Prepared for:
National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)
Office of Protected Resources

In accordance with:
NOAA Administrative Order Series 216-6:
Environmental Review Procedures for Implementing
The National Environmental Policy Act (NEPA)

Pursuant to:
The National Environmental Policy Act of 1969

Environmental Impact Statement
to Implement the Operational Measures of the North Atlantic Right Whale Ship Strike Reduction Strategy

Draft Environmental Impact Statement

July 2006

Abstract

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) proposes to implement the *North Atlantic Right Whale Ship Strike Reduction Strategy* to reduce the occurrence and severity of vessel collisions with endangered North Atlantic right whales (*Eubalaena glacialis*). The Strategy addresses the lack of recovery of the North Atlantic right whale population by reducing the likelihood and threat of ship strike related deaths and serious injuries to the species. This draft environmental impact statement (DEIS) analyzes the potential environmental impacts of implementing the operational measures of the Strategy contained in the proposed action and alternatives. The EIS commenced after a preliminary environmental assessment came to a finding of potentially significant impacts on the human environment.

Comments Must Be Submitted No Later Than September 5, 2006
Direct Comments to:

Chief, Marine Mammal and Sea Turtle Conservation Division
Attn: Right Whale Ship Strike Reduction DEIS
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910
ShipStrike.EIS@noaa.gov

This Page Intentionally Left Blank

EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) has prepared this draft environmental impact statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the NOAA environmental review procedures (NOAA Administrative Order 216-6).

ES.1 Proposed Action

The proposed action is to implement the operational measures of NOAA's Ship Strike Reduction Strategy in waters off the East Coast of the United States (US) to reduce vessel strikes to the endangered North Atlantic right whale. Due to regional differences in right whale distribution and behavior, oceanographic conditions, and ship traffic patterns, the proposed operational measures would apply only in certain areas and at certain times of the year, or under certain conditions. To account for these regional variations, the US East Coast is divided into three implementation regions: northeastern US (NEUS), mid-Atlantic US (MAUS), and southeastern US (SEUS). All vessels 65 ft (19.8 m) and greater in overall length and subject to the jurisdiction of the US would be required to abide by the operational measures, except for vessels owned or operated by, or under contract to the Federal government. The measures also apply to all other vessels 65 ft (19.8 m) and greater in overall length entering or departing a port or place under the jurisdiction of the US. The proposed measures would include the following:

- **Seasonal Management Areas (SMAs).** SMAs are pre-determined and established areas in each of the three regions, all with seasonal speed restrictions. In the SEUS, an SMA would be established off the coast of Georgia and Florida from November 15 to April 15. In the MAUS, SMAs would be established with a 30 nautical mile (nm) (56 km) radius around nine ports in the region from November 1 to April 30. In the NEUS, SMAs would be established in Cape Cod Bay (January 1 – May 15), Off Race Point (March 1 – April 30), and Great South Channel (April 1 – July 31). Within the SMAs and during designated time frames only, vessels would be required to proceed at a reduced speed (10, 12, or 14 knots).
- **Dynamic Management Areas (DMAs).** When a certain number of whales are sighted in an area outside of the boundaries of, or at times when, SMAs are implemented; NMFS is considering a scenario in which the agency would draw a circle with a radius of 2.8 nm [5.2 km] around the sighting. This radius would expand incrementally with the number of whales sighted (e.g. 2.8 nm [5.2 km] for a single right whale, 3.9 nm [7.2 km] for two whales, 4.8 nm [8.9 km] for three whales, etc.). In addition, a larger circular zone would be designated that would extend an additional 15 nm (28 km) beyond the core area to allow for whale movement. Vessels would be required to transit through DMAs at a reduced speed, or would have to route around the area. DMAs would apply in all three implementation regions out to 200 nm (370 km).

- **Routing Measures.** Such measures would apply to the NEUS and SEUS regions. In the NEUS region, routing measures are proposed in Cape Cod Bay to deflect major vessel traffic away from right whale aggregations. In the SEUS region, routing measures are proposed for routes into and out of the ports of Jacksonville and Fernandina Beach, Florida; and Brunswick, Georgia. Speed restrictions would be required in the portions of these recommended shipping routes located within a SMA. The recommended routes in the NEUS and SEUS were analyzed by the United States Coast Guard (USCG) with regard to navigational and environmental safety through a Port Access Routes Study (PARS). NMFS also intends to submit a proposal to the International Maritime Organization (IMO) for an Area To Be Avoided (ATBA) adjacent to, and east of, the Boston Traffic Separation Scheme (TSS). The US already submitted a proposal to the IMO for a narrowing of, and a 12-degree northern shift in the Boston TSS. All routing measures are nonregulatory[1] operational measures.

ES.2 Purpose and Need

The purpose of the proposed action is to reduce the number and severity of vessel collisions with North Atlantic right whales, thereby contributing to the recovery and sustainability of the species, while minimizing the economic effects on the shipping industry and maritime commerce.

NMFS has jurisdiction under both the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), to protect the endangered North Atlantic right whale. Although various measures to reduce ship strikes have been in place for several years, these measures have not significantly reduced the number of vessel collisions with right whales. A continued lack of recovery, and possible extinction, will occur if deaths from ship strikes are not reduced. Thus, additional measures are needed for NMFS to fulfill its responsibility. Ship strikes represent the majority of anthropogenic serious injuries and deaths to right whales. Therefore, NMFS is proposing to reduce this threat by taking the regulatory approach that is expected to be the most effective at helping the population to recover. The operational measures of the proposed Strategy would impose regulatory speed restrictions and nonregulatory routing measures on specific vessel classes to reduce the ship strike threat to right whales without imposing undue economic burdens on the shipping industry. The combination of speed restrictions and reducing the co-occurrence of right whales and vessel traffic is expected to be an effective means of reducing the number and severity of ship strikes and promoting population growth and recovery.

ES.3 Alternatives

The following table summarizes the alternatives considered in the EIS:

[1] Although described in the proposed rule, nonregulatory measures are not actually a part of the NMFS-proposed rule; they will be implemented through other means.

Operational Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
New routing requirements	No	No	No	Yes, in SEUS and NEUS regions, plus proposed modification to Boston TSS, and an ATBA.	Yes, in SEUS and NEUS regions, plus proposed modification to Boston TSS, and an ATBA.	Yes, in SEUS and NEUS regions
DMAs	No	Yes, in US Territorial waters and the EEZ	No	No	Yes	Yes, in SEUS, MAUS, and NEUS regions
SMAs	No	No	No	No	No	Yes, in SEUS, MAUS and NEUS regions
Speed restrictions	No	Yes, associated with DMAs	Yes, within specific areas in each implementation region, year round in NEUS region and seasonal in MAUS and SEUS regions.	No	Yes, associated with DMAs, and within the areas defined for Alternative 3	Yes, associated with DMAs, and all SMAs

ES.3.1 Alternative 1 – No Action

None of the operational measures would be implemented under the No Action Alternative. NMFS would continue to implement existing measures and programs to reduce the likelihood of ship strikes. Research would continue and existing technologies would be used to determine whale locations and pass this information on to mariners. NMFS would continue to pursue the nonregulatory components proposed in the Strategy.

ES.3.2 Alternative 2 – Dynamic Management Areas

Dynamic Management Areas (DMAs) are the only operational measure proposed under Alternative 2. DMAs are temporary and provide protection for a minimum of 15 days. This time period may be extended if whales are present after the initial designation. Aerial surveys and other observations of a whale or aggregation of whales would be the only means for a DMA to be triggered and implemented. Alternative 2 does not propose any permanent measures to reduce the occurrence of ship strikes.

ES.3.3 Alternative 3 – Speed Restrictions in Designated Areas

As speed restrictions are the only measure that would be implemented under this alternative, the areas and time applied to these restrictions are generally both larger in size and extend for a greater length of time (except for the SEUS, where speed restrictions would be in place for a shorter length of time) than those proposed under Alternative 6. There are no routing measures and no DMAs proposed under Alternative 3. The proposed restrictions would apply as follows:

- In the NEUS region, year-round restrictions within all waters in the Seasonal Area Management (SAM) zones designated in the Atlantic Large Whale Take Reduction Plan (ALWTRP). There are currently two SAM zones in the Northeast: SAM West, in effect from March 1 to April 30; and SAM East, in effect from May 1 to July 31. The boundary between SAM West and SAM East is 69°24'W longitude. These areas adjoin, although are exclusive of, Cape Cod Bay and the Great South Channel critical habitats (NMFS, 2005a). The preferred alternatives considered in the ALWTRP Draft EIS (DEIS) propose to expand these zones. By the time the operational measures of the Strategy are implemented, it is likely that the expanded zones in the ALWTRP would be operational; therefore, these would be the application zones for this alternative.
- In the MAUS region, restrictions are from October 1 to April 30. The restricted area would include all waters 25 nm [46 km] out from the US coastline between Providence, RI/New London, CT (Block Island Sound), and Savannah, GA.
- In the SEUS region, restrictions are from December 1 to March 31. The restricted area would include all waters within the Mandatory Ship Reporting Systems (MSRS) WHALESSOUTH reporting area and the presently designated right whale critical habitat.

ES.3.4 Alternative 4 – Recommended Shipping Routes

Alternative 4 proposes several types of routing measures in the NEUS and SEUS regions. Routing measures are proposed under this alternative as a stand alone measure. Speed restrictions are not proposed in these routing measures. These measures would be operational, although they are nonregulatory, in that they would not be implemented through rule making.

- In the NEUS, recommended shipping routes are proposed for Cape Cod Bay to/from the Cape Cod Canal (January 1 to May 15), an ATBA is proposed in the Great South Channel (April 1 to July 31), and a narrowing of, and a 12-degree northern rotation of the Boston TSS is also proposed under Alternative 4.
- There are no measures proposed in the MAUS under Alternative 4.
- In the SEUS, recommended shipping routes are proposed in the approaches to the ports of Jacksonville and Fernandina Beach, Florida, and Brunswick, Georgia. These routes would be operational from November 15 to April 15.

ES.3.5 Alternative 5 – Combination of Alternatives 1-4

All of the measures previously mentioned under alternatives 1, 2, 3, and 4 would be implemented under Alternative 5.

ES.3.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

The measures proposed under Alternative 6 are summarized in the following table:

Region	Proposed Measures	Areas of Application	Period of Application
Southeast (SEUS)	Speed restrictions in the Southeast SMA and shipping lanes	Ports of Jacksonville, FL; Fernandina, FL; Brunswick, GA; and Southeast SMA	November 15 to April 15
Mid-Atlantic (MAUS)	SMAs around nine port areas with speed restrictions	South & east of Block Island Sound (Montauk Point to western end of Martha's Vineyard)	November 1 to April 30
		Ports of New York & New Jersey	
		Delaware Bay (Ports of Philadelphia & Wilmington)	
		Entrance to Chesapeake Bay (Ports of Hampton Roads & Baltimore)	
		Ports of Morehead City & Beaufort, NC	
		Port of Wilmington, NC	
		Port of Georgetown, SC	
		Port of Charleston, SC	
		Port of Savannah, GA	
Northeast (NEUS)	Speed restrictions in the CCB seasonal management area and shipping lanes	Cape Cod Bay	January 1 to May 15
	Speed restrictions in the ORP seasonal management area	Off Race Point	March 1 to April 30
	Speed restrictions in GSC seasonal management area	Great South Channel	April 1 to July 31
	DMAs	Gulf of Maine area	Year round
All Three Regions	DMAs	US territorial waters and EEZ	Year round

ES.4 Impacts

In general, both the biological and economical impacts increase in magnitude as the speed restriction becomes more conservative (e.g., 10 vs. 14 knots) in alternatives that include speed as an operational measure. In the first three sections below, the impacts of speed restrictions are discussed in general and not for 10, 12, and 14 knots specifically. All costs refer to economic impacts in 2004.

ES.4.1 Impacts on the North Atlantic Right Whale

Alternative 1 would have significant, direct, long-term, negative effects on the right whale population and recovery. Alternative 2 would have minor, direct, long-term, positive effects on the right whale population. Alternative 3 would have direct, long-term positive effects on the right whale population. As Alternative 3 proposes speed restrictions as a stand alone measure, a 10-knot speed restriction would be more effective at reducing the severity and occurrence of ship strikes, and helping the right whale population recover than a 12- or 14-knot speed restriction. Alternative 4 would have direct, long-term, positive effects on right whales in the NEUS and SEUS, although it offers no protection in the MAUS, therefore the overall effects are minor. Alternative 5 would have significant, direct, long-term, positive effects on the right whale population; this alternative provides the highest level of protection to the population. Alternative 6 would also have major, direct, long-term, positive effects on the population.

ES.4.2 Impacts on Other Marine Species

Alternative 1 would have indirect, long-term, adverse effects on marine mammals and sea turtles. Alternative 2 would have no significant effects on marine mammals and sea turtles. Alternative 3 would have minor, indirect, long-term, positive effects on marine mammals and sea turtles that occur in the designated areas with speed restrictions. Alternative 4 would potentially result in minor, indirect, long-term, positive effects on marine mammals and sea turtles, depending on their distribution. Alternative 5 would have major, indirect, long-term, positive impacts on other marine mammals, although sea turtles would benefit slightly less. Alternative 6 would also have indirect, long-term, positive effects on marine mammals and sea turtles.

ES.4.3 Impacts on the Physical Environment

Alternative 1 would not affect bathymetry and substrate, water quality, air quality, or ocean noise levels. Alternatives 2–6 would not affect bathymetry and substrate. Alternative 2 would have negligible effects on water quality, and minor, direct positive impacts on air quality and ocean noise. Under Alternative 3, there would be a negligible effect on water quality, direct, short-term positive impacts on air quality, and potentially direct, short- and long-term positive impacts on ocean noise levels. Alternative 4 would have negligible or minor adverse effects on water quality, no significant effects on air quality, and potentially minor, direct, short-term, adverse effects on ocean noise levels. Alternative 5 would have negligible or minor adverse effects on water quality, minor, direct, long-term, positive effects on air quality, and potentially minimal, direct, long-term, positive effects on ocean noise. Alternative 6 would have negligible impacts on water quality in the NEUS and minor adverse impacts in the SEUS, and minor, direct, long-term positive effects on both air quality and ocean noise.

ES.4.4 Impacts on Port Areas and Vessel Operations

Alternative 1 would not affect port areas and vessel operations. The following adverse impacts refer to additional operating costs resulting from speed restrictions and/or routing measures. Alternative 2 would result in an estimated direct economic impact of $17 million with a 10-knot speed restriction, $10.8 million at 12 knots, and $6.5 million at 14 knots. Alternative 3 would result in an estimated total (includes both direct and indirect impacts) economic impact of $237 million at 10 knots, $143.3 million at 12 knots, and $77.3 at 14 knots. Alternative 4 would result in a direct economic impact of $1.1 million. The actual speed limit is not relevant in Alternative 4 as there are no speed restrictions proposed in this Alternative. Alternative 5 would result in an estimated total economic impact of $260.4 million at 10 knots, $155.2 million at 12 knots, and $88.7 at 14 knots. Alternative 6 would result in an estimated total economic impact of $107.4 million at 10 knots, $56.4 million at 12 knots, and $30.2 million at 14 knots.

