

**BIOLOGICAL ASSESSMENT**  
**for the**  
**NEW BEDFORD HARBOR – SOUTH TERMINAL PROJECT,**  
**NEW BEDFORD, MASSACHUSETTS**

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## **New Bedford Harbor - South Terminal Project** **Endangered Species Act Biological Assessment**

### **I. Introduction**

This Biological Assessment (BA) was prepared to comply with Section 7 of the Endangered Species Act (ESA) and will assess the potential effects of the construction and long-term operation of the New Bedford Harbor (NBH) - South Terminal project in New Bedford, MA, on three species that may occur in the area of the proposed project under review: roseate tern (*Sterna dougallii*), listed as endangered; piping plover (*Charadrius melodus*), listed as threatened; and Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), listed as threatened. The project area provides potential habitat for nesting, rearing and/or foraging for these species. On the other hand, New Bedford Harbor is not identified as an area of critical habitat for any federally endangered species.

The species of principal focus is roseate tern. Roseate terns were once abundant in Massachusetts waters, reportedly numbering in the hundreds of thousands, but a variety of threats have resulted in much-reduced populations. According to the U.S. Fish and Wildlife Service Roseate Tern Recovery Plan – Northeastern Population (USFWS 1998), the numbers of roseate terns were severely reduced in the 1870's and 1880's by commercial hunting for the millinery trade and most colonies previously recorded appear to have been eliminated at that time. The total number of remaining roseate terns was estimated to be roughly 2,000 pairs at the lowest point in about 1890 (Nisbet 1980 in USFWS 1998). Following protection efforts in the 1890's and strengthened by the Migratory Bird Treaty Act of 1918, roseate tern populations increased to a high of about 8,500 pairs in the 1930s but declined again to a low of 2,500 pairs in 1977 due to habitat loss and gull encroachment (USFWS 1998).

The islands in Buzzards Bay and Nantucket Sound have been among the most important nesting sites for roseate terns in the northeast. In 2009, based upon total season estimates of roseate tern pairs, approximately 94% of the population was concentrated at just 3 colonies: Great Gull Island, New York (NY) (1,524 pairs); Bird Island, Marion, Massachusetts (MA) (782); and Ram Island, Mattapoisett, MA (645). The only other nesting colonies in MA in 2009 were at Penikese Island (50 pairs) near the southern tip of the Elizabeth Island chain, and Norton's Point, Martha's Vineyard (50) (USFWS 2010). The total nesting area available to roseate terns is limited which increases the terns' vulnerability to potential catastrophic events, such as oil spills or disease. The gradual loss of breeding sites in the northeast and the roseate tern's reluctance to colonize new sites are serious obstacles to the recovery of the northeast population.

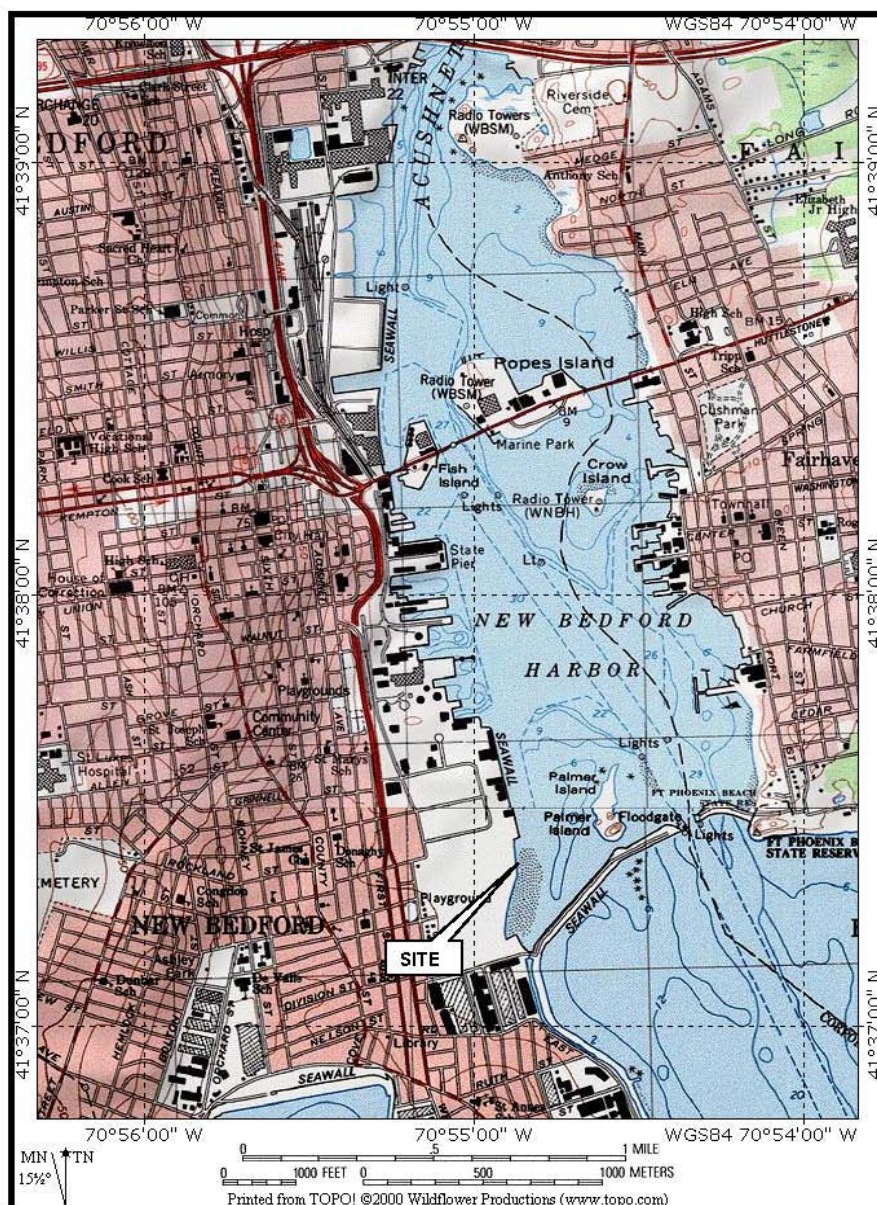
Piping plover and Northeastern beach tiger beetle are not likely to be adversely affected by the proposed project, as explained further below.

## II. Project Description

The proposed New Bedford Harbor (NBH) - South Terminal project is described in the document entitled the State Enhanced Remedy in the New Bedford, South Terminal – Expanded Avian Assessment prepared by the Massachusetts Department of Environmental Protection (MADEP 2010b). An excerpted project description from that document is as follows:

The purpose of the project is to develop a multi-purpose marine terminal, as a component of the approved State Enhanced Remedy for New Bedford Harbor, a primary purpose of which will be to provide critical infrastructure to serve offshore renewable energy facilities, and which is also capable of beneficially re-using sand from navigational dredging or the construction of confined aquatic disposal facilities to the extent approved by EPA. The City also proposes to use the terminal for other cargoes, which may include container, break bulk, and bulk cargo shipping.

The proposed NBH - South Terminal would be a filled structure adjacent to the shoreline, bounded by sheet piling, currently planned to be capped by crushed stone. The majority of the upland that will be incorporated into the proposed facility is a former heavy industrial property that has been heavily disturbed. The total estimated size of the facility, including the ancillary southern properties, is currently anticipated to be approximately 28.25 acres. To complete the project as proposed, a total of approximately 21.73 acres of intertidal and subtidal resource areas would be altered (see Section III. Environmental Setting, below, for further discussion of resource areas).



**Figure 1: Site Location Map**  
 South Terminal CDF Proposed Location  
 City of New Bedford, New Bedford, Massachusetts

Source: Expanded Avian Assessment Appendices (MADEP 2010b)

## **A. Alternatives Considered**

An alternatives analysis was completed by the Massachusetts Department of Environmental Protection (MADEP) as part of the planning process for the NBH-South Terminal project. Marine ports within the region were initially screened to determine if the structural and physical attributes of each site had the capability to support the intended uses of the terminal. Criteria were further refined based upon additional information gathered from off-shore wind energy manufacturers. Such facilities have specific operational requirements associated primarily with the scale of the turbine and foundation components; factors such as proximity to the offshore facilities, horizontal and vertical clearances, laydown area, and access to deep water navigation constitute 'hard criteria' site requirements (MADEP 2010a).

