several currently protected areas in and around Buzzards Bay and Nantucket Sound. Buzzards Bay is a designated estuary of significance under the National Estuary Program (Center for Coastal Studies 2005). The bay has a comprehensive conservation and management plan that is carried out by several state agencies, federal agencies, and two nonprofit organizations. The Buzzards Bay Coalition is a nongovernment organization that works to protect the area from pollution and degradation and restore ecosystem function and wildlife habitat. Regulations on fishing and trawling are strict, and boating can be limited in certain times of the year to protect marine mammals. Commercial fishing regulations and trawling regulations vary annually, and periodic closures of certain areas is becoming more common as incidences of algal blooms increases in Cape Cod Bay, Buzzards Bay and Nantucket Sound.

Existing ocean protection measures around Nantucket Shoals include the Great South Channel Critical Habitat Area and the Fishery Closure Area to the northwest of the shoals. However, nearshore areas and the shallow waters of Nantucket Shoals are not protected from development. At the federal level, there are several existing management and/or protection options for coastal and marine areas in the Nantucket Shelf region (Recchia et al. 2001), but none of these directly encompass Nantucket Shoals. The critical habitat areas are managed by the federal government and do not necessarily restrict development, but rather focus on habitat critical to the endangered right whale. Regulated or limited activities include marine discharge or dumping, nonrenewable resource extraction, dredging, and cable-laying (Recchia et al. 2001). The Fishery Closure Area east of Nantucket Shoals was established to rebuild the overfished stocks of cod, haddock, and flounder. Other seasonal closures, gear restrictions, and habitat protections are described in Center for Coastal Studies (2005).

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