To determine whether these increased shipping costs would significantly affect the price and volume of traded goods via East Coast ports, the estimated economic impact was calculated relative to the value of East Coast Trade. For example, at 12 knots, Alternative 2 represents 0.003 percent of trade value, Alternatives 3 and 5 represent 0.020 percent, Alternative 4 has no impact on trade value, and Alternative 6 represents 0.012 percent of trade value. These results indicate that implementation of the proposed operational measures would not have a measurable impact on the volume of merchandise traded through East Coast ports.

Ocean freight costs are considered a conservative proxy for shipping industry revenues, and thus can help assess the significance of the abovementioned costs on the shipping industry. For example, at 12 knots, Alternative 2 represents 0.063 percent of ocean freight costs, Alternative 3 represents 0.370 percent, Alternative 4 represents 0.006 percent, Alternative 5 represents 0.383 percent, and Alternative 6 represents 0.221 percent. These results indicate that implementation of the proposed operational measures would have an insignificant impact on the financial revenues and hence the financial performance of the vessel operators calling at East Coast ports.

ES.4.5 Impacts on Commercial Fishing Vessels

There would be no impacts on commercial fishing vessels under Alternative 1. There would be negligible adverse impacts on commercial fishing vessels under Alternative 2 at any of the speed restrictions. Alternative 3 would not affect vessels at a 12- or 14- knot speed restriction; however, the economic impact at a 10-knot speed restriction is estimated at $0.9 million. Alternative 4 would result in negligible impacts on commercial fishing vessels at all three speed restrictions. Alternative 5 would result in the same impacts as Alternative 3. Alternative 6 would not affect vessels at a 12- or 14- knot speed restriction; however, the economic impact at a 10-knot speed restriction is $1.0 million. Considering the largest potential economic impact of $1.0 million is approximately two-tenths of one percent of the East Coast commercial fishery landings in 2003, implementation of the proposed operational measures would not have significant adverse impacts on the commercial fishing industry.

ES.4.6 Impacts on Ferry Vessels

The vast majority of passenger ferry vessels sail within inland waters that are not covered by the operational measures and thus would not be affected. Among the vessels that are affected, specifically those that operate in southern New England, impacts will vary depending on whether the companies utilize fast ferry services (24-39 knots) or regular ferry service (12-16 knots). The No Action Alternative would not affect ferry vessel operations. There would be direct, long-term, adverse impacts on ferry vessels under Alternative 2, in the amount of $5.1 million at 10 knots, $4.1 million at 12 knots, and $3.2 million at 14 knots. Alternative 3 would result in direct, long-term, adverse economic impacts in the amount of $6.5 million at 10 knots, $5.5 million at 12 knots, and $4.1 at 14 knots. Alternative 4 would not affect ferry vessels. Alternative 5 would result in the same impacts as Alternative 3. There would be direct, long-term, adverse economic impacts on ferry vessels under Alternative 6, in the amount of $5.6 million at 10 knots, $4.6 million at 12 knots, and $3.6 million at 14 knots.

ES.4.7 Impacts on Whale Watching Vessels

The majority of whale watching vessels are 65 feet and longer and would be affected, although impacts vary according to whether the operations deploy high-speed (25-38) or regular-speed vessels (16-20). Alternative 1 would not affect whale watching vessels. Alternative 2 would result in direct, long-term, adverse economic impacts of $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.5 million at 14 knots. Alternative 3 has a larger direct, long-term, adverse economic impact with an estimated $2.8 million at 10 knots, $1.6 million at 12 knots, and $0.9 million at 14 knots. There would be no impacts under Alternative 4. Alternative 5 has the same impacts as Alternative 3. Alternative 6 would have direct, long-term, adverse economic impacts, estimated at $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.5 million at 14 knots.

ES.4.8 Impacts on Charter Vessels

There would be no impacts to charter vessel operations under Alternatives 1, 2, and 4. Alternatives 3 and 5 would result in minor, direct, long-term, adverse impacts on charter vessels, estimated at $1.1 million at 10 knots, $600,000 at 12 knots, and $200,000 at 14 knots. Alternative 6 would have a slightly larger direct, long-term, adverse economic impact at $1.2 million at 10 knots, $720,000 at 12 knots, and $240,000 at 14 knots. For headboats more than 65 feet, these costs result from an increase in roundtrip steaming time. However, these impacts could be reduced if a charter company has multiple boats, and utilizes a vessel under 65 feet or if the captain changes course to fish at an alternate site that may not have speed restrictions.

ES.4.9 Impacts on Environmental Justice

Although ten of the 26 port areas analyzed in this EIS could be considered environmental justice communities, the economic impacts in these areas would not disproportionately affect minority or low-income populations. Rather, the impacts would be distributed throughout the entire region or local economy. There would be no impacts on environmental justice communities under

Alternative 1. Alternatives 2, 3, 4, 5, and 6 would not disproportionately affect low-income or minority populations.

ES.4.10 Impacts on Cultural Resources

No cultural resources have been identified on the ocean surface in waters that would be affected by the operational measures. Therefore, there are no impacts on cultural resources under any of the alternatives.

ES.5 Areas of Controversy

NMFS has provided many opportunities for public involvement and comments on the development of the proposed rulemaking and DEIS. One of the objectives of the proposed measures is to reduce serious injury and deaths of right whales from ship strikes while not posing an undue economic burden on the maritime industry. NMFS has incorporated elements of the public comments and recommendations into the DEIS to balance both industry and environmental perspectives. For this reason, many of the alternatives described in the notice of intent (NOI) to prepare a DEIS differ from the alternatives in this DEIS. The major areas of controversy are:

- **Speed Restrictions.** The public commented on the basis of the speed restriction and in general was concerned that the speed restrictions may not effectively reduce the occurrence and severity of ship strikes. Environmental stakeholders generally felt that 10 knots would be the most effective, but 12 knots would also reduce ship strikes. Industry stakeholders generally preferred less stringent speed restrictions, if any, and would rather have routing measures implemented. In order to show the entire range of impacts, this DEIS analyzes 10, 12, and 14 knots.
- NOAA proposed a 10-knot speed restriction in the proposed rule, although the agency is also requesting comments on 12 and 14 knots. The proposed speed restriction of 10 knots is based on historical and recent research that indicates that 10 knots is the optimal speed limit in the range considered for right whale recovery.
- **Federal Vessels.** The majority of Federal agencies supported the exemption of Federal vessels, whereas other stakeholders, from both industry and environmental groups, suggested that the operational measures apply to all vessels, unless the Federal vessels were operating under mitigation measures from a Section 7 consultation.
- The proposed regulations would not apply to vessels owned or operated by, or under contract to, Federal agencies. This exemption would also extend to foreign sovereign vessels engaging in joint exercises with the US Department of the Navy. NMFS believes that the national security, navigational, and human safety missions of some agencies may be compromised by mandatory vessel speed restrictions. However, this exemption would not relieve Federal agencies of their obligations under the ESA, including Section 7. NMFS will be reviewing the federal actions involving vessel operations to determine where ESA Section 7 consultations would be appropriate. NMFS also requests all Federal agencies to voluntarily observe the conditions of the proposed regulations when and where their missions are not compromised.

This Page Intentionally Left Blank

Environmental Impact Statement to Implement the Operational Measures of the North Atlantic Right Whale Ship Strike Reduction Strategy

Contents

Chapter **Page**

Contents

Chapter **Page**

Contents

Contents

Chapter **Page**

Contents

Chapter **Page**

Contents

Contents

Chapter **Page**

Contents

Contents

Chapter **Page**

Tables

Page

Data Charts

Page

Data Charts

Page

Figures

Follows Page

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AIS	Automated Identification System
ALWTRP	Atlantic Large Whale Take Reduction Plan
ALWTRT	Atlantic Large Whale Take Reduction Team
ANPR	Advanced Notice of Proposed Rulemaking
ATBA	Area to be Avoided
BO	Biological Opinion
CEA	Cumulative Effects Analysis
CEQ	Council on Environmental Quality
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CHPT	Cherry Point
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAM	Dynamic Area Management
DEIS	Draft Environmental Impact Statement
DMA	Dynamic Management Area
DoD	Department of Defense
DoN	Department of the Navy
DTAG	Digital Acoustic Recording Tag
DWT	Dead Weight Tons
EA	Environmental assessment
EBRV	Energy Bridge Regasification Vessel
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental impact statement
ENC	Electronic Navigational Charts
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EWS	Early Warning System
FACSFAC	Fleet Area Control and Surveillance Facility
VACAPES	Virginia Capes
FERC	Federal Energy Regulatory Commission
FRFA	Final Regulatory Flexibility Analysis
FONSI	Finding of No Significant Impact
FR	*Federal Register*
ft	Foot (feet)
GIS	Geographic Information Systems
GoMOOS	Gulf of Maine Ocean Observing System
GRT	Gross registered tons
GSC	Great South Channel

Acronym	Definition
HAB	Harmful Algal Bloom
HITS	Historical Temporal Shipping database
HRMA	Hampton Roads Maritime Association
Hz	Hertz
IMO	International Maritime Organization
IRFA	Initial Regulatory Flexibility Analysis
ISPS	International Ship and Port Security
IUCN	World Conservation Union
JAX	Jacksonville
km	Kilometer(s)
LFA	Low Frequency Active [Sonar]
LNG	Liquefied Natural Gas
LOA	Length overall
M	Meter(s)
m/m	mass per unit mass
MARPOL	International Convention on Marine Pollution
MARAD	Maritime Administration
MAUS	Mid-Atlantic region of the United States
MMS	Mineral Management Service
MSA	Metropolitan Statistical Area
MSRS	Mandatory Ship Reporting System
NAO	North Atlantic Oscillation
NAICS	North American Industry Classification System Codes
NEAQS	New England Air Quality Study
NEPA	National Environmental Policy Act
NEUS	Northeastern United States
NHPA	National Historic Preservation Act
Nm	Nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register for Historic Places
NSF	National Science Foundation
NWS	National Weather Service
OEIS	Overseas Environmental Impact Statement
OPAREA	Operating Area
OSP	Optimum Sustainable Population
PARS	Port Access Routes Study
PBR	Potential Biological Removal level
PCBs	Polychlorinated biphenyls
PCCS	Provincetown Center for Coastal Studies
PM	Particulate Matter
ppb	Parts per billion
ppm	Parts per million

Acronym	Definition
PSP	Paralytic Shellfish Poisoning
PTS	Permanent Threshold Shift
PWSA	Ports and Waterways Safety Act
RIR/RIA	Regulatory Impact Review/Regulatory Impact Assessment
RFA	Regulatory Flexibility Act
RNA	Regulated Navigation Area
SAM	Seasonal Area Management
SAG	Surface Active Group
SAR	Stock Assessment Report
SAS	Sighting Advisory System
SBA	Small Business Administration
SBNMS	Stellwagen Bank National Marine Sanctuary
SED	Shipper’s Export Declarations
SEUS	Southeastern United States
SHPO	State Historic Preservation Office
SINKEX	Sinking Exercises
SMA	Seasonal Management Area
SOLAS	International Convention on the Safety of Life at Sea
SPUE	Sightings Per Unit Effort
sq	Squared
SRV	Shuttle Regasification Vessel
SST	Sea Surface Temperature
SURTASS	Surveillance Towed Array Sensor System
TARFOX	Tropospheric Aerosol Radiative Forcing Observational Experiment
TBT	Tributylin
TRT	Take Reduction Team
TSS	Traffic Separation Scheme
TTS	Temporary Threshold Shift
USACE	United States Army Corps of Engineers
U.S.	United States
USC	United States Code
USCG	United States Coast Guard
VACAPES	Virginia Capes
VAST/IMPASS	Virtual At-Sea Training/Integrated Maritime Portable Acoustic Scoring & Simulator
VSRP	Voluntary Speed Reduction Program
VTS	Vessel Traffic Service
VTSS	Vessel Traffic Separation Scheme
WTG	Wind Turbine Generator

This Page Intentionally Left Blank

1 PURPOSE AND NEED

Introduction

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) proposes to implement the *North Atlantic Right Whale Ship Strike Reduction Strategy* (Strategy), to reduce ship strikes of North Atlantic right whales, an endangered species under the Endangered Species Act (ESA). North Atlantic right whales are also considered depleted under the Marine Mammal Protection Act (MMPA). This draft environmental impact statement (DEIS) analyzes the potential environmental impacts of implementing the *operational measures* component of the Strategy (the Strategy includes other components that are not addressed in this DEIS). Except when specifically stated otherwise, when Strategy is referred to throughout this DEIS, it is in reference to the operational measures to reduce ship strikes only. This EIS has been prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality's Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the NOAA environmental review procedures (NOAA Administrative Order 216-6) (NOAA, 1999).

1.1 Background

The North Atlantic right whale (*Eubalaena glacialis*), whose habitat extends from waters off the coasts of southern Canada to northern Florida, is a critically endangered large whale species. This species was overharvested by aboriginal and commercial whaling operations during the 16th to 18th centuries. Right whales were easy targets because they are slow swimmers and their high body fat content causes them to float after death. Hence their English name: they were the "right" whale to hunt.

Right Whales

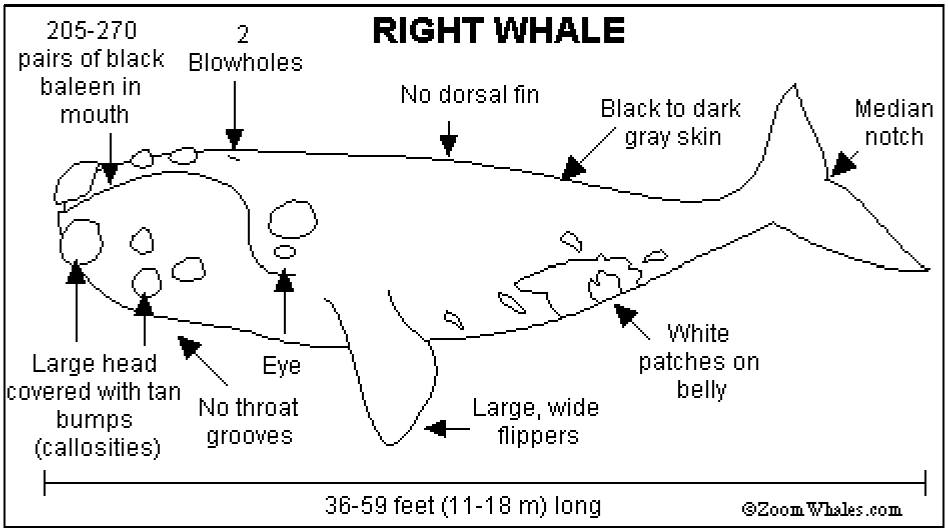
Right whales are found in three general regions: the North Atlantic, the North Pacific, and the Southern Hemisphere.