The following alternative sites, outside of the New Bedford Harbor location, were evaluated using the refined feasibility criteria; Port of Davisville, Quonset Business Park, Quonset Point, Rhode Island (RI); Dry Dock #4, Marine Industrial Park, South Boston, MA; Fall River State Pier, Fall River, MA; Union Wharf and Fairhaven Shipyard, Fairhaven, MA; and North Terminal and Pope's Island, New Bedford, MA (MADEP 2010a). The alternatives analysis resulted in the state concluding that the NBH-South Terminal project location is the least environmentally damaging practicable alternative that meets the basic project purpose. More detailed information concerning the alternatives analysis evaluation may be found in the document entitled State Enhanced Remedy in New Bedford, South Terminal dated August 25, 2010 and prepared by the Massachusetts Department of Environmental (MADEP 2010a).

## **B. Action Area**

New Bedford Harbor is located on the northern shore of the Buzzards Bay and borders the communities of Fairhaven to the east, and New Bedford to the west. The New Bedford Hurricane Barrier seawall and floodgates (immediately south of Palmer Island) demarcates the outer harbor from the inner harbor and there is also a federal navigation channel which leads into the inner harbor (see Figure 1 - Site Location Map, above). The Acushnet River flows into the northernmost part of the upper estuary and is the most significant freshwater inflow into the harbor. The inner harbor contains several marinas, a recreational fleet, historical attractions, commercial fishing fleets and fish processing/cold storage facilities. Land usage along the shore is a mixture of residential, commercial and industrial uses (MADEP 2010a).

New Bedford Harbor is highly contaminated with polychlorinated biphenyls (PCBs) and heavy metals from manufacturing discharges that occurred from 1940 to the late 1970s. The harbor sediments are contaminated in varying degrees from the upper Acushnet River into Buzzards Bay. Bioaccumulation of PCBs within the marine food chain has resulted in closing the area to lobstering and fishing, and recreational activities and harbor development have been limited by the widespread PCB problem. The source of the contamination has been attributed to two

electrical capacitor manufacturing facilities that operated between the 1940s and 1970s. One facility, Aerovox Corporation was located near the northern boundary of the site and the other facility, Cornell-Dubilier Electronics, Inc. is located just south of the New Bedford Hurricane Barrier. Based on the health concerns of the site, the Environmental Protection Agency (EPA) added the site to the National Priorities List in 1983 as a designated Superfund Site (USACE 2010). EPA's selected remedy involves sediment removal by dredging and the containment of contaminated sediments. Full scale dredging began in 2004 and to date approximately 200,000 cubic yards of contaminated sediments and soils have been remediated (EPA 2010a).

### **III. Environmental Setting**

#### **A. Flora - Salt Marsh, Intertidal and Subtidal Resources**

New Bedford Harbor is a coastal embayment with a mean tidal range of approximately 3.3 feet or 1 meter (Howes and Goehringer, 1996 in MADEP 2010a). The primary resource areas in the NBH- South Terminal project area include; intertidal, near-shore subtidal (existing elevation between -1 and -6 MLLW), deeper subtidal (existing elevation between -20 and -25 MLLW), and salt marsh (MADEP 2010a). Although the proposed site is isolated by industrial properties, the salt marsh, intertidal and sub-tidal areas provide feeding locations and potential nesting habitat for shore birds, serve as finfish foraging and spawning habitat, and support a benthic and shellfish invertebrate community (see Figure 2 – Salt Marsh, Intertidal and Subtidal Resources). However, the sediments within the resource areas are contaminated with PCBs (MADEP 2010a). Fishing, shellfishing, and lobstering are banned within New Bedford Harbor (EPA 2010a).

#### **B. Fauna – Finfish and Shellfish**

New Bedford Harbor is home to a wide variety of marine life. Fisheries include both commercial and recreational bottom dwelling and free-swimming water column resident and migratory species. The intertidal and subtidal areas were found to support abundant benthic and shellfish resources and provide spawning and nursery habitat for fish. Ecologically, the harbor functions both as an ocean embayment and estuarine environment (MADEP 2010a).

A shellfish survey was conducted in May 2010 under the guidance of Mr. David Whittaker, South Shore Section Leader of the MA Department of Marine Fisheries (MADMF) in order to determine potential impacts to the local shellfish population due to the NBH-South Terminal project construction (MADEP 2010a). Approximately 1,019,986 quahogs, oysters and clams are estimated to be impacted from the direct impacts of filling and dredging in the proposed project area.

Approximately 1.43 acres of intertidal area which serves as horseshoe crab habitat will also be impacted (MADEP, 2010a). The data indicates that the intertidal area within the







proposed NBH-South Terminal project has significant ecological function. However, the Massachusetts Department of Public Health (MDPH) promulgated state regulations in 1979 prohibiting the consumption of any fish/shellfish within designated areas of NBH due to high levels of contamination (EPA 2010b). The consumption of shellfish or fish is still an avenue for bioaccumulation of PCBs in fish and wildlife utilizing these resources.

An Essential Fish Habitat (EFH) assessment was prepared by the MA DEP for the NBH - South Terminal project in conformance with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) for managed fish species listed in the project vicinity. There are twenty EFH species listed for the NBH area; three species of which are considered potential forage for roseate terns. These include bluefish (*Pomatomus saltatrix*) (listed for the presence of juveniles and adults), king mackerel (*Scomberomorus cavalla*) (listed for all life stages; eggs, larvae, juvenile and adults) and Spanish mackerel (*S. maculatus*) (listed for all life stages) (MADEP 2010a). Roseate terns generally feed on the young of the year of these larger fish species.

A fisheries study was conducted by Normandeau Associates Inc. (NAI) in New Bedford Harbor from June 1998 to May 1999 which consisted of three near shore seine sampling stations (two in the outer harbor and one in the inner harbor) and trawl samples along five transects (three in the outer harbor and two in the inner harbor) in deeper waters (from 6.5 to 33 feet). As noted above in Section II. Project Description, the demarcation between the inner harbor and the outer harbor is the New Bedford Hurricane Barrier (MADEPa). No inner harbor sampling sites were located in the NBH-South Terminal project area; however, the fisheries data would be characteristic of the typical fish community in the inner and outer harbor area.

The most numerous fish species found in the NAI study in the three near shore seine sampling stations were Atlantic silversides (*Menidia menidia*) (44 %), striped killifish (*Fundulus majalis*) (16%), mummichog (*Fundulus heteroclitus*) (9%), cunner (*Tautoglabrus adspersus*) (7%), and winter flounder (*Pseudopleuronectes americanus*) (6%). The most numerous fish found in trawl catches (standardized for length of tow and catch for comparison purposes) were scup (*Stenotomus chrysops*) (23%), cunner (21%), winter flounder (13%), black sea bass (*Centropristus striata*) (9%), and northern pipefish (*Syngnathus fuscus*) (6%). Alewife (*Alosa pseudoharengus*) appeared in trawl samples in September in lesser numbers but was absent in other months. Atlantic silversides, bay anchovy (*Anchoa mitchilli*) and Atlantic herring (*Clupea harengus*) were also found in the trawling sampling in lesser numbers. Bluefish represented 9.3% of catch at one seine sampling station in the outer harbor area. Although known to utilize Buzzards Bay, blueback herring and mackerel were not found in abundance in either the seine or trawling sampling data, most likely being tallied as part of the category of "other species" (MADEPa).

The bluefish is a wide ranging pelagic species (Robins et al. 1986 in NOAA 2006) that travels in schools of like-sized individuals and undertakes seasonal migrations. They spawn off the Atlantic coast and juveniles and adults eat whatever taxa are locally abundant. The bluefish diet includes fish, crustaceans and polychaetes (Friedland et al. 1988 in NOAA 2006). Mackerel is another pelagic schooling fish; they spawn in a wide ranging area off the Atlantic coast. They have a diet of copepod larvae and eggs, the smaller adult copepods, various other minute crustacea, and small fish larvae. Various other planktonic animals also enter regularly into the diet of the mackerel. Juveniles often enter estuaries and harbors in search of food (Bigelow et al. 2002).