The **North Pacific right whale** (*Eubalaena japonica*) was considered until recently to be the same species as the North Atlantic right whale. Although genetic studies now provide evidence that they are in fact a different species, the ESA still combines them into one species, the Northern right whale.

The **Southern right whale** (*Eubalaena australis*) is a distinct species of right whale that occurs only in the Southern Hemisphere off the coasts of South America, Australia, New Zealand, and South Africa. It is a larger population than the North Atlantic right whale (estimated at over 10,000 animals with a 7.2 percent annual growth rate [Best *et al.*, 2001]), but remains classified as vulnerable by the World Conservation Union (IUCN) and listed under Australia's endangered species legislation.

Additionally, there are two distinct populations of **North Atlantic right whales** (*Eubalaena glacialis*): the eastern population, once found from northern Europe to the northwest coast of Africa, and now appears to be nearly extinct; and the western population. Unless otherwise specified, **all references to "right whales" in this EIS are to the western North Atlantic right whale**.

Right whales belong to the family of baleen whales, also referred to as mysticetes (Suborder *Mysticeti*). Adults are generally between 45 and 55 feet (ft) (14 and 17 meters [m]) long and can weigh up to 70 tons, with females being somewhat larger than males. Calves are 18 to 20 ft (5.5 to 6 m) long at birth. Distinguishing features for right whales include a stocky body, a generally black coloration (although some individuals have white patches on their undersides), a lack of a dorsal fin, a large head (about one-quarter of the body length), a strongly bowed margin of the lower lip, and callosities (raised patches of roughened skin) about the head. Two rows of long (up to 8 ft [2.4 m] long), dark baleen plates hang from the upper jaw, with an average of 225 plates on each side. The tail is broad, deeply notched, and all black with a smooth trailing edge.[1]



1.1.1 Right Whale Population Status

International protection for the right whale began in 1935 when the Convention for the Regulation of Whaling placed a ban on commercial whaling. Prior to the whaling ban, and primarily in the 16th, 17th, and 18th centuries, right whales were severely overharvested. The North Atlantic right whale has been listed as endangered under the ESA since the passage of the act in 1973. Despite protective measures, right whale populations in the Northern Hemisphere continue to be depleted and show no signs of recovering. The best estimate of the size of the North Atlantic right whale population is 300 to 350 animals. Recent models indicate that this population is likely declining rather than remaining static or increasing (Caswell *et al.*, 1999). While the life span of the right whale is relatively long and complete extinction is unlikely in the immediate future, studies have shown that if current conditions continue (i.e. high death rates due to human activities), extinction is probable in less than 200 years (Caswell *et al.*, 1999; Fujiwara and Caswell, 2001).

Today, the right whale population is sufficiently fragile that the premature death of a single mature female could make recovery of the species untenable (for biological reasons, the number of reproductive-age females is more essential to a species' ability to maintain itself or grow than the number of males). Because the primary causes of premature mortality among right whales are anthropogenic, mainly due to ship strikes and fishing gear entanglement, any recovery of the

[1] www.nmfs.noaa.gov/pr/species/mammals/cetaceans/right_whales.doc

right whale population is contingent upon reducing the effects of human activities on the species, in addition to maintaining optimal habitat conditions. These threats are reflected in the recent increase in known anthropogenic mortality and serious injury; from 1999 to 2003, this number has increased from 2.0 right whales per year to 3.2 (NMFS, 2005f).

Sixty-six known right whale deaths have occurred from 1970 to (May) 2005; this number is a minimum as additional deaths are undetected. Of these, 17 (26 percent) have occurred since 2000, suggesting an increase in the frequency of such occurrences. The increase may also be attributable to increased awareness, and increased survey effort and detectability, suggesting the death rate may have been high for some time and further indicating the rate is not sustainable. In the 16-month period from January 2004 to May 2005, there have been eight confirmed right whale deaths (Kraus *et al.*, 2005). Three (possibly four) of these eight deaths were caused by ship strikes and one by fishing gear. The cause of the other deaths is unknown at this time. Six of the eight whales were adult females, and three of the females were carrying near-term fetuses (Kraus *et al.*, 2005). Four were attaining sexual maturity and therefore beginning a period to bear calves. Since the average lifetime calf production of a female right whale is 5.25 calves, the deaths of four females represent a lost reproductive potential of as many as 21 animals (Kraus *et al.*, 2005).

The premature right whale mortality over the last two decades well exceeded the NMFS potential biological removal (PBR) level for the species. The PBR level is the maximum number of individuals that can be removed from a marine mammal population by nonnatural mortality while still allowing that population to reach or maintain its optimum sustainable population (OSP).[2] NMFS develops PBR levels to assess the effects on a population of nonnatural mortalities. NMFS estimates that the North Atlantic right whale population is well below the OSP. Therefore, the PBR for the species has been set to zero, meaning that any mortality or serious injury is significant. Again, these are known deaths; others may go undetected.

1.1.2 Anthropogenic Causes of Right Whale Injury and Mortality

1.1.2.1 Ship Strikes

Ship strikes are responsible for the majority of human-caused right whale mortalities (Jensen and Silber, 2003; Knowlton and Kraus, 2001; NMFS, 2005b). As such, ship strikes are a primary cause of the lack of recovery of the species. In waters off the United States and Canadian East Coast, several major shipping corridors overlap with, or are adjacent to, right whale habitat and migratory corridors, and pose a grave threat to these animals. Presumably, right whales are either unable to detect approaching vessels or ignore them if they are involved in important activities such as feeding, nursing, or mating. On the other hand, given the density of ships and the distribution of right whales, overlap is nearly inevitable thereby increasing the probability of a collision, even if one entity or the other is actively avoiding a collision. Additionally, right whales are very buoyant and slow swimmers, which may make it difficult for them to avoid oncoming vessels even if they are aware of a vessel's approach.

[2] The term "optimum sustainable population" means, with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element [16 U.S.C. § 1362 (9)].

NMFS published a database in 2003 of all known ship strikes to large whales worldwide. Because not all ship strikes are documented, available data likely underestimate the actual number. Based on a recent estimate of the mortality rate and records of ship strikes, scientists estimate that less than a quarter (17 percent) of ship strikes are actually detected (Kraus *et al*., 2005). Collisions occur off almost every US coastal state, but strikes are most common along the East Coast. More than half (56 percent) of the recorded ship strikes from 1975 to 2002 occurred off the coasts of Northeast United States and Canada, while the mid-Atlantic and Southeast areas each accounted for 22 percent (Jensen and Silber, 2003). Records from Knowlton and Kraus (2001) show similar results; of 15 confirmed ship strikes in the western North Atlantic (including Canada) from 1970 to 1999, nine (60 percent) occurred in the Northeast, and three (20 percent) occurred in both the mid-Atlantic and Southeast.

Records of deaths from 1970 to 1999 indicate that ship strikes are responsible for over one-third (16 out of 45, or 35.5 percent) of all "confirmed" right whale mortalities (a "confirmed" mortality is one observed under specific conditions defined by NMFS).[3] Of the remaining "confirmed" mortalities, three (6.7 percent) were due to entanglement in fishing gear; 13 (28.9 percent) were neonate deaths, and another 13 (28.9 percent) were deaths of noncalf animals from unknown causes (Knowlton and Kraus, 2001). Based on criteria developed by Knowlton and Kraus (2001), 56 additional ("unconfirmed") serious injuries and mortalities from entanglement or ship strikes were found to have occurred between 1970 and 1999: 25 (44.6 percent) from ship strikes and 31 (55.4 percent) from entanglement. Of these, 19 were fatal interactions (16 ship strikes, three entanglements); 10 possibly fatal (two ship strikes, eight entanglements); and 27 nonfatal (seven ship strikes, 20 entanglements) (Knowlton and Kraus, 2001).

Another study conducted over a similar period, 1970 to 2002, examined 30 (18 adults and juveniles, and 12 calves) out of 54 reported right whale mortalities from Florida to Canada (Moore *et al.*, 2004). Human interaction (ship strike or gear entanglement) was evident in 14 of the 18 adults examined, and trauma, presumably from vessel collision, was apparent in 10 out of 14 cases. Trauma was also present in four out of 12 calves, although the cause of death was more difficult to determine in these cases. In 14 cases, the assumed cause of death was vessel collision, and an additional four deaths were attributed to entanglement. The cause of death was undetermined in the other 12 cases (Moore *et al.*, 2004).

A NMFS reference document on mortality and serious injury determinations for large whales contains 50 reports of right whale events from 1999 to 2003 (Cole *et al.*, 2005). During this period there were five right whale mortalities and no serious injuries from ship strikes, while entanglements resulted in three right whale mortalities and seven reports of serious injury. Over this five-year period, there were 18 verified right whale mortalities, of which 27.8 percent resulted from ship strikes and 16.7 percent resulted from entanglement (Cole *et al.*, 2005).

Many types and sizes of vessels have been involved in ship strikes, including container/cargo ships/freighters, tankers, steamships, US Coast Guard (USCG) vessels, US Navy vessels, cruise ships, ferries, recreational vessels, fishing vessels, whale watching vessels, and other vessels (Jensen and Silber, 2003). Vessel speed (if recorded) at the time of a large whale collision has

[3] There are four main criteria used to determine whether serious injury or mortality resulted from ship strikes: (1) Propeller cut(s) or gashes which are more than approximately 8 cm in depth, (2) Evidence of bone breakage which was determined to have occurred premortem, (3) Evidence of haematoma or haemorrahaging, (4) Ship-struck animal appeared in poor health (Knowlton and Kraus, 2001).

ranged from 2 to 51 knots (Jensen and Silber, 2003). Vessels can be damaged during ship strikes; of the 13 records that include vessel damage, all of these vessels were traveling at least 10 knots (Jensen and Silber, 2003). (Occasionally, collisions with large whales have even harmed or killed humans on board the vessel.) A summary paper on ship collisions and whales by Laist *et al.* (2001), reported that of 28 recorded collisions causing lethal or severe injuries, 89 percent involved vessels traveling at 14 knots or faster and the remaining 11 percent involved vessels traveling at 10 to 14 knots. None occurred at speeds below 10 knots, although there is a predicted 45 percent chance of death or serious injury at 10 knots (Pace and Silber, 2005).

1.1.2.2 Fishing Gear Entanglement

Entanglement in fishing gear is another common anthropogenic cause of right whale mortality and serious injury. Because right whale occurrence can overlap with frequented fishing areas, gear entanglements are frequent and can cause death by drowning or serious injuries such as lacerations, which in turn can lead to severe infections. Most right whale entanglements appear to be with gillnets, lobster pots, crab pots, seines, fish weirs, and aquaculture equipment (NMFS, 2005a). Where right whales are feeding, entanglements in the mouth are common. Entanglements of juveniles are particularly dangerous because restrictions and infections can increase as the whale grows.

According to the 2003 Stock Assessment Report, 60 percent of right whale mortalities or serious injuries reported from 1997 to 2001 resulted from entanglements or fishery interactions (NMFS, 2003b). This number increased to approximately 69 percent from 1999 through 2003 (NMFS, 2005f). In January 1997, two lobster pot fisheries (the Gulf of Maine and the US mid-Atlantic) were reclassified from Category III to Category I fishery based on the number of large whales entangled by lobster pot gear. A fishery qualifies as a Category I if the annual mortality and serious injury of a marine mammal stock in that fishery is greater than or equal to 50 percent of the PBR level, whereas a Category III fishery is a fishery where the annual mortality and serious injury is less than or equal to 1 percent of the PBR level (16 U.S.C. § 1387).

Although entanglements do not always result in death or serious injury, they pose a serious threat to North Atlantic right whales. Analysis of the North Atlantic Right Whale Catalog[4] indicates that 61.6 percent of the overall population shows physical evidence of entanglements, such as scars, and between 10 and 28 percent experience entanglements each year (Hamilton *et al.*, 1998b from NMFS, 2003b; Knowlton *et al.*, 2001).

1.1.2.3 Other Anthropogenic Causes of Whale Mortality

Several other human activities may affect the health and survival of the right whale, although these have not been documented. The most notable are:

- Habitat destruction, which includes military activities, undersea mining exploration and development, dredging and associated disposal of dredged materials, and oil, and gas exploration (Perry *et al*., 1999).
- Pollution, which occurs in the forms of dredging, ocean dumping and disposal, and noise. Some contaminants dumped into the ocean affect right whales indirectly through their food supply (Perry *et al*., 1999).

[4] The Right Whale Catalog is a database of whale sightings and photos maintained by the New England Aquarium.

- Chemical contaminants/endocrine disruptors, which can cause reduced fertility or reproductive failure (Reeves *et al*., 2000; Rolland *et al*., 2005).

1.2 NOAA's Current Right Whale Conservation Measures

To mitigate anthropogenic threats to the right whale population, NMFS currently implements various conservation measures.

1.2.1 Ship Strike Reduction Measures

Due to increasing concern in the 1990s over the disturbance to right whales caused by vessel approaches, NMFS issued an interim final rule in 1997 to reduce the disturbance and potential for a vessel collision caused by vessels transiting near whales. The rule states that it is illegal to knowingly approach a North Atlantic right whale within 500 yards (460 m) by vessel, aircraft, or any other means unless permitted by NMFS (50 CFR 222.32).

In addition to the vessel approach restrictions, NMFS has developed and implemented various programs to further reduce the potential for a vessel collision. NMFS also has several mechanisms in place to alert mariners of right whales' locations and help reduce ship strikes. The following sections describe these programs, research projects, and other conservation measures aimed towards reducing ship strikes.

1.2.1.1 Surveys

Systematic surveys from both aircraft and vessels are conducted to observe right whales in their migratory corridor and critical habitats to:

- Locate whales so mariners can be informed of their presence.
- Photograph individuals for identification and life history data collection.
- Document fishery or vessel interactions.
- Record ship traffic patterns or anomalies.
- Further quantify or refine distribution patterns, abundance estimates, etc.

Comprehensive surveys began in 1993 in the southeast Atlantic area (where it is known as the Right Whale Early Warning System) and in 1997 in the northeast Atlantic area (where it is known as the Right Whale Sighting Advisory System). The collected information is distributed through various means, including the Mandatory Ship Reporting Systems (MSRS).

1.2.1.2 Mandatory Ship Reporting System

In an effort to further raise mariner awareness of right whales and to disseminate information on the location of right whales and how to avoid them, NOAA designed the MSRS and prepared a proposal for the IMO. The US submitted the proposal to the IMO, and in December 1998, the IMO approved the proposal. Jointly funded by NOAA and the USCG, the MSRS began operations in July 1999, and these agencies continue to operate the program. The overall goals of MSRS are to:

- Alert mariners about right whale locations in two East Coast aggregation areas.
- Raise awareness about the whale's vulnerability to ship strikes.
- Obtain data on ship traffic volume and patterns from the incoming ship reports to aid in developing measures to reduce ship strikes.

When ships greater than 300 gross tons enter two key right whale habitats—one in waters off the northeastern US and one off the southeastern US—they are required to report to a shore-based station. Mariners report their ship location, speed, course, waypoints, and destination. In return, ships receive an automated message about right whales, their vulnerability to ship strikes, precautionary measures the ship can take to avoid hitting a whale, and locations of recent whale sightings. Mariners are advised to reduce speeds when near whales, in their critical habitat, or in conditions with poor visibility. The MSRS operates year-round in a predetermined area that includes Cape Cod Bay and in the Great South Channel and from November 15 to April 15 in waters off the Southeast US.

1.2.1.3 Charts and Publications

The National Ocean Service (NOS) routinely updates and publishes nautical charts with new or emerging navigational hazards, regulations, or requirements. Additionally, NOS publishes *Coast Pilots*, a series of regional references on navigation hazards, rules, and environmental conditions that ship captains of a certain vessel size class are expected to carry in US waters. NMFS routinely works with NOS to ensure this information is current. At the request of NMFS, NOS began including information for mariners on right whales. As a result, NOS' nautical charts and *Coast Pilots* contain information regarding right whale critical habitat, seasonal occurrence, MSRS, and regulations regarding approaching protected marine species. In 2005, updates to these navigational aids provided by NMFS included speed advisories, suggesting mariners proceed at 12 knots or less.

Additionally, National Geo-Spatial Intelligence (formerly National Imagery and Mapping Agency) began to include information at NOAA's request on right whales in its publications in 1998 and 1999 respectively, of *Notice to Mariners* and *Sailing Directions*. This information is updated annually.

1.2.1.4 Regional Recovery Plan Implementation Teams

Two recovery plan implementation teams (as provided for under the ESA) exist for the right whale, one in the US Southeast Atlantic region, and one in the US Northeast Atlantic region. In the past, these implementation teams focused on critical habitat areas, vessel strikes, and the take reduction process[5], as provided for under the MMPA. However, the Northeast Implementation Team was reorganized by NMFS in 2004, and now its focus is on ship strike reduction efforts. In the Southeast, the principal focus of the team is the collection and real-time dissemination of right whale sighting information to mariners through Navy, USCG, and US Army Corps of Engineers (USACE) collaborations. The Southeastern US Implementation Team has several ongoing efforts to protect right whales, including a geographic information system (GIS) subcommittee to analyze sightings, vessel traffic data, and environmental data to learn how to aid in reducing threats and enhancing recovery. This team also provided a contract for the

[5] The take reduction process is described in Section 1.2.2.

publication of the quarterly *Right Whale Newsletter*, until it recently changed hands to the Georgia Environmental Policy Institute.

1.2.1.5 Right Whale Grant Program for Research

Congressional funding for right whale research and management by NMFS began in 1986 and until recently, has generally increased each year. NMFS oversees and distributes a portion of this funding through a competitive grant program for right whale research. NMFS contributes funds to the recovery activities previously mentioned as well as for the following activities:

- Photo identification and sighting databases.
- VHF radio tracking and passive acoustic detection of vocalizing right whales.
- Detecting whales at sea.
- Predictive modeling.
- Habitat and zooplankton abundance monitoring.
- GIS analyses.

1.2.1.6 Ship Speed Advisories through NOAA-Based Communications

NOAA now issues ship speed advisories to help reduce ship strikes using NOAA-based communications (proposed in a July 26, 2005 internal NOAA decision memorandum). The National Weather Service (NWS) currently issues right whale advisories and speed advisories on NOAA weather radio when aggregations are sighted. Advisories are voluntary and apply to areas where right whale sightings have been confirmed. They indicate that neither navigational nor human safety is to be jeopardized as a result of reduced speeds. Speed advisories have also been integrated into NOAA publications.

As described in Section 1.2.1.3, the National Ocean Service's Office of Coast Survey publishes language on right whales in the US Coast Pilot series. These sections have been updated to include the proposed ship speed advisories. In addition, there is the possibility that real-time environmental data layers (including right whale advisories) could be incorporated into NOAA's Electronic Navigational Charts (ENCs).

1.2.1.7 Other Conservation Measures

NMFS also develops and implements education and outreach programs to raise mariner awareness about the right whale ship strike problem. NMFS and other organizations have produced a variety of materials to distribute to mariners, fishermen, shipping companies, cruise ships, and ports concerning right whales and ship strikes.

As provided in Section 7 of the ESA, NMFS has conducted several interagency consultations with other Federal agencies regarding fishing, dredging, and vessel operations in US waters. More consultations are expected as the threat of right whale ship strikes continues.

1.2.2 Fisheries Gear Entanglement Prevention Measures

The 1994 amendments to the MMPA required NMFS to establish teams comprised of stakeholder groups to determine ways to reduce serious injury and mortality of strategic stocks of marine mammals, including threatened or endangered species, that interact with category I or II fisheries (Section 1.1.2.2). The Take Reduction Team assists NMFS in developing a Take Reduction Plan. The immediate goal of the Take Reduction Plan is to reduce incidental mortality or serious injury to the marine mammal stock’s PBR level within six months of the plan’s implementation. The longer term goal is to reduce serious injuries and mortality to an insignificant level approaching a zero mortality and serious injury rate (NMFS, 2005b). As right whales are endangered, NMFS established a Take Reduction Team and Plan that includes right whales.

In August 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to design an Atlantic Large Whale Take Reduction Plan (ALWTRP) for North Atlantic right whales, humpback whales, fin whales, and minke whales affected by the southeastern US shark gillnet fishery, the Northeast/mid-Atlantic lobster trap/pot fishery, the mid-Atlantic coastal gillnet fishery, and the Northeast sink gillnet fishery. The ALWTRP was first put into effect in 1997 and has been modified several times since, most recently in August 2003. The ALWTRP includes gear restrictions, research recommendations, time and area closures, outreach and education recommendations, and a disentanglement program. The ALWTRT most recently met in April 2005. NMFS released a draft EIS to analyze alternatives for gear modification and improved time and area management in the ALWTRP in February 2005 (NMFS, 2004d). The proposed rule for these modifications to the ALWTRP published in the *Federal Register* in June 2005.

One measure contained in the ALWTRP is seasonal area management (SAM). SAM restrictions are in place to protect the predictable aggregations of right whales in waters off Cape Cod out to the Exclusive Economic Zone (EEZ) from entanglement in fishing gear. The western zone is in effect from March 1 to April 30, and the eastern zone is in effect from May 1 to July 31. The SAM program restricts the use of lobster trap/pot and gillnet gear. Such gear may only be used if it meets the requirements allowing it to be considered low risk gear as described in the ALWTRP.

In addition, dynamic area management (DAM) measures are in place in Cape Cod Bay and the Gulf of Maine to limit fishery interactions with right whales when whales are sighted at unanticipated times or in unanticipated locations. For example, a right whale aggregation off Provincetown resulted in fishing restrictions until the aggregation dispersed. Three or more right whales in an area (75 square nautical miles [nm^2]) is the density that results in DAM closures in that area to prevent right whale entanglements—a density equal to or greater than 0.04 right whales per nm^2 (NMFS, 2004g).

1.2.3 Other Conservation Measures

NMFS encourages research geared towards assessing the effects of habitat destruction and pollution on right whales. Other threats to the right whale population, including disease, loss of genetic diversity, and food availability, are accounted for through research and workshops. NOAA has also launched a collaborative effort to gather information and assess the impacts of shipping noise on all marine mammals. NMFS designated critical habitat for right whales in 1994, to further protect important feeding grounds in the Northeast and calving grounds in the Southeast. The specific locations of the critical habitat areas are discussed in Chapter 2.

1.3 Proposed North Atlantic Right Whale Ship Strike Reduction Strategy for Increased Protection of Right Whales

The conservation measures previously described have increased awareness of the endangered status of right whales and the threats of ship strikes, gear entanglement, and naturally occurring obstacles to recovery. However, they have failed to sufficiently reduce the occurrence of human-caused mortality among right whales. Therefore, while existing conservation programs will continue, NMFS proposes to more actively pursue the effort to reduce ship strikes. To this end, NMFS solicited comments on the *North Atlantic Right Whale Ship Strike Reduction Strategy* in an advanced notice of proposed rulemaking (ANPR) dated June 1, 2004 (69 FR 30857). The Strategy contains proactive measures to reduce the likelihood and threat of collisions between vessels and endangered North Atlantic right whales, primarily by proposing speed restrictions. It also aims to minimize the geographical overlap of shipping lanes and whale habitat to reduce the likelihood of ship strikes in a manner that minimizes adverse effects on the shipping industry and maritime commerce. The Strategy is customized for each region to accommodate for differences in (1) oceanography, (2) commercial ship traffic patterns, (3) navigational concerns, and (4) right whale migration patterns and behavior.

The Strategy is intended to supplement existing conservation plans and includes the following components:

- Continue ongoing research and conservation activities.
- Mariner education and outreach programs.
- Review the need for ESA Section 7 consultations with all Federal agencies that operate or authorize the use of vessels in waters inhabited by right whales, or whose actions directly or indirectly affect vessel traffic.
- Negotiate a Right Whale Conservation Agreement with the government of Canada.
- Establish new operational measures for commercial and recreational mariners, including consideration of routing and speed restrictions.

Only the last component (operational measures) is addressed in this EIS.

The three regions where implementation of the operational measures would occur are (from south to north):

1. The southeastern US (SEUS) Atlantic Coast region, bounded to the north by latitude 31º27’N, to the south by latitude 29º45’N, to the east by longitude 80º 51.6’W, and the west by the US shoreline (Figure 1-1, SEUS Proposed Regulatory Areas).
2. The mid-Atlantic US (MAUS) region, extending from the northernmost boundary of the SEUS to the southernmost boundary of the third region, the northeastern US Atlantic Coast, and 30 nautical miles (nm) (56 kilometers [km]) offshore (Figure 1-2, MAUS Proposed Regulatory Areas).
3. The northeastern US (NEUS) Atlantic Coast region, north and east of Block Island up to Canada (Figure 1-3, NEUS Proposed Regulatory Areas).