The bay anchovy, because of its abundance and widespread distribution in the mid-Atlantic Region, is a very important component of the food web of many sport and commercial fishes (Derickson and Price 1973; Richards 1976 in Morton, 1989 in USFWS 1989) as well as sea birds. Bay anchovy feed primarily on macrozooplankton, small benthic crustaceans, small mollusks and detritus (Darnell 1958, 1961 and Odum 1971 in USFWS 1989). In the mid-Atlantic region, spawning generally occurs in estuarine waters where salinities are usually over 10 parts per thousand (ppt) (Dovel 1981 in USFWS 1989). Heinemann (1992) found that anchovy accounted for 6% of the roseate tern diet in 1990 and 4% in 1991.

Alewives and blueback herring (*Alosa aestivalis*) are anadromous species; returning to freshwater in the Acushnet River to spawn in the April/May timeframe. Alewife and blueback herring are plankton feeders, subsisting primarily on copepods and pelagic shrimp, as well as on young sand lance and other small fish fry (Bigelow et al. 2002). Herring are an important prey source for many EFH species that occur in the New Bedford Harbor vicinity, such as bluefish (Bowman et al. 2000 in MADEP 2010a). Heinemann (1992) found that herring-type fish accounted for 8% of the roseate tern diet in 1990 and 11% in 1991.

Sand lance (*Ammodytes americanus*) is the primary prey species for the roseate tern. Heinemann 1992 found that sand lance was the most important prey species over the entire season, representing 71% of the diet. Sand lance, an eel-like fish which grows to an average of 25 centimeters (cm) in length, are widespread in estuarine, open coastal and off shore habitats along the northeastern coast of the United States (Sherman et al. 1981; Morse 1982 in Auster et al. 1986). They prey primarily on copepods, but also eat fish eggs and larvae and are important in the diet of piscivorous species of fish and birds. Sand lance rely on sandy bottoms for habitat and are found in somewhat patchy distributions. Strong evidence exists that Stellwagen Bank provides spawning habitat for the sand lance (Studds 2010). The sand lance was not in abundance in the NAI seine and trawl sampling, most likely being tallied as part of the category of "other species" (MADEPa).

The Atlantic silverside is a resident fish species of New Bedford Harbor, inhabiting the salt marsh and shallow intertidal areas. Atlantic silversides spawn in the intertidal zone of nearly all

major estuaries and tributaries (USFWS 1983). Heinemann (1992) found that Atlantic silversides represent approximately 10% of the roseate tern diet in 1990 and 11% in 1991 with the tern capture rate more prevalent in the mid-July to early August timeframe. Atlantic silversides grow to about 12 cm and are common in near shore waters, usually on sand or gravel shores and in salt marshes at high tide. Swimming in schools of similarly sized fish, they prey upon zooplankton, shrimp, young squid, worms and algae. They serve as food for other predators such as birds, mackerel and bluefish (URI 2010). Exposure to contaminated sediment during larval and juvenile development may have health implications for this species during later life stages (MADEP 2010a).

The foraging behavior of the fish species preferred by roseate terns increases the opportunity for their exposure and bioaccumulation of PCBs, either because of a longer duration of exposure to contaminated sediment or because of a greater consumption of contaminated forage. These prey species are, in turn, an exposure route for PCBs in the roseate tern. The potential impacts of the proposed NBH–South Terminal project on the fish species used by foraging roseate terns are discussed in Section V., Effects Analysis, below.

### **C. Physical Conditions – Sediments, Patterns of Circulation, Noise**

**Sediments** – For descriptive purposes, the New Bedford Inner and Outer Harbor have been divided into three areas: upper, lower (also referred to as the inner harbor) and outer harbor based upon geographic features, basin morphology and gradients of contamination. The upper harbor, the area north of the Coggeshall Street Bridge, has PCB contaminant levels ranging from below detection to approximately 4,000 parts per million (ppm). The upper harbor initially had PCB “hot spots” in the range of 100,000 ppm which were removed in 1994 and 1995 as part of EPA first clean up phase. The lower harbor, which lies between the Coggeshall Street Bridge and the New Bedford Hurricane Barrier has PCB contamination ranging from below detection to approximately 100 ppm. The outer harbor area is defined as the area lying outside the hurricane barrier (which was constructed in the mid-1960s). The outer harbor has sediment PCB levels averaging approximately 1 ppm, with localized areas approaching 50 ppm (USACE 2010).

Long-term sediment and toxicity monitoring has been conducted in New Bedford Harbor as part of the long term monitoring program for the New Bedford Harbor Superfund site. One of the monitoring stations (Station 253) is located within the proposed dredge area for the NBH – South Terminal project. The long-term sediment monitoring data for Station 253, conducted five times between 1993 and 2009, showed an average PCB concentration of 5.7 ppm and the grain size analysis showed an average 46.9% silt/clay component (email dated October 4, 2010 from William Nelson, US EPA to Judith Johnson, Army Corps of Engineers, New England District). Prior to project implementation, a sediment sampling plan will be developed for both the area behind the sheet steel (CDF) and the area to be dredged for navigation/berths (October 13, 2010

personal communication with Matthew Schweisberg, Chief, Wetlands Protection Program, EPA) to better define the sediments in the project area.

**Patterns of Circulation** - Although general data regarding circulation conditions and sediment transport within the harbor has been collected, no data exist describing the actual site-specific sediment transport and circulation patterns within the NBH - South Terminal site. Circulation patterns within New Bedford Harbor are primarily driven by meteorological events and mixed semi-diurnal tidal currents (EBASCO 1991; Howes and Goerhinger 1996; NBHTC 1996 in MADEP 2001a). Flushing of the harbor was determined to take 2 days under winter conditions, and 8 days under summer conditions (Bellmer 1988 in MADEP 2001a). Local embayment and channel restrictions produce faster currents. Examples of these locations include: within the opening in the hurricane barrier, within the vicinity of Popes Island, and within the vicinity of the Coggeshall Street Bridge located in the upper harbor. At the Coggeshall Street Bridge, the average ebb tide velocity is 0.7 knots, however currents as fast as 3.5 knots have been recorded here during ebb tide (USACE 1990 in MADEP 2010a). In a study entitled the New Bedford Harbor PCB Flux Study conducted by Wood Hole Group on behalf of the USACE for EPA, NBH sediments and water were identified as a source of PCB contamination to the area outside of the hurricane barrier (outer harbor area) (USACE 2010 Unpublished).

**Noise and Traffic** - The NBH- South Terminal is located within the Designated Port Area for the Port of New Bedford, which has been specifically reserved for water dependent industrial uses by the Commonwealth of Massachusetts and interfaces with the Waterfront Industrial and “Industrial B” zoning districts (MADEP 2010a). The inner harbor contains several marinas, a recreational fleet, historical attractions, commercial fishing fleets and fish processing/cold storage facilities. Land usage along the shore is a mixture of residential, commercial and industrial uses (MADEP 2010a). Dredging activities in the harbor for both navigation and remediation of New Bedford Superfund site adds additional human disturbance to the harbor area. The current level of human disturbance, noise and traffic undoubtedly deters the foraging of shorebirds to some extent.

#### **IV. Species Considered**

##### **A. Roseate Tern**

##### **1. Seasonal Distribution**

In North America, the roseate tern breeds in two discrete populations; from Nova Scotia south to New York (the Northeast Population) and in the Caribbean. Roseate terns arrive in MA from late-April to mid-May to nest at just a handful of coastal locations. MA birds depart from breeding colonies in late-July and August and concentrate in “staging areas” around Cape Cod and the Islands, before departure for wintering grounds in September. Most have departed

staging areas and have begun migrating southward (principally to South America) by mid- to late-September (MA NHESP 2007).

## 2. Nesting

In Massachusetts, the roseate tern generally nests on sandy, gravelly, or rocky islands. Roseate terns have very specialized habitat requirements; however, are always found nesting in close association with the common tern (*Sterna hirundo*). Roseate terns, being less aggressive than the common tern, seem to rely on the common terns aggressive tendencies to protect their own nests. Roseate terns usually place their nests under cover in dense vegetation, such as seaside goldenrod (*Solidago sempervirens*) or beach pea (*Lathyrus maritima*), or under boulders or other structures (e.g. nestboxes or wooden boards). Roseate terns appear to enjoy the security of crevices and structural backing to their nesting sites. Common terns tend to nest in open sandy areas with limited vegetation (Nisbet, 2002 in USACE 2006).

In Buzzards Bay, terns start arriving at the nesting islands in late-April. Common terns usually begin laying eggs the second week of May, and roseate terns begin a few days later. Peak egg-laying takes place from mid-May to mid-June, but eggs may be laid into mid-August. Incubation lasts about three weeks, and after three to four weeks chicks can fly. Fledglings of both species are dependent on their parents for at least several weeks post-fledging. Most terns begin moving in July to pre-migration staging areas in the region (especially on Cape Cod) where they feed and roost before starting migration a few weeks later. By early September, essentially all terns have departed the nesting islands for the pre-migration staging areas. By mid-September, most have departed the staging areas for the wintering grounds (principally in South America), but some linger at staging areas until mid-October (USACE 2006).

The islands in Buzzards Bay and Nantucket Sound have been among the most important nesting sites for roseate terns in the northeast. In 2009, there were four roseate tern nesting colonies; Bird Island, Marion, MA; Ram Island, Mattapoisett, MA; Penikese Island near the southern tip of the Elizabeth Island chain, and Norton's Point, Martha's Vineyard (USFWS 2010). Bird Island and Ram Island (located approximately 17 km "as the crow flies" and 9.2 km, respectively) are the two closest colonies to the NBH- South Terminal project area that are within the typical foraging range (25 km) of the roseate tern.

Bird Island is a 3-acre island located in Buzzards Bay in Marion, MA, southwest of Butler's Point at the entrance of Outer Sippican Harbor. Bird Island is subject to wave action and submergence during storm events which has eroded the island over time. Sand and gravel areas have given way to the establishment of some areas of salt marsh and two salt pannes. The island is also the location of a historic light house. In 2009, Bird Island supported 782 nesting pairs of roseate terns (USFWS 2010).

Ram Island, a 2.5-acre island located 0.8 km southeast of Mattapoisett Neck, Mattapoisett, MA, is composed of eroded glacial till, surrounded by scattered boulders. There is a tidal pond in the center with a small area of low-grade salt marsh, and a storm beach of gravel and shell. Common and roseate terns have been known to breed on the island since the 1930s (Mass Audubon 2010) but the island was eventually overrun with gulls. Suitable conditions for nesting roseate terns were restored in the 1990's by the MA NHESP and as of 2009, the island supported 645 nesting pairs of roseate terns (USFWS 2010).

### **3. Staging**

Roseate tern staging areas in the New Bedford Harbor general vicinity (within 50 miles) include Monomoy Island and Nauset Beach on Cape Cod, Natucket Island, and Napatree Point on the Connecticut/Rhode Island border (USFWS 1998). Trull et al. (1999) (in USFWS 2010) identified twenty areas of open beach or sand flat sites around Cape Cod where roseate terns (and common terns) staged between 24 July and 22 September. Birds from eight different breeding sites were identified among staging flocks (Trull et al. 1999 in USFWS 2010).

### **4. Foraging**

Roseate terns feed almost exclusively on small and/or juvenile fish, occasionally including crustaceans and insects in its diet. Its feeding habits are fairly specialized, consuming primarily sand lance. Heinemann 1992 found that the roseate terns from Bird Island foraged primarily (95%) on sand lance prior to mid-June (71% over the season). After mid-June, the breadth of the diet increased to include herring, anchovy, silversides, mackerel and bluefish. Roseate terns capture food mainly by plunge-diving (diving from heights of 1-12 meters (m) and often submerging to  $\geq 50$  centimeters (cm)), but also by surface-dipping and contact-dipping (MA NHESP 2007)).

Roseate terns feed in bays, tidal inlets, or between islands in MA. They are known to fly up to 25 km to feed over reliable feeding areas (Nisbet 1991, Duffy 1986, Safina 1990, Heinemann 1992 in USFWS 1998). Rock et al. 2007 found an average foraging distance of 7 km from a colony in Country Island, Nova Scotia, Canada. Roseate terns forage in highly specialized situations such as shallow sand bars (less than 3 meters (m) deep) or rip tides where prey fish are swept close to the surface. They will also feed in shallow water (less than 2 m deep) where prey fish cannot stay below the plunge depth. Roseate terns will also take advantage of school feeding of predatory fish or feeding close to double-crested cormorants when smaller fish are driven to the surface. Some roseate terns specialize in stealing fish from other terns (Heinemann 1992). Rock et al. 2007 found that 90% of foraging was in water less than 5 m deep in a Canadian foraging study using telemetry.



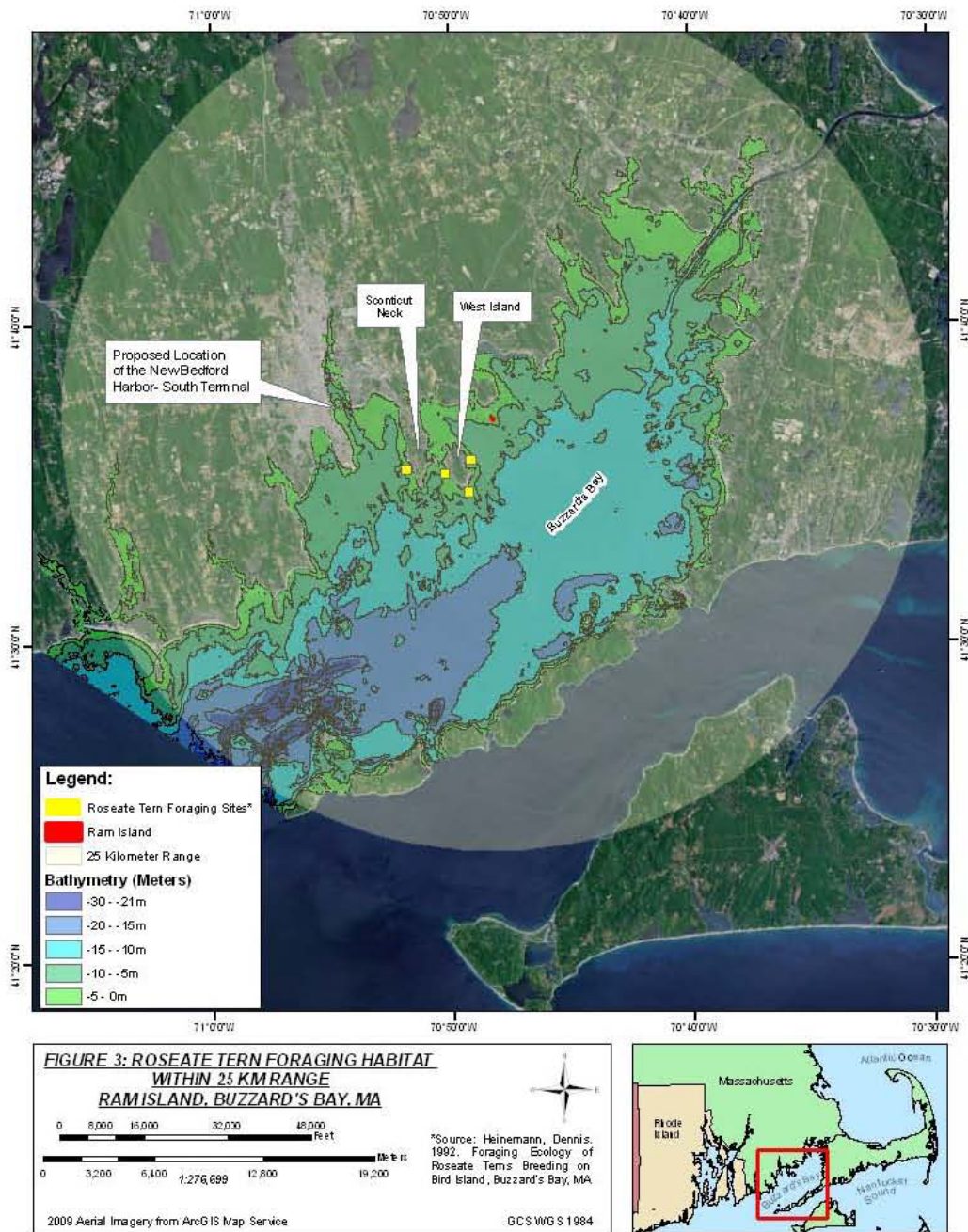
In 1990 and 1991, a study was conducted to assess the foraging locations and ecology of roseate terns breeding on Bird Island in MA (Heinemann 1992). Eight survey transects were established in the Buzzards Bay and Vineyard Sound area and roseate tern observation surveys were conducted during the months of June and July in 1990 and 1991. Five of the eight transects went into the New Bedford outer harbor of which two of these transects went into the inner harbor (north of the Hurricane Barrier). Of the five transects that included the New Bedford outer harbor area, the most southern foraging location in three transects was the West Island area and, in one transect, a small number of terns (1 to 9 birds) were observed foraging on the west side of Sconticut Neck (outer New Bedford Harbor) (for the location of these areas see Figure 3 – Roseate Tern Foraging Habitat Within 25 km). No roseate terns were identified foraging in the inner harbor area.