Southeastern U.S. (SEUS) Proposed Regulatory Measures

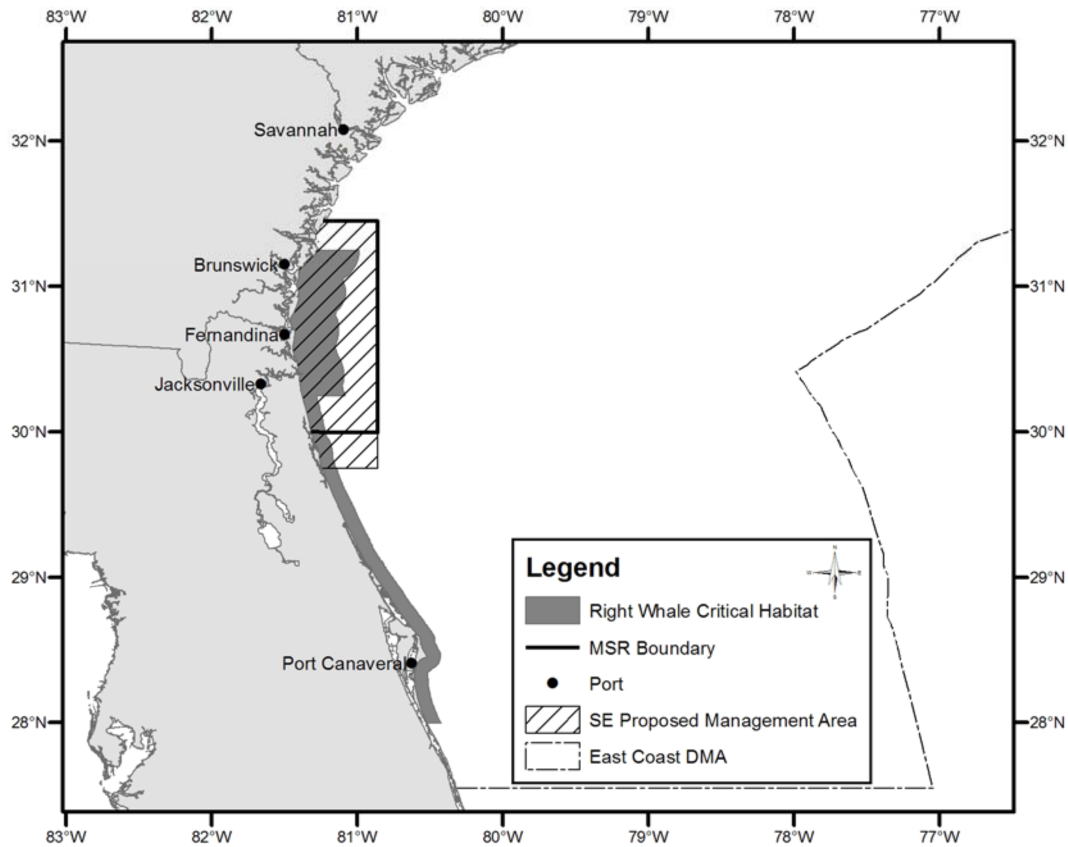


Figure 1-1

This Page Intentionally Left Blank

Mid-Atlantic U.S. (MAUS) Proposed Regulatory Areas

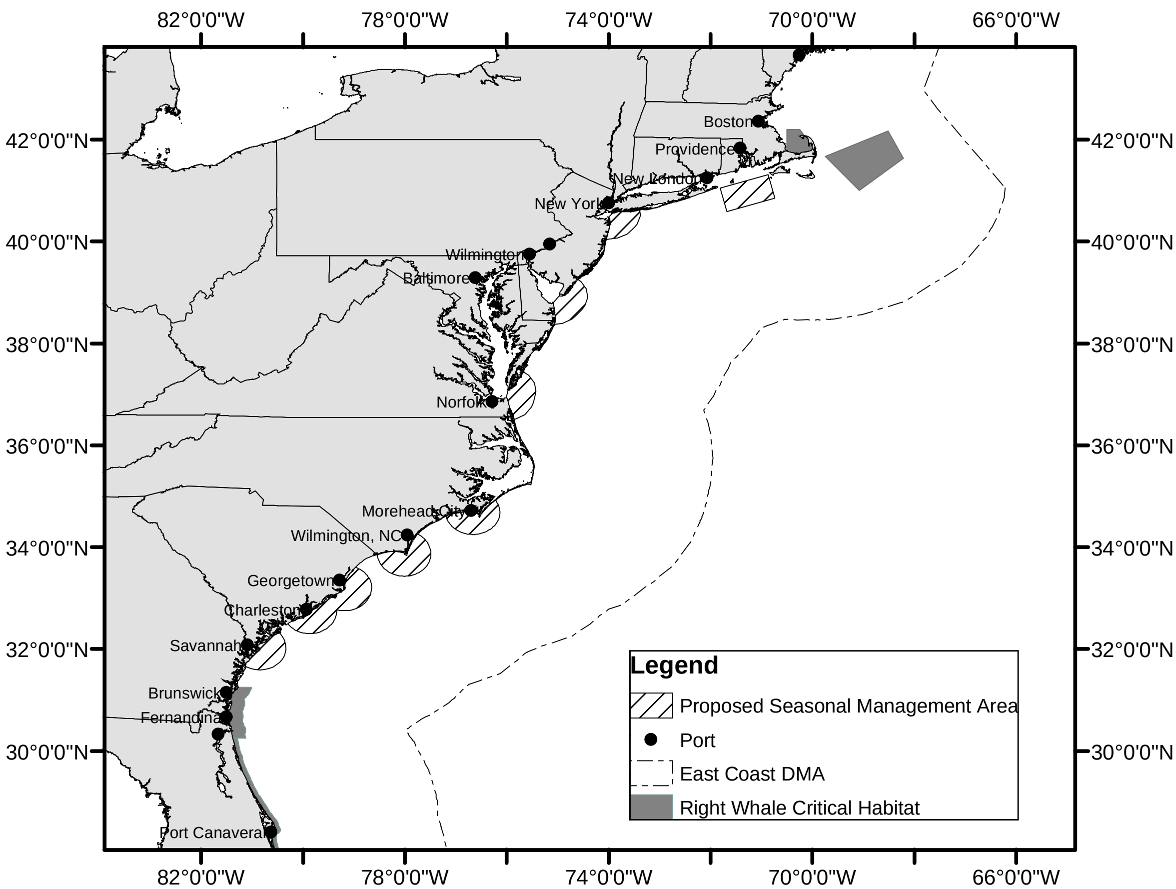


Figure 1-2

This Page Intentionally Left Blank

Northeastern U.S. (NEUS) Proposed Regulatory Measures

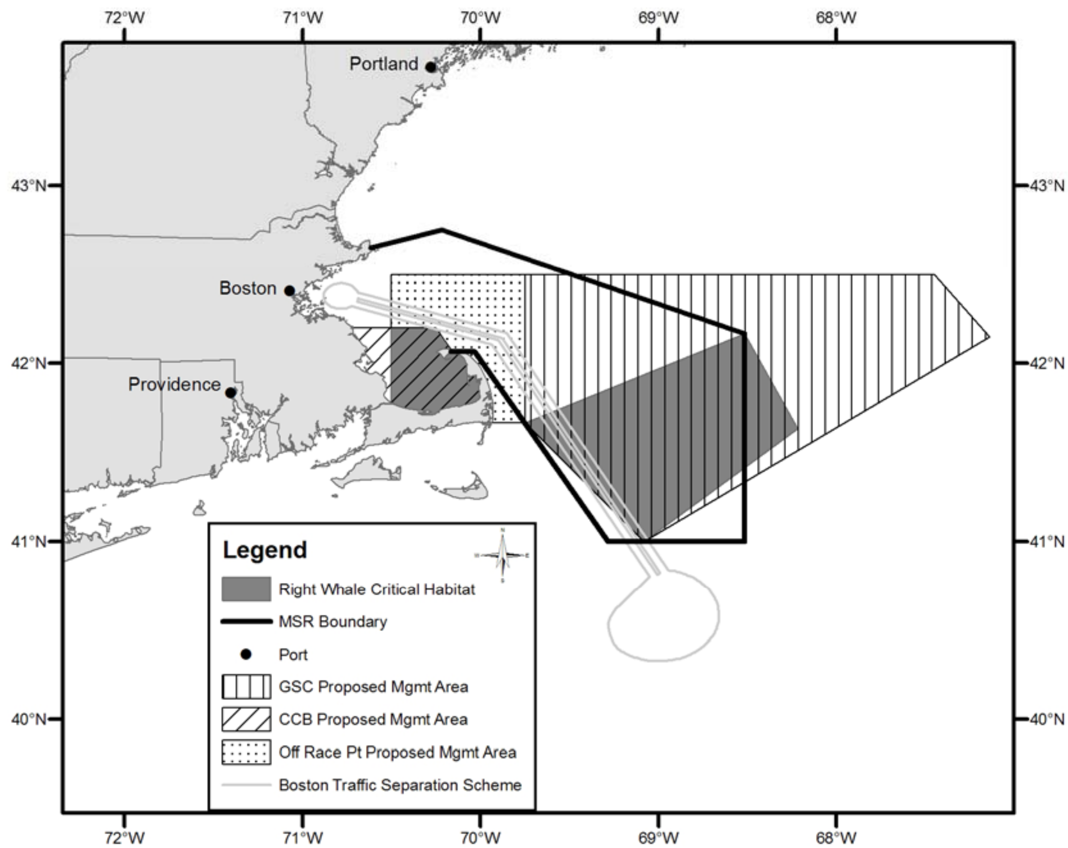


Figure 1-3

This Page Intentionally Left Blank

1.4 Proposed Operational Measures

The intention of the Strategy's proposed operational measures is to devise navigational regulations applicable to all vessels 65 ft (19.8 m) and greater in overall length and subject to the jurisdiction of the US, except for vessels owned or operated by, or under contract to the Federal government.[6] The measures also apply to all other vessels 65 ft (19.8 m) and greater in overall length entering or departing a port or place under the jurisdiction of the US.

Research on vessel collisions indicates that most severe and lethal injuries to whales resulting from ship strikes involved large ships. A recent synthesis showed that out of a total of 58[7] recorded ship collisions with a whale (all large whale species), 23 resulted in the death of the animal. Of these 23, at least 20 (87 percent) involved vessels longer than 262 ft (80 m). Also, out of 15 collisions where the whale was seriously injured, three were with vessels less than 65 ft (19.8 m), three with vessels between 65 and 262 ft (19.8 and 80 m), and the rest with longer vessels (Laist *et al*., 2001). However, the smallest vessel involved in a fatal collision with a right whale was an 82 ft (25 m) vessel (NMFS, 2004i). On this basis, NMFS determined that a length of 80 ft (24 m) would serve as the upper limit on the minimum vessel size to be included in the operational measures (NMFS, 2004i). After reviewing various regulatory requirements for vessels, NMFS found that the class of vessels that posed the highest risk of seriously injuring or killing a right whale was ships 65 ft (19.8 m) and longer (NMFS, 2004i). The 65 ft (19.8 m) threshold also corresponds to a well established criterion used in many USCG regulations, and one understood by mariners.

The proposed operational measures vary (mostly by specific times and affected areas) based on ship traffic patterns and locations of right whale habitat and migratory corridors in the three regions of implementation along the US East Coast. The proposed measures would include the following:

- **Seasonal Management Areas (SMAs).** SMAs are predetermined and established areas in each of the three regions, all with seasonal speed restrictions. In the SEUS, an SMA would be established off the coast of Georgia and Florida from November 15 to April 15. In the MAUS, SMAs would be established with a 30 nm (56 km) radius around nine ports in the region from November 1 to April 30. In the NEUS, SMAs would be established in Cape Cod Bay (January 1 – May 15), Off Race Point (March 1 – April 30), and Great South Channel (April 1 – July 31). At these locations (which are described in greater detail in Chapter 2) and during designated time frames only, vessels would be required to proceed through SMAs at a reduced speed (10, 12, or 14 knots). The seasonal nature of these restrictions would minimize unnecessary impact to industry (NMFS, 2004e).
- **Dynamic Management Areas (DMAs).** When a certain number of whales are sighted in an area outside of the boundaries of, or times when SMAs are implemented, NMFS is considering a scenario in which the agency would draw a circle with a radius of 2.8 nm (5.2 km) around the sighting. This radius expands incrementally with the number of whales sighted (e.g., 2.8 nm [5.2 km] for a single

[6] Vessels owned, operated by, or under contract to the United States Federal government are also referred to as sovereign vessels throughout the DEIS.
[7] Only 58 of the 292 records of ship strikes included the vessel speed at the time of the strike.

right whale, 3.9 nm [7.2 km] for two whales, 4.8 nm [8.9 km] for three whales, etc.). In addition, a larger circular zone will be designated that will extend an additional 15 nm (28 km), beyond the core area to allow for whale movement. Vessels would be required to transit through the area with extreme caution and at a reduced speed or route around the area. DMAs would apply in all US waters.

- **Routing Measures.** Such measures would apply to the NEUS and SEUS regions. In the NEUS region, routing measures are proposed in Cape Cod Bay to deflect major vessel traffic away from right whale aggregations. In the SEUS region, NMFS proposed routing measures into and out of the ports of Jacksonville and Fernandina Beach, Florida; and Brunswick, Georgia. Speed restrictions would be required in the portions of these recommended shipping routes located within a SMA. These recommended routes in the NEUS and SEUS were analyzed by the USCG with regard to navigational and environmental safety through a Port Access Routes Study (PARS). NMFS also intends to submit a proposal to the IMO for an Area To Be Avoided (ATBA) adjacent to, and east of, the Boston Traffic Separation Scheme (TSS). The US already submitted a proposal to the IMO for a narrowing of, and a 12-degree northern shift in the Boston TSS. All routing measures are nonregulatory operational measures.

All proposed measures include speed restrictions, as previously specified.

1.5 Purpose and Need for the Proposed Action

The proposed action analyzed in this EIS is implementation of the Strategy's operational measures. The purpose of the proposed action is to reduce the number and severity of vessel collisions with North Atlantic right whales, thereby contributing to the recovery and sustainability of the species while minimizing the effects on the shipping industry and maritime commerce.

NMFS has jurisdiction under both the ESA and the MMPA, to protect the endangered North Atlantic right whale. Although various measures to reduce ship strikes (described in Section 1.2.1) have been in place for several years, these measures have not significantly reduced the number of vessel collisions with right whales. A continued lack of recovery, and possible extinction, will occur if deaths from ship strike are not reduced. Therefore, additional measures are needed for NMFS to fulfill its responsibility. As mentioned earlier, ship strikes represent the majority of anthropogenic serious injuries and deaths to right whales. Therefore, NMFS is proposing to reduce this threat by taking the regulatory approach that is expected to be the most effective at helping the population to recover. The operational measures of the proposed Strategy would impose regulatory speed restrictions and nonregulatory routing measures on specific vessel classes to reduce the ship strike threat to right whales without imposing undue economic burdens on the shipping industry. The combination of speed restrictions and reducing the co-occurrence of right whales and vessel traffic is expected to be an effective means to reduce the number and severity of ship strikes and promote population growth and recovery.

1.6 Relevant Legislation

Federal rulemaking and implementation of Federal regulations must be consistent with a variety of relevant laws and regulations. The following sections provide a brief description of the principal environmental requirements relevant to the proposed operational measures to reduce right whale ship strikes. Both the MMPA and the ESA require NMFS to implement plans to conserve the North Atlantic right whale, as it is both a depleted marine mammal species and an endangered species. The MMPA and the ESA both prohibit the taking of North Atlantic right whales.

1.6.1 Endangered Species Act

The ESA provides broad protection for species and critical habitats of fish, wildlife, and plants that are listed as threatened or endangered. Under the ESA, it is generally unlawful for any person subject to the jurisdiction of the United States to "take" any such species within the United States or the high seas, unless authorized under specific provisions of the ESA. The ESA defines "take" as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct to species listed as threatened or endangered." [16 U.S.C. § 1532(19)]

Because the North Atlantic right whale is part of species listed as endangered by the ESA, NMFS is responsible for developing and implementing a recovery plan for the conservation and survival of the species. The recovery plan requires actions to assess and establish voluntary or mandatory measures to reduce the likelihood of ship/whale interactions. The operational measures proposed in the Strategy address these requirements. In 1991, NMFS completed a Final Recovery Plan for the Northern Right Whale (which included both the North Atlantic and Pacific right whales). This plan was most recently revised in 2005, and is now entitled, Recovery Plan for the North Atlantic Right Whale. Reduction of ship strikes is one of the top priorities identified in the Plan.

1.6.2 Marine Mammal Protection Act

The MMPA protects all marine mammals. Right whales are considered "depleted" under the MMPA because the population is below OSP (Section 1.1.1) and they are listed as endangered under the ESA. The MMPA, subject to limited exceptions, prohibits any person or vessel subject to the jurisdiction of the United States from "taking" marine mammals in the US or on the high seas without authorization. The term "taking" defined in the MMPA [16 U.S.C. § 1362(13)] as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The relevant definition of the term "harassment" in the context of this action means any act that:

- Has the potential to injure a marine mammal or marine mammal stock in the wild; or (Level A Harassment).
- Has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B Harassment).

Because the North Atlantic right whale is considered a depleted marine mammal species, the MMPA requires NMFS to provide a conservation plan designed to conserve and restore the species. NMFS will develop a conservation plan based on the most recent revision of the recovery plan discussed in the previous section.

1.6.3 Ports and Waterways Safety Act

The Ports and Waterways Safety Act of 1972 (PWSA) gives the USCG authority over vessel and port operations in order to promote vessel safety and protection of the marine environment. The act recognizes the need for advanced planning to ensure protective measures for the nation's ports and waterways and to continue consultations with other Federal agencies (33 U.S.C. § 1221). Section 1224 of the act gives the USCG authority over vessel traffic services (VTS) and related activities. It also gives the USCG authority to require specified navigation equipment and other electronic devices, to specify times of entry and departure, and to establish routing measures.

1.6.4 Regulatory Flexibility Act

According to the Regulatory Flexibility Act of 1980 (RFA), Federal agencies must consider the economic impacts their rules may have on small entities, including small businesses, organizations, and governmental jurisdictions. The agency must prepare an initial and final regulatory flexibility analysis (IRFA/FRFA), unless the agency can certify that the rule would not have "a significant economic impact on a substantial number of small entities." In an IRFA/FRFA, among other things, regulatory alternatives must be evaluated that achieve the objective of applicable statutes and might minimize negative economic impacts on small entities. However, the RFA does not require that the alternative with the least cost or the least impact on small entities be selected as the preferred alternative.

1.6.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) is designed to encourage and assist states in developing coastal management programs, to coordinate state activities, and to safeguard regional and national interests in the coastal zone. Section 307(c) of the CZMA and the implementing regulations (15 CFR 930) require that any Federal activity affecting the land or water uses, or natural resources of a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal zone management program.

1.7 Applicable Executive Orders

Several executive orders (EOs) are applicable to the proposed Strategy.

1.7.1 Executive Order 12898

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs all Federal agencies to incorporate environmental justice in achieving its mission. Each Federal agency is to accomplish this by conducting programs, policies, and activities that substantially affect human health or the environment in a manner that does not exclude communities from participation in, deny communities the benefits of, or subject communities to discrimination under such actions, because of their race, color, or national origin.

1.7.2 Executive Order 12866

EO 12866, *Regulatory Planning and Review*, requires Federal agencies to follow "a program to reform and make more efficient the regulatory process." During regulatory decision-making, Federal agencies are required to maximize net benefits after conducting quantitative and qualitative cost-benefit analyses, including the option of not regulating.

1.8 Plans, Policies, and Interagency Coordination

This section describes other relevant conservation activities, recovery plans, and other policies related to the Strategy and subsequent right whale recovery.

1.8.1 Right Whale Recovery Plan

The Final Recovery Plan for the Northern Right Whale (*Eubalaena glacialis*) was originally published by NMFS in December 1991. The revised Recovery Plan for the North Atlantic Right Whale was released in May 2005.