The MADEP (2010b) conducted a broader assessment for potential usage in the vicinity of the NBH - South Terminal project for avian nesting and foraging by reviewing existing data. The assessment included a review of a bird survey conducted by the USEPA in 1987, bird observations within Bristol County made via the Massachusetts Audubon Society's online "eBird" system, the species prioritization list associated with Bird Conservation Region 30 (Southern New England Data), information from the Paskamansett Bird Club's 2007 Christmas Bird Count, identifications made by an individual within New Bedford from 2005-2008 and observations made for the Mass Audubon Society's Breeding Bird Atlas 2. The conclusion of this assessment was that "These surveys indicate that the Common and Roseate Terns likely do not travel inside of the New Bedford Hurricane Barrier, and if they do, they do so infrequently and have not been noted within the surveys in question." (MADEPb).

Of the roseate tern nesting colonies in Massachusetts, only Bird Island and Ram Island are within the foraging range for roseate terns (approximately 25 km) to the New Bedford Harbor. Bird Island is located approximately 17 km from New Bedford Harbor but terns would most likely follow a water route during foraging which extends the flying distance from Bird Island to New Bedford Harbor to the outer-most foraging range. Heinemann (1992) stated that "Roseate Terns from the Bird Island do not forage in the immediate vicinity of New Bedford Harbor, although they can be found in significant numbers near West Island and Ram Island 6-9 km away." Therefore, it is unlikely that Bird Island roseate terns forage in the New Bedford Harbor area during nesting season. However, Ram Island is located 9.2 km from New Bedford Harbor. The Heinemann (1992) tern foraging study was conducted prior to the restoration of Ram Island and as such, may not account for Ram Island roseate terns foraging in the New Bedford Harbor area during nesting season since the mid-1990's.

In addition, terns migrating to and from wintering areas or moving from nesting and staging areas may use New Bedford Harbor for foraging. Little information is known about the movements or ecology of the birds during this time. Additional potential risks to migrating roseate terns related to NBH – South Terminal include increased shipping traffic, noise, oil

spills, etc. The potential impact to foraging roseate terns from Ram Island and migrating roseate terns is discussed in the Section V., Effects Analysis.



## **B. Piping Plover**

Since its 1986 listing, the Atlantic Coast piping plover population estimate has increased 234%, from approximately 790 pairs to an estimated 1,849 pairs in 2008, and the U.S. portion of the population has almost tripled, from approximately 550 pairs to an estimated 1,596 pairs. The largest population increase between 1989 and 2008 has occurred in New England (245%) (USFWS 2009).

A growing body of evidence reinforces information presented in the 1996 revised USFWS recovery plan regarding the importance of wide, flat, sparsely-vegetated barrier beach habitats for recovery of Atlantic Coast piping plovers. Such habitats include abundant moist sediments associated with blowouts, washover areas, spits, unstabilized and recently closed inlets, ephemeral pools, and sparsely vegetated dunes (USFWS 2009).

Several papers in the peer-reviewed literature explicitly recommend avoiding beach management practices (e.g., jetty construction, breach filling, dune building, beach nourishment) that typically inhibit natural renewal of ephemeral pools, bay tidal flats, and open vegetation because these natural features are key elements of suitable habitat for piping plover (Elias et al. 2000, in USFWS 2009) (Cohen et al. 2009, in USFWS 2009).

In Virginia, Boettcher et al. (2007, in USFWS 2009) reported that the five islands where piping plover breeding was observed every year from 1986-2005, "... encompass large segments of broad beaches with low discontinuous dunes and expansive sand-shell flats ... providing unimpeded access from beach nest sites to the moist-soil ecotones of backside marshes." Cross and Terwilliger (2000, in USFWS 2009) found that chick habitat use, foraging rates, and invertebrate prey abundance on four Virginia barrier islands was highest at moist inner-beach marsh edge and barrier flat habitats.

No observations of piping plover have been reported at or near the location of the proposed NBH-South Terminal project (MADEP 2010b).

## **C. Northeastern Beach Tiger Beetle**

The Northeastern beach tiger beetle was historically common on coastal beaches from Massachusetts to central New Jersey and also along the Chesapeake Bay in Maryland and Virginia. Today, the beetle is found only in the Chesapeake Bay area adjacent to Maryland and Virginia, and three beaches in Massachusetts (two of which are natural locations and the third was created as a translocation site by the USFWS and MADFW) (MADFW 2007).

In general, the Northeastern beach tiger beetle requires large, highly exposed beaches with fine sand particles and a low intensity of human disturbance. The largest population in

Massachusetts inhabits an offshore barrier beach, ranging in width from 16 to 34 meters, with a well-defined and dynamic dune system. The predominant vegetation on the dunes and upper beach is beach grass. The beach is relatively pristine and undisturbed by human activity, and there is very little off-road vehicle traffic. In Massachusetts, the two known locations of Northeastern beach tiger beetle are on Martha's Vineyard and in the Westport area, a distance of approximately 28 kms and 17 kms, respectively, from the proposed location for the NBH South Terminal project.

The Northeastern beach tiger beetle was federally listed as a threatened species on August 7, 1990, and is also a Massachusetts state-listed endangered species. Major conservation threats include degradation of key habitat from human development, recreational disturbance and pollution as well as natural factors, such as beach erosion, storms, parasites and predators.

## **V. Effects Analysis**

Direct adverse impacts to aquatic resources from constructing the NBH-South Terminal project would include the filling of 0.18 acres of salt marsh; 1.43 acres of intertidal area; 4.73 acres of near-shore sub-tidal area; and approximately 50-125 square feet of temporary alteration associated with the construction of a temporary bridge (the bridge and pilings would be removed at a later date, after the initial use of the facility was complete). In addition, 9.0 acres of near-shore subtidal area (existing depth between -1 and -6 MLLW) would be dredged to between -20 and -30 MLLW (6.65 acres to -20 MLLW and 2.35 acres to -30 MLLW), and 6.39 acres of subtidal area (existing depth between -20 and -25 MLLW) would be dredged to -30 MLLW to create the adjacent deep water channel and mooring area. A total of approximately 21.73 acres of intertidal and subtidal resource areas would be directly altered due to filling and dredging during the construction process. Secondary impacts would include temporary elevated turbidity, the resuspension and mobilization of contaminants during the construction process, and human disturbance (vessel traffic, noise, etc.) associated with the post-construction operation of the terminal (MADEP 2010b).

### **A. Roseate Tern**

#### **1. Foraging by Nesting and/or Migrating Roseate Terns**

Ram Island is located 9.2 km from New Bedford Harbor which is within the 25 km foraging distance for roseate terns and as such there is some potential for Ram Island roseate terns to forage in the New Bedford Harbor area during nesting season. In 2009, Ram Island supported 645 roseate tern pairs; 20.6% of the northeast population in 2009. Of that number, only a portion would be expected to forage at any one time in the direction of New Bedford Harbor. In addition, roseate terns forage in highly specialized situations such as shallow sand bars or rip tides where prey fish are swept close to the surface. The southern- most foraging areas, located

around West Island and the west side of Sconticut Neck (outer New Bedford Harbor), could also be used by Ram Island roseate terns and Heinemann (1992) identified many other foraging sites in Buzzards Bay that are also within the range of foraging Ram Island terns. No roseate terns were identified foraging in the inner harbor area by Heinemann (1992).

In addition, the MADEP (2010b) conducted an assessment for potential avian usage of the NBH – South Terminal area by reviewing a wide variety of existing avian survey data. The conclusion of this assessment was that “ These surveys indicate that the Common and Roseate Terns likely do not travel inside of the New Bedford Hurricane Barrier, and if they do, they do so infrequently and have not been noted within the surveys in question” (MADEPb).

Terns migrating to and from wintering, nesting and staging areas also have the potential to forage in New Bedford Harbor. However, Trull et al. (1999) (in USFWS 2010) suggested that at least half of the entire northeast population was concentrated around Cape Cod at the time of staging. These staging areas are located 40 miles or more from New Bedford Harbor which is beyond the foraging range for roseate terns. It would be expected that only occasional or transient birds would attempt to use New Bedford Harbor for foraging during migration and staging based upon existing survey data.

One possible avenue of exposure to terns is through foraging contaminated fish, shellfish, benthic invertebrates, etc. Higher level trophic feeders can bioaccumulate PCBs in their body tissues from foraged prey which can result in pathogenic effects. Studies performed by the EPA at the NBH superfund site demonstrate a generally decreasing trend (north to south) of PCB levels in locally caught seafood; PCB levels decreased proportionally with the distance from the primary source of PCBs in the upper harbor (the Aerovox facility) in a report entitled Contaminated Monitoring Report for Seafood Harvested in 2007 from the New Bedford Harbor Superfund Site (EPA 2009). In addition, the 2010 New Bedford Harbor PCB Flux Study (USACE 2010, unpublished) shows that PCB is exported to the outer harbor daily through tidal flux. Blue fish were found to have the highest levels of PCBs, followed by flounder, in a study conducted by the EPA and the MA DFW of the fish adult terns brought to their chicks at tern colonies in Buzzards Bay, MA (EPA 2008). The export of PCBs from NHB likely contributed to high levels of PCBs found in chicks found dead at Bird Island in 1970s (EPA 2008) and two common terns that were found dead on Bird Island near the end of the 1989 breeding season. These birds were found to have PCB concentrations of 400 ppm in their brains (Heinemann 1992).

Ward et al. (2010) investigated PCB exposure route and the effect of contamination on the survival and reproductive success of common terns (*Sterna hirundo*) in a nesting colony in Lake Michigan, Illinois. That study showed that the most likely pathway by which terns are exposed to PCBs is via filter-feeding fish (e.g., alewives, *Alosa pseudoharengus*). The study also quantified extremely poor parental attentiveness during incubation which led to low reproductive

success. Although this could not be directly attributed to PCB contamination, it appears to have significant impacts on the overall reproductive success of common terns (Ward et al. 2010). In addition, Safina et al. (1998) showed that roseate terns in New York suffered reduced productivity in a year of low prey density, suggesting that population, habitat alteration, fishing activities or disturbance can reduce prey availability which may have severe consequences for the population stability of roseate terns (Safina et al. 1988, in Heinemann 1992). Exposure to contaminated prey species is a risk factor for roseate terns.

New Bedford Harbor is not designated as an area of critical habitat for the federally endangered roseate tern. New Bedford inner harbor is out of the foraging range for the majority of the northeast population of roseate terns and the amount of suitable habitat for foraging appears to be limited in New Bedford inner harbor due to the terns' specificity for certain types of foraging areas (shallow bars, rip tides, etc.). There are areas of Roseate tern foraging habitat identified around West Island and the east side of Sconticut Neck (Heinemann 1992) which is within the foraging range of Ram Island roseate terns which would seemingly be preferred over foraging in the NBH inner harbor project area. In addition, roseate terns forage in waters up to approximately 10 meters in depth and as such, there is a large amount of potential foraging habitat around the New Bedford Harbor area (see Figure 3 – Roseate Tern Foraging Habitat Within 25 km). In addition, the amount of existing human related disturbance in the harbor is a deterrent for foraging birds (as discussed below). Therefore, it would be expected that use of the New Bedford inner harbor by roseate terns for foraging during, nesting, migration or staging would be limited to occasional or transient birds.

## **2. Noise and Traffic**

New Bedford Harbor is a highly industrialized area with noises level related to the operation and repair of over 500 commercial fishing vessels, operation of dozens of fish processing plants, multiple cargo ship receiving facilities, multiple ship-yards, ferry boats, cruise ships, and repair yards. This activity produces a significant quantity of noise, particularly in the spring, summer, and early fall, during which the activity within the harbor is at its peak, and when foraging for the roseate tern would be at its peak (MADEP 2010b), which would be a deterrent to foraging shorebirds.

The construction and operation of the NBH-South Terminal will involve increased truck traffic and noise impacts in the project vicinity. It is estimated that work will be conducted on an as-needed basis, and could occur 24 hours per day, 365 days per year (shipping activities and/or offloading from fishing vessels). The NBH-South Terminal is located within the Designated Port Area for the Port of New Bedford, which has been specifically reserved for water dependent industrial uses by the Commonwealth of Massachusetts and interfaces with the Waterfront Industrial and "Industrial B" zoning districts (MADEP 2010a). As discussed in above, the current level of human activity in the harbor is likely to be a deterrent to shorebirds foraging in



the area. Increased noise and traffic from construction and operational activities at the terminal may further deter roseate terns from using the area. However, this is not likely to adversely affect the roseate tern since the use of the New Bedford inner harbor by roseate terns is expected to be limited to occasional and transient individuals and there are several and more preferred areas terns may use for foraging in Buzzards Bay.

### **3. Direct Loss of Salt Marsh, Intertidal and Subtidal Habitat**

The NBH-South Terminal project construction will result in direct impacts to 6.34 acres of intertidal resources and the alteration of 15.39 acres of subtidal area (for a total of approximately 21.73 acres). These aquatic resource areas were found to support abundant benthic and shellfish resources and are used as fisheries spawning and nursery habitats. The direct effect to marine resources caused by filling and dredging intertidal and subtidal areas include permanent loss of spawning and foraging habitat, reduction in the availability of food supply, and loss of refuge areas from predators.

Project related impacts on the prey species preferred by the roseate tern are dependent on the mobility, life history, food preference and spawning behavior of the species. Benthic organisms or slow moving invertebrates (food for prey species) will be buried or trapped by filling during construction of the NBH-South Terminal. Highly mobile species of fish would likely avoid the disturbance areas. Spawning habitat for the pelagic species such as sand lance, mackerel and bluefish, which spawn in coastal areas, or the anadromous herring which spawns in fresh water (in the Acushnet River), would be least likely to be directly affected by the filling of intertidal and subtidal habitat. However, the bay anchovy spawns in estuarine waters and the juveniles of bluefish, herring and mackerel that may utilize the NBH-South Terminal intertidal area for foraging. However, these species were not well represented in the near NIA near shore sampling or trawl sampling and as such do not appear to utilize the area to a great extent. Overall, the intertidal resources that will be affected by the proposed project represent a small portion of the total potential spawning, nursery and foraging habitat in New Bedford Harbor.