The ultimate goal of this recovery plan is to promote the recovery of North Atlantic right whales to a level sufficient to warrant their removal from the List of Endangered and Threatened Wildlife and Plants under the ESA. The intermediate goal is to reclassify the species from endangered to threatened. The most significant need for North Atlantic right whale recovery is to reduce or eliminate deaths and injuries from anthropogenic activities, namely shipping and commercial fishing operations. In addition, the development of demographically-based recovery criteria must be completed quickly. Secondary priorities for the species' recovery are characterization, monitoring, and protection of important habitat; and identification and monitoring of the status, trends, distribution and health of the species. Third priorities include conducting studies on the effects of other potential threats and ensuring that they are addressed, and conducting genetic studies to assess population structure and diversity. An overarching need is to work closely with state, other Federal, international and private entities to ensure that research and recovery efforts are coordinated (NMFS, 2005b).

1.8.2 Atlantic Large Whale Take Reduction Plan

The Northeast Regional Office of NMFS is proposing broad-based gear modifications to the ALWTRP (Section 1.2.2), which was developed pursuant to Section 118 of the MMPA to reduce serious injury and mortality of right, humpback, fin, and minke whales due to incidental interactions with commercial fisheries. The proposed rulemaking for these modifications was published in the *Federal Register* on June 21, 2005. An EIS is also being prepared on the modifications to the ALWTRP and was released to the public as a DEIS in February 2005. This section focuses on the differences between the ALWTRP EIS and this EIS.

This EIS and the underlying Strategy focus solely on right whales whereas the ALWTRP addresses humpback and fin whales as well. Fin whale mortalities from vessel collisions are greater than mortalities from gear entanglement and there are reports of vessel collisions with humpback whales. Although both these species are endangered, the *Ship Strike Reduction Strategy* specifically focuses on right whales because of their critically endangered status and because they have the highest occurrence of vessel strikes in recent years. Right whales also had the highest proportion of entanglements and ship strikes relative to the number of reports for a species (i.e., even though right whales had less reports than other species, there was still a high occurrence of incidents) (Cole *et al.*, 2005). In addition, while the Strategy focuses on the habitat and migratory corridor of right whales, there is an overlap with the habitats of other whales; thus these other species would indirectly benefit from the proposed Strategy.

1.8.3 ESA Section 7 Consultations

Under Section 7 of the ESA and implementing regulations, Federal agencies must consult with NMFS and/or FWS to ensure their actions will not jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat. Generally a Biological Opinion (BO) is issued when the action is likely to adversely affect a listed species. BOs include conservation recommendations, reasonable and prudent measures to mitigate the adverse effects, and terms and conditions with which the agency is required to comply.

NMFS Office of Protected Resources initiated Section 7 consultation on the operational measures of the Strategy, and a BO will be completed before the final rule is published in the *Federal Register.* As the Strategy is aimed towards reducing threats to the recovery of the right whale population, it is assumed that the BO will determine the actions would not jeopardize the continued existence of the right whale.

A summary of previous NMFS consultations conducted under Section 7 of the ESA involving right whales is provided in Appendix A. However, the EIS does not address the future review of Section 7 consultations with other Federal agencies that operate vessels in waters inhabited with right whales, as proposed in the Strategy as the EIS only evaluates the operational measures component of the Strategy. NMFS Office of Protected Resources has previously entered into Section 7 consultations with the Navy, USCG, and the USACE regarding right whale protection measures. BOs were issued following consultations with the USCG in 1995, 1996, and 1998, with the Navy in 1997, and with the USACE since the 1970s.

The 1995 USCG BO addressed the potential impacts of USCG vessel and aircraft operations off the North Atlantic shoreline. The BO concluded that the proposed activities may adversely affect, but were not likely to jeopardize, the continued existence of endangered and threatened species under NMFS jurisdiction. In 1996, the USCG reopened consultation on the same activities. NMFS concluded that these actions may affect, but were not likely to jeopardize, the continued existence of the humpback and fin whales, and all species of sea turtles except the Olive ridley, but *were* likely to jeopardize the continued existence of the North Atlantic right whale. NMFS issued a reasonable and prudent alternative based on these findings. In 1997, the USCG reopened the consultation a second time. This BO was issued in 1998. NMFS found that USCG actions were not likely to jeopardize the continued existence of specific endangered species and not likely to destroy or adversely modify the critical habitat that has been designated for the North Atlantic right whale. The mitigation measures included in these BOs are included in Appendix A.

The 1997 BO issued to the Navy for activities off the coast of the southeastern US concluded that these actions were not likely to jeopardize the continued existence of any endangered or threatened species under NMFS jurisdiction. The mitigation measures included in this BO are included in Appendix A.

The USACE BOs were issued on the potential impacts of harbor dredging and related activities. Consultations in the southeastern US began in 1978 and were reinitiated in 1980, 1986, 1991, 1995, and 1997. The pursuant BOs found that these actions were not likely to adversely affect right whales, although reasonable and prudent measures were developed in the 1991 BO (Appendix A). Similar consultations on dredging in the Northeast, in 2002 and 2003, and a beach nourishment project in 2000, also found the potential for a whale-vessel interaction was unlikely, although conservations measures were adopted for these actions as well.

In 2005, Section 7 consultations were initiated on proposed sites for Liquefied Natural Gas (LNG) terminals in the northeastern and mid-Atlantic US (see Section 4.7.3.1). NMFS has initiated several informal and formal consultations on the proposed LNG sites in the waters off the East Coast, although no BOs have been completed in this area to date. These proposed projects would cumulatively contribute additional vessels and vessel traffic along the coast, which could increase the risk of ship strikes. During the consultation process NMFS will propose mitigation measures (consistent with those contained in the Strategy) to reduce the risk of ship strikes.

1.8.4 Stellwagen Bank National Marine Sanctuary

The NOS' Office of National Marine Sanctuaries administers Stellwagen Bank National Marine Sanctuary (SBNMS). SBNMS is located around Massachusetts Bay and is a habitat for many species, including right whales. SBNMS is currently revising its 1993 management plan, which is scheduled to be finalized in fall 2006. The management plan provides a review of information relevant to large whale conservation, including shipping traffic, gear entanglements, and whale watching.

NMFS is coordinating with SBNMS on various operational and technical measures to reduce right whale ship strikes. One of these measures involves analyzing vessel traffic patterns through SBNMS in an effort to re-route shipping lanes through areas with low densities of whales. SBNMS is proposing a 12 degree northern rotation of the existing Boston TSS, into an area with lower densities of right whales. This shift could result in a decrease in the potential for whale encounters with shipping vessels. It would add approximately 3.75 nm (6.9 km) to the TSS, which would increase travel time for a vessel by approximately 10 to 22 minutes, depending on speed (Wiley, *unpublished data*). After working with other Federal agencies (including the USCG), through the interagency review process, NOAA submitted the TSS proposal to the IMO in April 2006. SBNMS is also working collaboratively with NMFS to install passive listening devices to cover nearly the entire sanctuary.

1.9 Related NOAA NEPA Documents

The following sections provide a brief summary of NEPA documents NOAA is preparing that are related to this EIS because right whales are one of the species considered in the analysis.

1.9.1 Draft Environmental Assessment to Implement the Operational Measures of the North Atlantic Right Whale Ship Strike Reduction Strategy

A draft environmental assessment (EA) was completed in June 2005. It provided an analysis of potential environmental impacts of the proposed operational measures of the Strategy. The draft EA indicated that some of the impacts had the potential to be highly controversial and/or significant. Consequently, and in compliance with NEPA, NMFS initiated preparation of this EIS (NMFS, 2005e).

1.9.2 EIS for Amending the Atlantic Large Whale Take Reduction Plan

NMFS published a notice of availability of the draft EIS for proposed amendments to the ALWTRP regulations (50 CFR 229.32) in the *Federal Register* on February 25, 2005. The ALWTRP was developed pursuant to Section 118 of the MMPA to reduce serious injury and mortality of right, humpback, and fin whales due to incidental interactions with commercial fisheries. The proposed rule was published in the *Federal Register* on June 21, 2005 (70 FR 35894). NMFS proposes additional regulations for the fisheries currently covered by the ALWTRP, which include the Northeast sink gillnet, Northeast/mid-Atlantic American lobster trap/pot, mid-Atlantic coastal gillnet, Southeast Atlantic gillnet, and southeastern Atlantic shark gillnet fisheries. NMFS also proposes to regulate the following fisheries from the MMPA's List of Fisheries for the first time under the ALWTRP: Northeast anchored float gillnet, Northeast drift gillnet, Atlantic blue crab, and Atlantic mixed species trap/pot fisheries targeting crab (red, Jonah, and rock), hagfish, finfish (black sea bass, scup, tautog, cod, haddock, pollock, redfish [ocean perch], and white hake), conch/whelk, and shrimp.

1.9.3 Right Whale Scientific Research Permit EIS

The NMFS Office of Protected Resources is in the preliminary stages of environmental analysis on the proposed actions contained in scientific research permits on both North Atlantic and North Pacific right whales. Permits are required for scientific research because right whales are protected under both the MMPA and ESA. Permits and authorizations are required under the ESA and the MMPA to conduct activities that may result in the "taking" of a protected species. "Taking" is defined by the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." MMPA defines "taking" as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal."

1.9.4 Marine Mammals Ocean Acoustics EIS

NMFS published a notice of intent (NOI) on January 11, 2005 in the *Federal Register* (70 FR 1871) to prepare an EIS to analyze the potential impacts of applying new criteria in guidelines to determine what constitutes a "take" of a marine mammal under the MMPA and ESA as a result of exposure to anthropogenic noise in the marine environment. In particular, the EIS will identify potential impacts to human activities that occur in oceanic waters such as dredging, fisheries, shipping, geological exploration, military operations, construction, and acoustic and oceanographic research. The areas of interest for evaluation of environmental and socioeconomic effects will be US and international waters.

1.10 Public Involvement

Public involvement is an integral part of the NEPA process. This section describes the public involvement activities conducted prior to the preparation of the Draft EIS and outlines the public participation activities that will follow publication of the Draft. To avoid redundancies, NMFS has integrated, as much as possible, the public involvement effort for the Strategy and the ANPR, and the public involvement effort for this EIS (proposed action and alternatives described in the NOI). NMFS's intent is to encourage the public to participate in the rule making and NEPA processes, including interested citizens and environmental organizations, the shipping industry, and local, state, and Federal agencies as well as any other agencies with relevant jurisdiction or special expertise.

1.10.1 Public Involvement in Formulating the Strategy

NMFS has fostered public participation in the formulation of the Strategy through several methods, including solicitation of public comments on the ANPR, public meetings, industry stakeholder meetings, and other focus group meetings. NMFS worked with state and other Federal agencies, concerned citizens and citizens groups, environmental organizations, and the shipping industry to address the ongoing threat of ship strikes to right whales. Meetings, presentations and workshops were convened by the ship strike committee as early as 1999 in support of developing recommended measures to reduce ship strikes to right whales. Twenty-six meetings were held along the East Coast from 1999 to 2001. Bruce Russell compiled information from these meetings and right whale data to develop recommended measures that were submitted to NOAA in August 2001 (Russell, 2001). The majority of these measures were proposed several years later in the ANPR.

NMFS published an ANPR for Right Whale Ship Strike Reduction in the *Federal Register* on June 1, 2004 (69 FR 30857) and provided a comment period (ultimately extended until November 15, 2004 [September 13, 2004; 69 FR 55135]) to determine the issues of concern with respect to the practical considerations involved in implementing the Strategy and to determine whether NMFS was considering the appropriate range of alternatives. Five-thousand, two-hundred fifty comments were received from governmental entities, individuals, and organizations, and can be accessed at the NMFS website.[8] These comments were in the form of

[8] www.nmfs.noaa.gov/pr/shipstrike

e-mail, letters, website submissions, correspondence from action campaigns (e-mail and US mail), faxes, and a phone call. The majority (more than 4,500) of the submissions were e-mails from action campaigns, 700 of the submissions were form letters, and less than 100 were unique letters.

NMFS held five public meetings on the ANPR at:

- Boston, MA, at the Tip O'Neill Federal Building (July 20, 2004)
- New York/New Jersey at the Newport Courtyard Marriot (July 21, 2004)
- Wilmington, NC, at the Hilton Riverside Wilmington (July 26, 2004)
- Jacksonville, FL, at the Radisson Riverwalk Hotel (July 27, 2004)
- Silver Spring, MD, at NOAA Headquarters Science Center (August 3, 2004)

Public comments were requested and recorded. In addition, nine industry stakeholder meetings were held to explain the ANPR at:

- Boston, MA (September 30, 2004)
- Portland, ME (October 1, 2004)
- Norfolk, VA (October 4, 2004)
- Morehead City, NC (October 6, 2004)
- Jacksonville, FL (October 13, 2004)
- Savannah, GA (October 14, 2004)
- New London, CT (October 20, 2004)
- Newark, NJ (October 25, 2004)
- Baltimore, MD/Washington, DC (October 27, 2004)

A summary report of these meetings and a list of the attendees are posted on the Internet at *http://www.nero.noaa.gov/shipstrike*.

NMFS also held two focus group discussions with participants from nongovernmental organizations, academia, and Federal and state agencies. The first meeting was held in Silver Spring, MD, on September 26, 2004, and the second in New Bedford, MA, on November 5, 2004.

Comments on the ANPR addressed several broad topics including: speed restrictions; vessel size and operations; speed and routing issues specific to regions; routing restrictions (PARS and ATBA); safety of navigation; suggestions for alternative or expanded dates for operational measures; military and sovereign vessel exemptions; enforcement; and compliance. The written comments received are available on the NMFS website.[9]

[9] www.nmfs.noaa.gov/pr/shipstrike

1.10.2 Public Involvement for the DEIS

1.10.2.1 Notice of Intent

NMFS published an NOI for this EIS in the *Federal Register* on June 22, 2005 (70 FR 36121; a copy is included in Appendix B). In addition to describing the proposed action and its purpose and need, and providing relevant background information, the NOI presented, and solicited comments on, six initial alternatives, as follows (these alternatives are described in detail in Chapter 2 of the EIS):

- Alternative 1: No Action (continuation of existing conditions)
- Alternative 2: Use of DMAs only
- Alternative 3: Speed Restrictions in Designated Areas
- Alternative 4: Use of Designated or Mandatory Routes
- Alternative 5: Combination of Alternatives 1 through 4
- Alternative 6: NOAA Ship Strike Reduction Strategy, similar to Alternative 5 but with less extensive speed restrictions

Because several public and stakeholder meetings, workshops, and other consultation were held as part of the ANPR public involvement effort, NMFS did not consider it necessary to hold additional meetings following adequate public input on the NOI. However, interviews were conducted at several key port areas in reference to the economic impact analysis.