The Atlantic silverside is a resident of the intertidal area which makes it most susceptible to impacts associated with the direct filling of the 6.34 acres of intertidal resources and the alteration of 15.39 acres of subtidal habitat. The Atlantic silverside, spawns in intertidal areas, comprised 44% of the three near shore seine sampling stations and represents approximately 10% of the roseate tern diet (Heinemann 1992). However, the Atlantic silverside is wide spread, occurring from Nova Scotia to Florida and abundant in every major estuary (USFWS 1983). Overall, the intertidal resources that will be affected by the proposed project represent a small portion of the total potential spawning, nursery and foraging habitat in New Bedford Harbor. As well, the roseate tern has a preference primarily for sand lance and a range of other prey species which support its dietary requirements during the spring, summer, and fall in the northeast. It is unlikely, that the potential impact of the NBH-South Terminal project on the Atlantic silverside

population or other foraging juvenile prey species will affect the occasional or transient roseate terns that may use the New Bedford Harbor for foraging. Although the area will be eliminated as a potential foraging site for roseate terns, and as explained above, only occasional or transient birds would be expected to use the inner harbor area for foraging and there are several more preferred feeding sites in the Buzzards Bay area (as shown on Figure 3 – Roseate Tern Foraging Habitat Within 25 km).

#### **4. Dredging Related Injuries**

Other potential risks include those related to dredging activities and their impact on roseate tern foraging. These impacts may include increased exposure of prey fish to elevated turbidity and higher levels of contaminants in the water column from the dredging processes. Though direct mortality would not be expected, sub-lethal impacts could occur, such as decreased reproduction or bioaccumulation of contaminants in benthic organisms that the prey fish feed upon. Dredging will impact approximately 15 acres of subtidal area in order to create an adjacent deep water channel and mooring area.

The direct effects of dredging on fisheries include destruction of eggs or spawning areas, physical impairment (e.g., turbidity-induced clogged gills resulting in suffocation, or abrasion of sensitive epithelial tissue), behavior impairment (changes in migration patterns) or physiological impairment due to acute or chronic toxicity to contaminants within the dredge sediments. Some physical impairment of resident fish species within the harbor would be expected. Pelagic fish are more likely to avoid the turbidity plumes and leave that portion of the harbor occupied by the sediment plume. Anadromous fish may be temporarily impacted by any sediment plume as they pass through it to freshwater spawning areas.

To better understand the effects of dredging in the New Bedford Harbor Superfund site, the EPA Atlantic Ecology Division in Narragansett, RI, conducted extensive research with regard to water column contaminant bioaccumulation in the shellfish tissues. Blue mussels (*Mytilus edulis*) were selected for use in the study because they have been shown to accumulate PCBs in their tissues proportional to the concentration of PCBs in the water that they filter. Mussels were deployed at three sites; the Coggeshall St. Bridge in the upper harbor, the NBH Hurricane Barrier in the lower harbor, and approximately 1000 yards east of West Island. In order to quantify any dredging and operational related impacts, mussels were deployed at three different times; before dredging (Pre Operational), during dredging of PCB contaminated areas (Hot Spot Remediation) and after dredging (Post Operational). After the mussels were deployed for a period of 28 days, they were retrieved from the field and analyzed for PCB concentrations in their tissues (EPA, unpublished. B.J. Bergen and W.G. Nelson, U.S. EPA, Atlantic Ecology Division, Narragansett, RI).

Results of the study indicate that, over a period of twelve years (1987 to 1999), PCB bioaccumulation levels were relatively constant, which lead to the conclusion that operational dredging in the NBH had minimal impact on PCB bioaccumulation in mussels. The data showed that PCB concentrations do not increase during dredging periods in blue mussels and as such, it was reasonable to assume that dredging does not lead to increases in PCB concentrations in other biota in the harbor (EPA, unpublished. B.J. Bergen and W.G. Nelson, U.S. EPA, Atlantic Ecology Division, Narragansett, RI).

In addition, extensive water quality monitoring was performed during dredged material disposal into a constructed CAD Cell in the lower harbor area in 2009 to assess water column impacts (Technical Memo dated December 11, 2009, from Battelle to Robert Leitch, PE, USACE North Atlantic Division, New England District entitled Turbidity Monitoring and Plume Sampling Results for City Dredge Disposal at the New Bedford Harbor CAD Cell # 2). Monitoring was performed from April to July, 2009. In general, the results of the monitoring showed that water column impacts realized during disposal of dredged material into the CAD cell were nearly completely contained within the CAD cell silt curtain, with the plumes dissipating to near background levels within 1 to 1 ½ hours. Additionally, there were no measurable acute or sub-lethal toxicity related impacts to marine organisms from the water collected within the disposal area.

A grain size analysis for one sediment sample within the dredging footprint showed an average 46.9% silt/clay component (email dated October 4, 2010 from William Nelson, USEPA to Judith Johnson, Army Corps of Engineers, New England District), which shows a high level of fine particle material. Fine grained particles higher in organic content pose a greater likelihood of binding PCBs in the sediment. A sediment sampling plan is being developed for both the area behind the sheet steel (CDF) and the area to be dredged for navigation/berths (October 13, 2010 personal communication with Matthew Schweisberg, Chief, Wetlands Protection Program, EPA) to better define the nature of the sediments in the project area. Although the one grain size analysis showed a high level of fines in the NBH–South Terminal project area, the magnitude of turbidity generated and/or released during dredging, with any subsequent impacts to roseate tern foraging prey species, would be minimized using existing performance standards that have been developed through the State Enhanced Remedy process at the New Bedford Superfund site.

The New Bedford Superfund site performance standards were developed in coordination with federal, state and local authorities over two phases of navigational dredging (Phase II, which began in January 2005 and was completed in January 2006 and Phase III, which began in September 2006 and was completed in September 2009) (MADEP 2010b). A detailed description of the Performance Standards and water quality monitoring requirements can be found in Appendix 11 of the State Enhanced Remedy in the New Bedford, South Terminal – Expanded Avian Assessment prepared by the Massachusetts Department of Environmental Protection (MADEP 2010b). In accordance with the performance standards, silt-curtains and

absorbent booms will be deployed to enclose the area being dredged and turbidity monitoring will be conducted during the deployment of silt curtains to assess water column impacts. Written contingency plans will be required from the marine contractors working at the facility. Should turbidity monitoring indicate exceedances of the performance standards, the contractor will be required to implement contingency plans to reduce the turbidity levels. The impacts of dredging on water quality will be minimized by avoiding dredging during days of adverse weather and resultant increased wave and current velocities. The temporary impacts to the water column associated with turbidity will cease following completion of the maintenance dredging as shown by the water quality monitoring conducted by the EPA (MADEP 2010b).

The implementation of Performance Standards during dredging will minimize the water quality impacts associated with dredging the deep mooring area adjacent to the NBH – South Terminal project. In addition, EPA's long-term blue mussel bioaccumulation study showed that any elevated PCB concentrations into the water column do not translate into increases in tissue concentrations in blue mussels during dredging periods and as such, it is reasonable to assume that dredging in the lesser contaminated sediments in the project area would not lead to increases in PCB concentrations in other biota in the harbor. Furthermore, given that only occasional or transient roseate terns would be expected to use the NBH during breeding and migration, we believe that roseate terns are unlikely to be adversely affected as a result of this project. Should a few birds choose to forage in the project area during dredging operations, the risks of exposure to PCBs resulting from dredging would be extremely low. This conclusion is supported by long term trends which show that total PCBs have declined 12% since 1972 in tern breeding colonies in Buzzards Bay, MA (EPA, 2008). This decline in PCB levels in tern eggs, though not specifically linked to the remedial activities at the NBH Superfund site, coincides with declines in sediment PCBs concentrations from those activities.

## **5. Oil Spills and Shipping Traffic**

Increased vessel traffic and/or the uncontrolled release of oil to surrounding waters as a result of the operation and maintenance of the NBH – South Terminal project presents another potential vulnerability to terns foraging in Buzzard's Bay. An oil spill in 2003, the Bouchard No. 120 (B-120) oil spill in Buzzards Bay, Massachusetts, resulted in moderate oiling of Ram Island and slight oiling of Bird and Penikese Islands. During this event, roseate terns were hazed to discourage them from settling into nesting habitat until it was cleaned of oil. As a result, many tern pairs moved to other islands, and/or delayed nesting which resulted in reduced productivity at Ram Island by an estimated 350 chicks (USFWS 2008).

To determine the threat to avian wildlife, the MADEP (2010b) conducted an oil spill threat analysis of vessel traffic, as prepared by Nuka Research & Planning Group LLC (MADEP 2009 in MADEP 2010b). Nuka Research & Planning Group LLC considered the existing oil spill threat for New Bedford Harbor from vessel activity within shipping lanes; from increased vessel

traffic due to the construction of the NBH–South Terminal project; and from use of the facility as a maritime terminal after the initial offshore renewable energy project is completed. The analysis determined the relative increase in oil spill threat after the first year of operation of the new terminal for Regional Transit Vessels is 0.77% for the South Coastal/New Bedford area, 0.75% for the Dartmouth/Fairhaven/Marion/Mattapoisett/Wareham/Westport area and 0.75% for the Cape and the Islands. These increased threats were determined to represent a small incremental increase in overall oil spill threat over current conditions. Details of this analysis may be found in the document entitled the State Enhanced Remedy in New Bedford, South Terminal and dated August 25, 2010 (MADEP 2010a). In addition, Spendelow et al. (2008) (in USFWS 2008) examined survival rates of roseate terns over a 19-year period and did not detect a lower survival of the birds nesting at the colonies near the Bouchard No. 120 (B-120) oil spill compared to those nesting at other study sites in New York and Connecticut. Therefore, it is unlikely that roseate terns will be adversely affected by the increased threat of oil spills or increased traffic as a result of the NBH–South Terminal project.

## **6. Benefits of the Project**

In its current state, New Bedford Harbor presents a limited risk to roseate terns through potential foraging by transient terns within the harbor and the export to adjacent area of PCB contaminated forage fish (e.g., sand lance, alewife, blue fish, etc.). The on-going remediation at the NBH Superfund site has long-term benefits in terms of reducing the levels and amounts of PCBs and other contaminants in the sediments within the harbor areas and subsequent exposure to resident and transient fish species and resources. These benefits may be evident in the long-term trends that show that total PCBs have declined 12% in tern breeding colonies in Buzzards Bay, MA since 1972 (EPA, 2008).

### **B. Piping Plover**

As describe above in section IV. B., piping plover nest on wide, flat, sparsely-vegetated barrier beach habitats with abundant moist sediments that are associated with blowouts, washover areas, spits, unstabilized and recently closed inlets, ephemeral pools, and sparsely vegetated dunes (USFWS 2009). Ephemeral pools, bay tidal flats, and open vegetation are key natural features of suitable habitat for piping plover (Elias et al. 2000, in USFWS 2009) (Cohen et al. 2009, in USFWS 2009). These features are mostly absent from the proposed location for the NBH-South Terminal project.

Also, Boettcher et al. (2007, in USFWS 2009) reported from Virginia that important factors determining where piping plover breed include extensive areas of broad beaches with low discontinuous dunes and expansive sand-shell flats that provide unimpeded access from beach nest sites to the moist-soil ecotones of backside marshes. Moreover, Cross and Terwilliger (2000, in UFSWS 2009) found that chick habitat use, foraging rates, and invertebrate prey

abundance on four Virginia barrier islands was highest at moist inner-beach marsh edge and barrier flat habitats. These habitat features in the juxtaposition described do not exist at the proposed location for the NBH-South Terminal project.

Finally, no observations of piping plover have been reported at or near the location of the proposed NBH-South Terminal project (MADEP 2010b).

### **C. Northeastern Beach Tiger Beetle**

Northeastern beach tiger beetle does not occur at the beach habitat present at the proposed location for the NBH-South Terminal project. The only New England locations of the beetle are approximately 17 kms and more than 28 kms away. There is a theoretical potential for an indirect effect to this species from an accidental oil spill which might reach one of these beach locations. However, the possibility of such an accident occurring over the life of the project, as outlined above, and the spilled oil reaching Northeastern beach tiger beetle habitat at critical life history points (i.e., adults present, high tides present to reach larva) is very low.

### **Compensatory Mitigation**

Impacts to salt marsh, intertidal and subtidal resources have been avoided and minimized to the maximum extent practicable. Although the construction of the NBH-South Terminal project is unlikely to adversely affect foraging roseate terns, there are direct impacts to nesting, foraging, and spawning habitats of aquatic organisms in the project area, including potential impacts to resident Atlantic silverside, a prey species of the roseate tern. (It is not expected that potential impacts to resident Atlantic silversides will affect roseate terns adversely due to the availability of other prey species, and the area of impact is small as compared to overall fisheries habitat in the project area vicinity.) However, in order to compensate for the direct impact to resource areas due to construction and operation of the NBH-South Terminal, the MADEP has evaluated a number of mitigation options to compensate for the unavoidable impacts. Some of these options may provide habitat enhancement opportunities for the federally endangered roseate tern. Among other compensation activities, MADEP would do the following (see State Enhanced Remedy in the New Bedford, South Terminal – Expanded Avian Assessment (MADEP 2010b)):

- Creation/Enhancement of 11.8 acres of intertidal area via a combination of sites immediately outside of New Bedford Harbor to enhance foraging area for avian wildlife potentially using the proposed project area, including the common tern and the roseate tern (Alternative 3);
- 0.5 acres of intertidal area via a combination of sites either within New Bedford Harbor to enhance foraging area for avian wildlife potentially using the proposed project area, including the common tern and the roseate tern (Alternative 5); and,



- Creation/enhancement of 2 acres of a combination of successional marsh areas (mudflat, low marsh, high marsh, and transitional area) to enhance foraging area for avian wildlife potentially using the proposed project area, including the common tern and the roseate tern (Alternative 8).

## **VI. Conclusion and Determination of Effects**

### **A. Roseate Tern**

The proposed NBH–South Terminal project site contains no nesting habitat for roseate tern and will have no effect upon available roseate tern nesting habitat. In addition, no critical habitat has been designated for the roseate tern (USFWS 1998) within New Bedford upper, inner or outer harbor areas.

The project may have minimal effects on foraging roseate terns during nesting and migration. These effects are expected to be minimal because the number of foraging terns is expected to be limited to occasional and transient birds. Ram Island is the only nesting colony within the bird's known foraging distance of 25 km; only a portion of Ram Island roseate terns would be expected to forage in the direction of New Bedford Harbor. Likewise, roseate tern staging areas around the Cape and islands are located 60 km or more from New Bedford Harbor, which is also beyond the foraging range.

In addition, based on existing literature and known feeding habitats, there appears to be a lack of suitable feeding habitat for roseate terns in the NBH inner harbor. Roseate terns use specialized sites for feeding where currents or rip tides bring prey species to the surface. Studies to date show that use of the NBH inner harbor would be infrequent at best.

Noise and vessel traffic in the harbor are an added deterrent to the use of the harbor by roseate terns for foraging. However, in the unlikely event that roseate terns enter the NBH inner harbor to forage, noise and vessel traffic would serve to drive the birds away from the South Terminal site. Therefore, injury as a result of foraging during dredging is highly unlikely. In addition, the increased threat over existing conditions to migrating roseate terns due to increased vessel traffic and potential oil spills would be minimal.

The EPA concludes that, though the proposed NBH-South Terminal project may affect roseate tern, the project is unlikely to adversely affect the species.

### **B. Piping Plover**

The proposed NBH-South Terminal project site contains no suitable nesting, foraging, or migrating habitat for piping plover. The EPA concludes that the project is unlikely to adversely affect the species.

### **C. Northeastern Beach Tiger Beetle**

There is a theoretical potential to affect the Northeastern beach tiger beetle from an oil spill accident under the proposed action. However, the possibility of such an accident occurring over the life of the project and the spilled oil reaching Northeastern beach tiger beetle habitat at critical life history points (i.e., adults present, high tides present to reach larva) is very low. Therefore, EPA concludes that the proposed construction and operation of the NBH-South Terminal project may affect, but is unlikely to adversely affect, the Northeastern beach tiger beetle.

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