1.10.2.2 Summary of Major Comments on the Notice of Intent

During the 30-day comment period, from June 22, 2005 to July 22, 2005, NMFS received 41 letters and approximately 300 form e-mails in response to the NOI. A complete table of these comments with NMFS' responses is provided in Appendix B. A summary follows:

- **Comments from Federal Agencies.** Several Federal agencies encouraged interagency communications to further develop the Strategy and ensure consistency with international law.
- **Comments from Stakeholders.** Passenger vessel stakeholders voiced concerns that the initial analysis presented in the Ship Strike EA underestimated the number of passenger vessel arrivals. Recreational vessel stakeholders indicated their group was not given proper consideration in the EA and did not understand why recreational vessels were included at all. Stakeholders representing environmental groups urged NMFS to take immediate action with emergency regulations and/or implementation prior to completion of the EIS. Several groups suggested that NMFS develop viable and effective enforcement measures. Shipping stakeholders raised the point that costs have risen considerably since the 2002 and 2003 estimates used in the EA. They also voiced concern about delays resulting from speed restrictions, and the possibility of a port being affected as a result of shipping entities choosing an alternate port. Industry representatives also recommended that NMFS evaluate impacts on port operations, local economies that serve ports and port communities, and any other indirect economic and environmental impacts. Several stakeholders suggested the EIS contain

a review of Navy and USCG vessel activity on the East Coast. Several commenters proposed that NMFS seek technological solutions to use instead of, or in conjunction with, measures of the Strategy. Specific port authorities raised port-specific issues and the possibility of cumulative impacts to the port area. Commenters from various groups recommended that NMFS should require Federal vessels to adhere to the operational measures in the Strategy. Several industry groups raised the issues with the proposed and current LNG terminals.

- **Comments on the Alternatives.** There was broad support for Alternative 6, although several comments recommended changes to the areas covered and the proposed time frames. There was also broad agreement among environmental nongovernmental organizations that Alternatives 2, 3, and 4 would not be sufficient to reduce ship strikes; however, a number of industry commenters preferred these stand-alone measures. A few comments supported Alternative 1 (No Action). Several commenters recommended Alternative 5 as the most effective means for reducing ship strikes, although they also indicated Alternative 6 was reasonable as the minimum for protective measures.
- **Comments on Speed Restriction Issues.** Some commenters were supportive of the proposed speed restrictions in the range of 10 to 14 knots based on the best available data, whereas other commenters questioned the effectiveness of speed as a mitigation measure and would not support this measure until further speed and hydrodynamic studies were completed.
- **Comments on DMAs.** Commenters suggested that certain revisions to triggering and implementing a DMA were necessary before they could be considered a viable measure.

1.10.2.3 Review of the DEIS

Following publication of the DEIS, NMFS intends to hold three public hearings along the US East Coast to solicit and receive comments. These public hearings will provide the public with a forum to comment on the DEIS. A notice with information on the location and time of the meetings will be published in the *Federal Register* and a major local newspaper where the meetings will be held. Written comments should be sent to NOAA at the mailing and e-mail addresses printed on the cover page of the DEIS and the Notice of Availability for the DEIS.

1.11 Structure of the EIS

Chapter 1 presents the purpose and need for the proposed action and background information.

Chapter 2 describes the alternatives evaluated in the EIS.

Chapter 3 describes the affected environment.

Chapter 4 analyzes the potential impacts of the alternatives on the environment.

Chapter 5 addresses requirements under EO 12866 (Regulatory Impact Review)

Chapter 6 lists references.

Chapter 7 lists the persons, organizations, and agencies that were sent a copy of the Draft EIS for review.

Chapter 8 lists the persons that prepared the EIS.

Several **appendices** contain supporting information too detailed or technical to be incorporated in the body of the EIS.

1.12 Issues Not Addressed in the EIS

1.12.1 Enforcement

Enforcement will not be addressed in the EIS because it is outside the scope. NMFS will address any comments regarding enforceability in the final rule.

1.12.2 National Security

The proposed action and alternatives are not believed to affect national security. Vessels owned or operated by, or under contract to Federal agencies would not be subject to the proposed operational measures; therefore none of their operations would be affected. Further, Navy and USCG comments did not bring up any issues of national security, therefore NMFS defers to these agencies. If anything, requiring vessels to limit their speed can serve to promote national security. The USCG occasionally slows vessels to decrease the potential for a security threat (Section 3.4.1.3).

This Page Intentionally Left Blank

2 ALTERNATIVES

This chapter describes the alternatives the National Marine Fisheries Service (NMFS) is considering to implement the proposed regulatory and nonregulatory operational measures. These measures are one of the five components of the *North Atlantic Right Whale Ship Strike Reduction Strategy* (Strategy). Section 2.1 describes in detail the operational measures of the Strategy by geographical area. Section 2.2 outlines the six alternatives analyzed in the EIS, including taking no action. The alternatives include all operational measures being considered for implementation, and varies from proposing none at all, (Alternative 1: No Action) to individual measures, (Alternatives 2, 3 and 4) a combination, (Alternatives 5) and finally a subset of the operational measures (Alternative 6). Other alternatives considered by NMFS, but dismissed from further analysis, are discussed in Section 2.3. NEPA only requires that reasonable alternatives be considered in an EIS. An exception to this is the No Action Alternative, which, even if it is not a reasonable alternative, is analyzed in accordance with the Council on Environmental Quality's Regulations to provide a baseline against which to assess the impacts of the other alternatives.

2.1 Proposed Operational Measures

The proposed regulatory and nonregulatory operational measures that are a component of the Strategy would affect three regions along the East Coast of the United States: the southeastern United States region (SEUS), the mid-Atlantic United States region (MAUS), and the northeastern United States region (NEUS), where right whales aggregate or migrate through (Figures 1-1, 1-2 and 1-3). Some regulations would apply to all waters along the Atlantic Coast within the US Exclusive Economic Zone[1] (EEZ).

The major operational measures proposed are as follows:

- **Dynamic Management Areas (DMAs).** DMAs would impose temporary restrictions on vessels (described in Section 2.1.3.4) in areas where right whales are detected and no specific measure(s) are in place or in force at this time (NMFS, 2004g).
- **Seasonal Management Areas (SMAs).** SMAs would create seasonal speed restrictions in (a) a 30 nm (56 km) radius around specified ports in the MAUS (see Figure 1-2); (b) in specified areas in Cape Cod Bay, Off Race Point, and Great South Channel; and (c) in specified areas in the waters off the coasts of Georgia and Florida.
- **Vessel Routing Measures.** Routing measures include recommended shipping routes (also referred to as shipping lanes) that have been proposed by NMFS for the NEUS and SEUS and assessed by the United States Coast Guard (USCG) with regard to navigational and environmental safety through a Port Access Routes Study (PARS). Mariners would be required to abide by speed restrictions in recommended routes that are located within a SMA. After recommended routes have been established, NMFS

[1] The US EEZ extends to a distance 200 nautical miles from the baseline from which the breadth of the territorial sea is measured (www.archives.gov/federal_register/codification/proclamations/05030.html).

intends to monitor mariner use of the routes. If the routes are not used routinely, consideration will be given to making them mandatory through regulation. NMFS is also proposing an area to be avoided (ATBA) in Great South Channel and realigning a portion of the Boston Traffic Separation Scheme (TSS). All of the routing measures would be implemented via nonregulatory measures.

In all regions, unless otherwise noted, the operational measures would apply only to nonsovereign[2] vessels subject to the jurisdiction of the US that are 65 ft (19.8 m) or greater in length overall (Section 1.4). Sixty-five feet is a size class of vessel recognized by the maritime community and commonly used in maritime regulations (e.g., Automatic Identification System [AIS]; International Navigational Rules Act, Rules of the Road sections) to distinguish between a motorboat and a larger vessel.

With regard to speed restrictions, NMFS is considering[3], and this EIS is assessing, three alternative speeds: 10, 12, or 14 knots. Of the records available, the majority of serious injuries to, or deaths of, whales resulting from ship strikes involved ships operating at speeds of 14 knots or more (Laist *et al.*, 2001; Jensen and Silber, 2003); therefore, it is assumed that a vessel traveling less than 14 knots would reduce the likelihood and the severity of a ship strike. Recent analysis indicates that the probability of death or serious injury increases with increasing ship speed. A predicted 50 percent (0.27–0.62 95 percent C.I.) chance of death or serious injury occurred from strikes at 10.5 knots. The probability increased to 75 percent at 14 knots (Pace and Silber, 2005). Additionally, vessels traveling at lower speeds may also produce weaker hydrodynamic forces that, at higher speeds, have the capacity to first push a whale away from a moving ship and then draw the whale back toward the ship or propeller (Knowlton *et al*., 1998). Projects assessing issues of hydrodynamics and vessel speed are either underway or being contemplated, and research continues on the relationship between speed and whale death or serious injury.

2.1.1 Southeastern United States

Sighting data indicates that right whales occur in consistent aggregations in specific areas during certain times of the year; such areas and times are the foci of the measures for the SEUS region. Right whales occur in waters off the SEUS in winter and early spring as calving and nursery grounds. In fact, the only known calving area for North Atlantic right whales exists in waters off the SEUS. This area, adjacent to the coast of northern Florida and Georgia, was designated critical habitat for right whales in 1994 (59 FR 28793).

Note: NMFS received a petition on July 11, 2002, requesting the expansion of the Southeast critical habitat boundaries by approximately 2,700 nm^2 (5003.6 km^2). On August 28, 2003, NMFS made a determination not to expand the critical habitat[4], as the information presented in the petition did not adequately support the proposed boundaries (68 FR 51758).

[2] Nonsovereign vessels are commercial and recreational vessels, not owned, operated, or under contract to the US Federal Government.
[3] NMFS is proposing 10 knots in the proposed rule and requesting comments on 12 and 14 knots.
[4] The determination stated that the requested revision, "…is not warranted at this time. However, NMFS will continue to analyze the physical and biological habitat features essential to the conservation of right whales.

2.1.1.1 Area and Time

In the SEUS region, the proposed operational measures apply to an area bounded to the north by latitude 31º27’N (coinciding with the northernmost boundary of the mandatory ship reporting system [MSRS]; see Section 1.2.1.2); to the south by latitude 29º45’N; to the east by longitude 80º51.6’W (eastern boundary of the MSRS), and to the west by the shoreline (Figure 1-1). This area is referred to as Southeast SMA.

The proposed operational measures would apply from November 15 to April 15. Studies of right whale occurrence indicate that this is the time during which most right whales are in the SEUS calving and nursery areas. Because this is the only known calving area for North Atlantic right whales, the welfare of reproducing females in this area is vital to the recovery of the species and is a priority for protective measures. Estimates of the relative density of right whales in the SEUS region have been developed based on survey data from 1992 to 2003. In December, the areas of high sighting per unit effort (SPUE) occur in the northern part of the region. In January, the highest SPUE occurs in the central area of the habitat. In February, right whales are concentrated in the southern and central areas with very high SPUE values near Fernandina Beach and Jacksonville, FL. In March, SPUE values are generally low, with higher occurrences in the northern area (NMFS, *unpublished*).

2.1.1.2 Operational Measures

In the SEUS region, NMFS proposes speed restrictions in the Southeast SMA from November 15 to April 15 (Section 2.1.1.1). In addition, recommended shipping routes would be established within this SMA to reduce the simultaneous occurrence of vessels and whales. Routes would be established in the approaches to the ports of Jacksonville and Fernandina Beach, FL, and Brunswick, GA, located within the SEUS right whale critical habitat area. This area experiences high levels of vessel traffic and currently there are no defined approaches to the three ports. NOAA has submitted the proposed routes to the USCG for analysis by a PARS. The routes were developed to consolidate the vessel traffic into specific lanes that would take vessels through waters with relatively lower right whale densities (Garrison, 2005). The proposed lanes are shown graphically (relative to ship strike risk reduction) in Figures 2-1 and 2-2 (southeastern ports). Defining geographical coordinates for the green areas with the highest reduction in risk are listed in Table 2-1 (at this time the coordinates for the exact approaches have yet to be determined).

The USCG is analyzing the proposed lanes, and if necessary, will make recommendations to modify them to ensure navigational safety. The analysis is underway and as a result, specific approach routes for each port have yet to be identified.[5]

Vessels that are 65 ft (19.8 m) or more in length would be required to abide by the speed restrictions and expected to use the recommended shipping routes from November 15 to April 15. As previously noted, this EIS analyzes three speeds: 10, 12, or 14 knots, although NMFS is only proposing one speed, 10 knots, in the proposed rulemaking.

[5] The USCG released the PARS on May 24, 2006; however, the recommendations in the report are not final until comments are considered, therefore the specific routes will be analyzed in the Final EIS. The report is available at http://dmses.dot.gov/docimages/pdf96/398771_web.pdf.

Table 2-1
Coordinates for Proposed Shipping Lanes in the SEUS

Port	Southern Limit	Northern Limit	Best Approach	Percent Reduction	Pilot Buoy
Jacksonville	30º 06.1’	30º 23.3’	30º 21.2’	27%	30º 23.6’ N 81º 19.1’ W
Fernandina	30º 12.6’	30º 40.5’	30º 21.2’	32%	31º 40.8’ N 81º 11.8’ W
Brunswick	30º 55.6’	30º 59.9’	31º 04.2’	16%	31º 03.2’ N 81º 15.2’ W

Note: The approaches are listed as the latitude in degrees – minutes at the edge of the MSRS box (approximately 80º 38’ W longitude).

2.1.2 Mid-Atlantic Region of the United States

The MAUS region includes a coastal migratory corridor that right whales use to travel between their calving and nursery grounds in the SEUS region and feeding grounds in the NEUS region and Canada. Many ships enter ports throughout the MAUS region and traverse the migratory corridor, and as a result, create a high-risk situation for migrating right whales. Two right whale calves were found dead in the MAUS region in 2001, and there is a high probability that these deaths were caused by ship strikes. A dead mature female right whale observed floating off Virginia subsequently stranded on the coast of North Carolina in 2004, which almost certainly died as a result of a vessel collision.

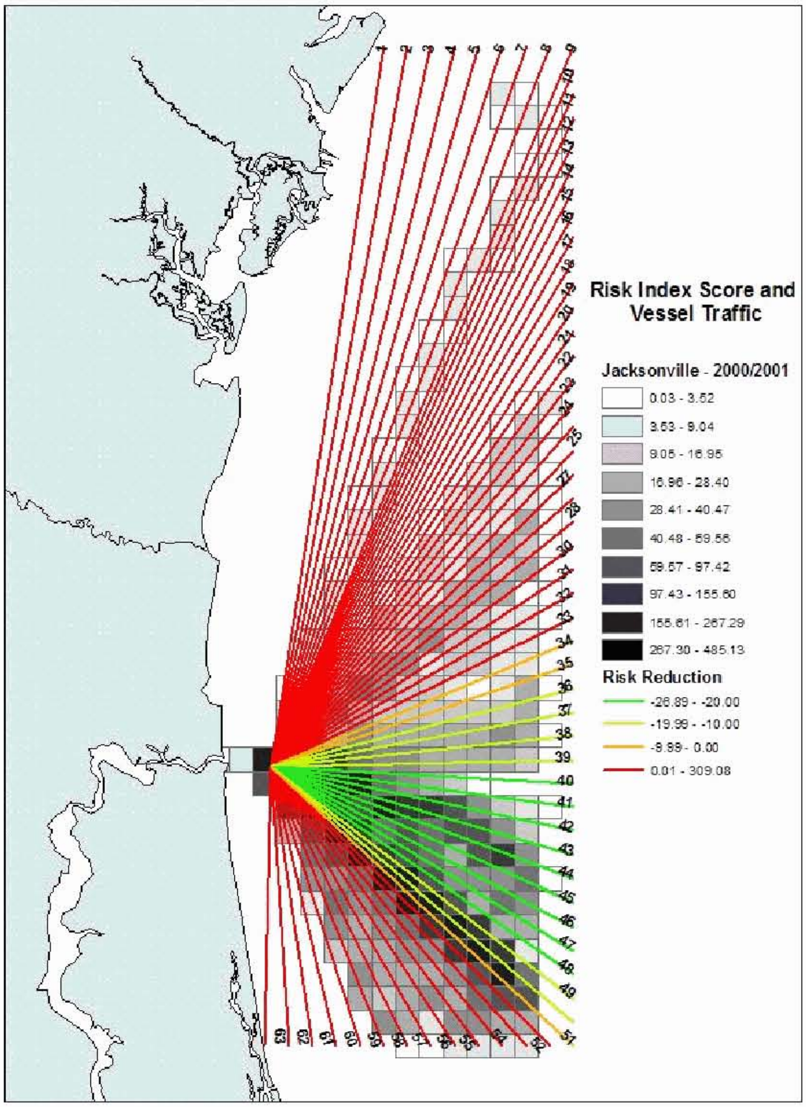
2.1.2.1 Area and Time

The operational measure applicable to the MAUS region would be the designation of SMAs around nine ports included at the end of this section and also shown in Figure 1-2. Each SMA would have a radius of 30 nm (56 km) (except in the case of Block Island Sound, which has rectangular area), sufficient to cover approximately 90 percent of right whale sighting records along the US East Coast. Speed restrictions would apply for each SMA from November 1 to April 30. This time is consistent with right whale sighting data.

MAUS Regulated Areas (SMAs)

1. South and east of Block Island Sound (Montauk Point to western end of Martha’s Vineyard). Figure 2-3
2. Ports of New York and New Jersey. Figure 2-4
3. Delaware Bay (Ports of Philadelphia and Wilmington). Figure 2-5
4. Entrance to Chesapeake Bay (Ports of Hampton Roads and Baltimore). Figure 2-6
5. Ports of Morehead City and Beaufort, NC. Figure 2-7
6. Port of Wilmington, NC. Figure 2-8
7. Port of Georgetown, SC. Figure 2-9
8. Port of Charleston, SC. Figure 2-10
9. Port of Savannah, GA. Figure 2-11

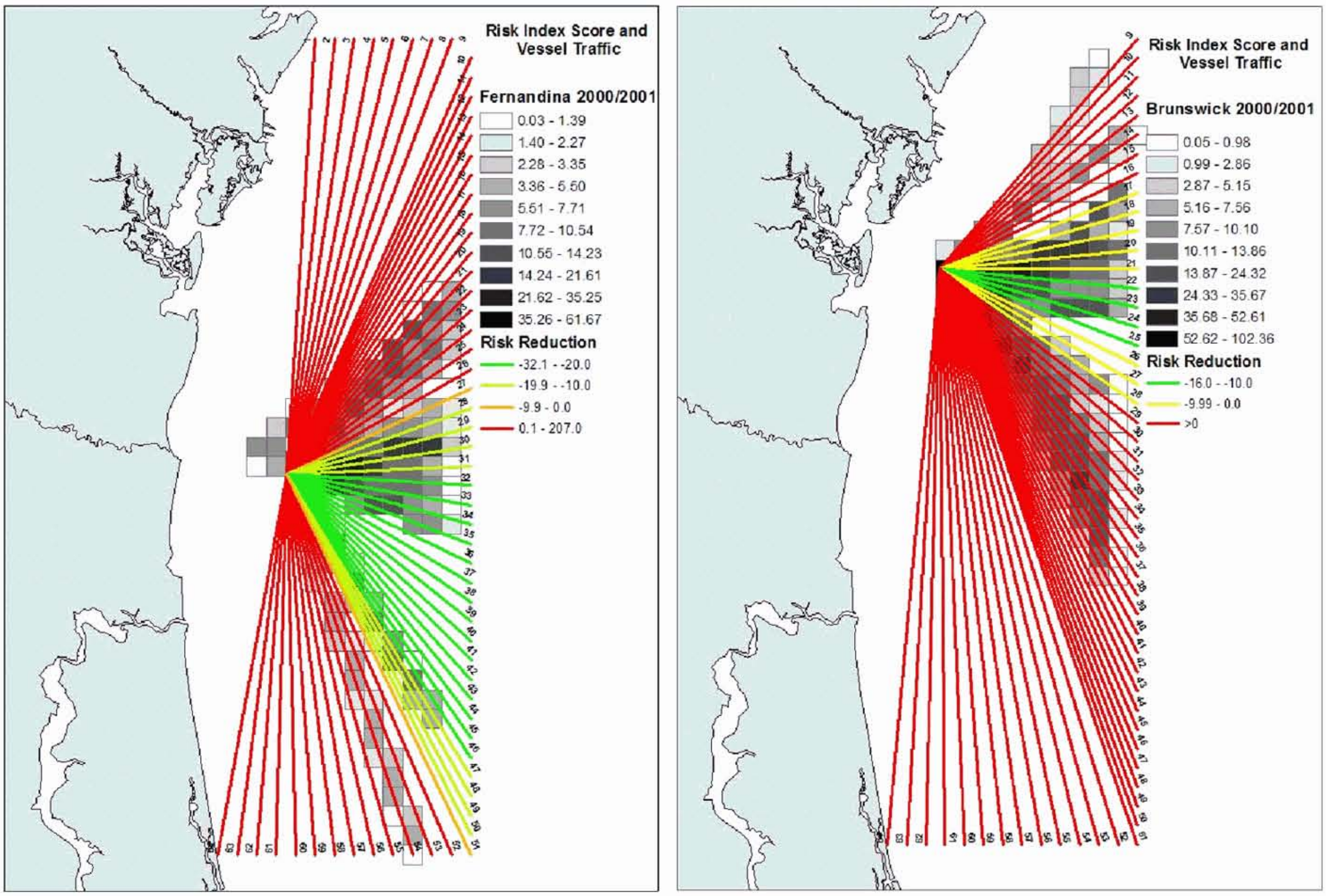
Reduction in Ship Strike Risk for Each Potential Approach into the Jacksonville Pilot Buoy*



**Note: The shaded grey boxes show the vessel traffic pattern from the MSRS for 2000/2001.*	**Figure 2-1**

This Page Intentionally Left Blank

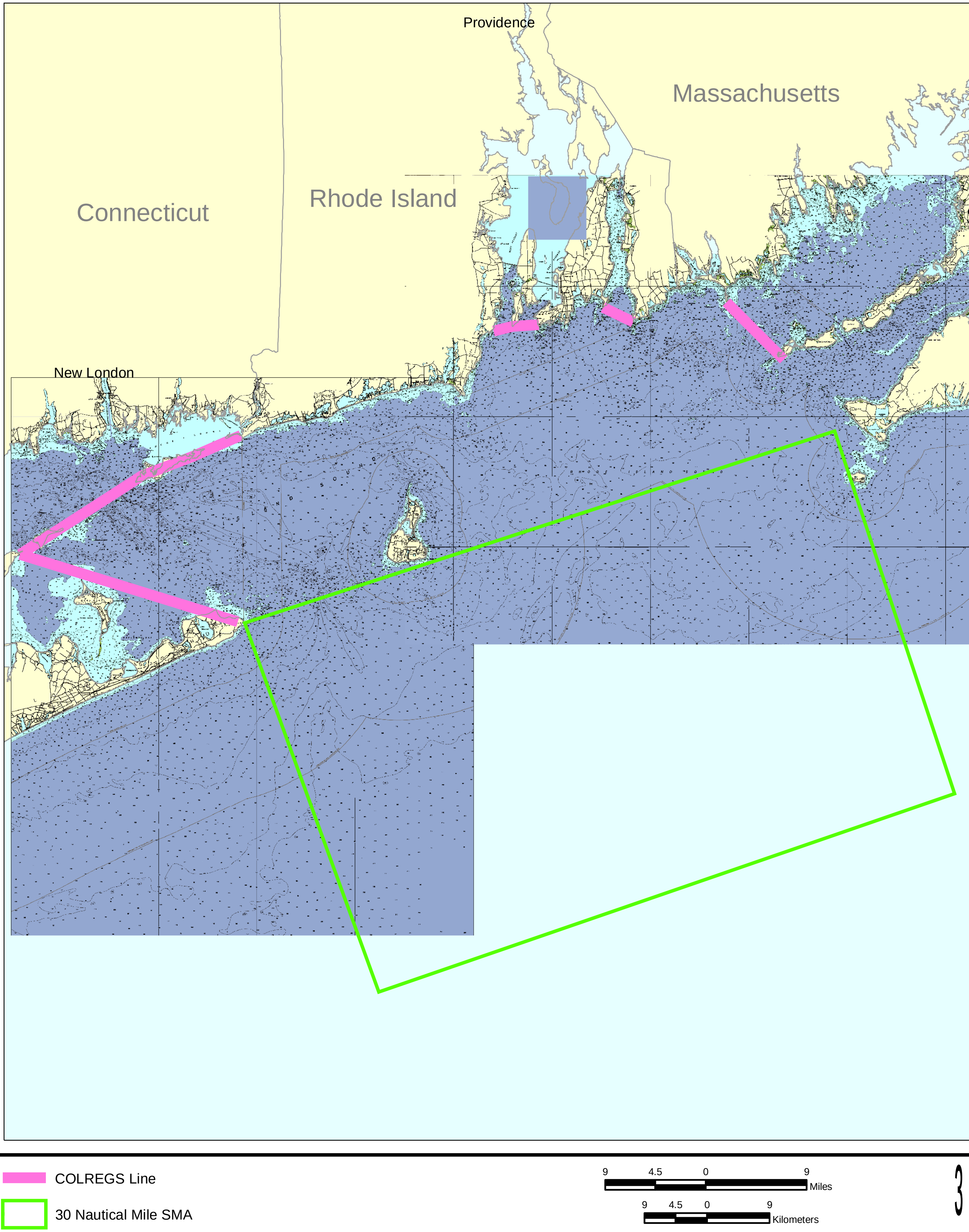
Reduction in Ship Strike Risk for Each Potential Approach into the Fernandina and Brunswick Pilot Buoys*



**Note: The shaded grey boxes show the vessel traffic pattern from the MSRS for 2000/2001.*	**Figure 2-2**

This Page Intentionally Left Blank

South & East of Block Island Sound Seasonal Management Area (SMA)

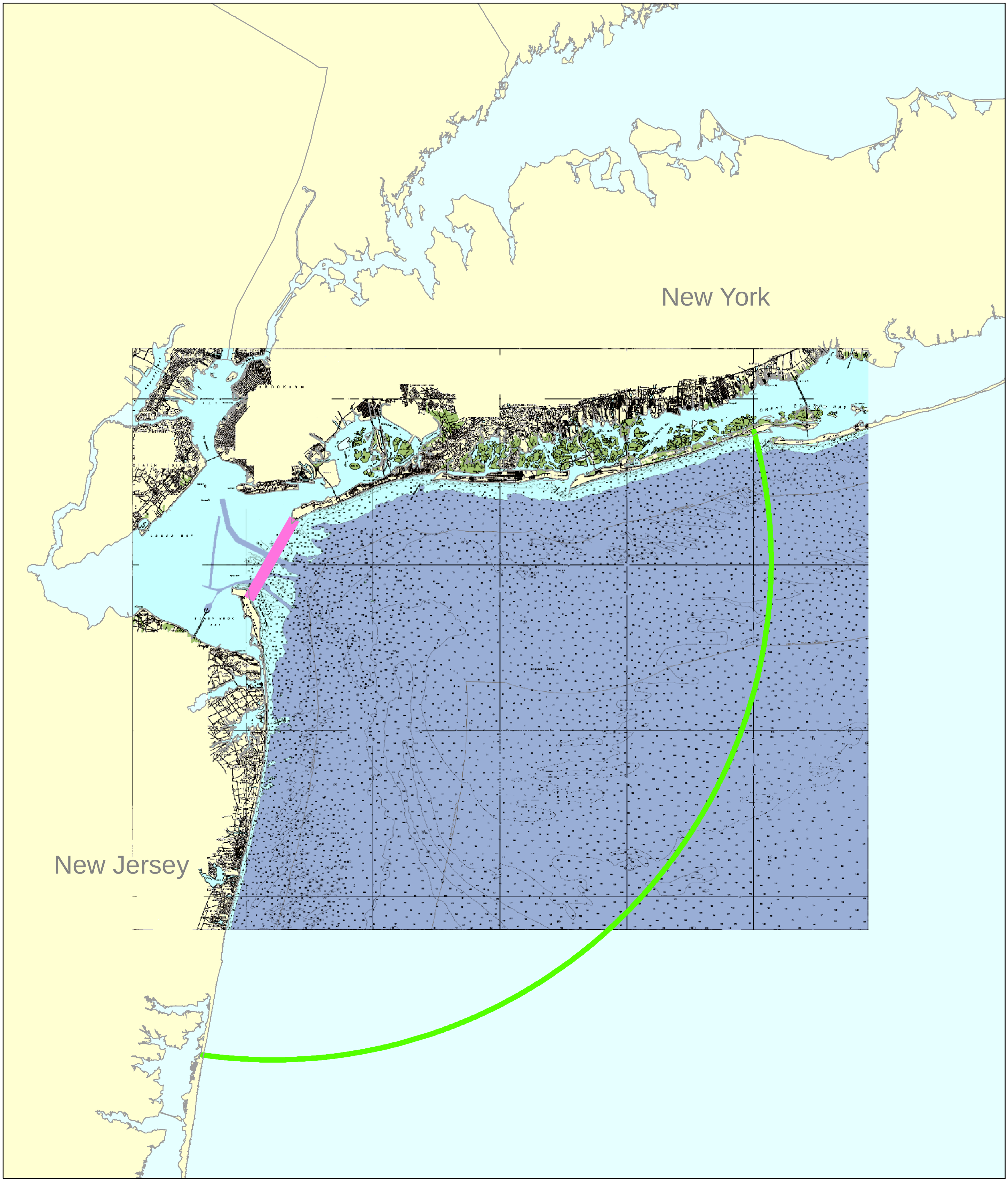


Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-3

This Page Intentionally Left Blank

Ports of New York and New Jersey Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

Note: COLREGS lines are approximate and this chart should not be used for navigation.

10 5 0 10 Miles

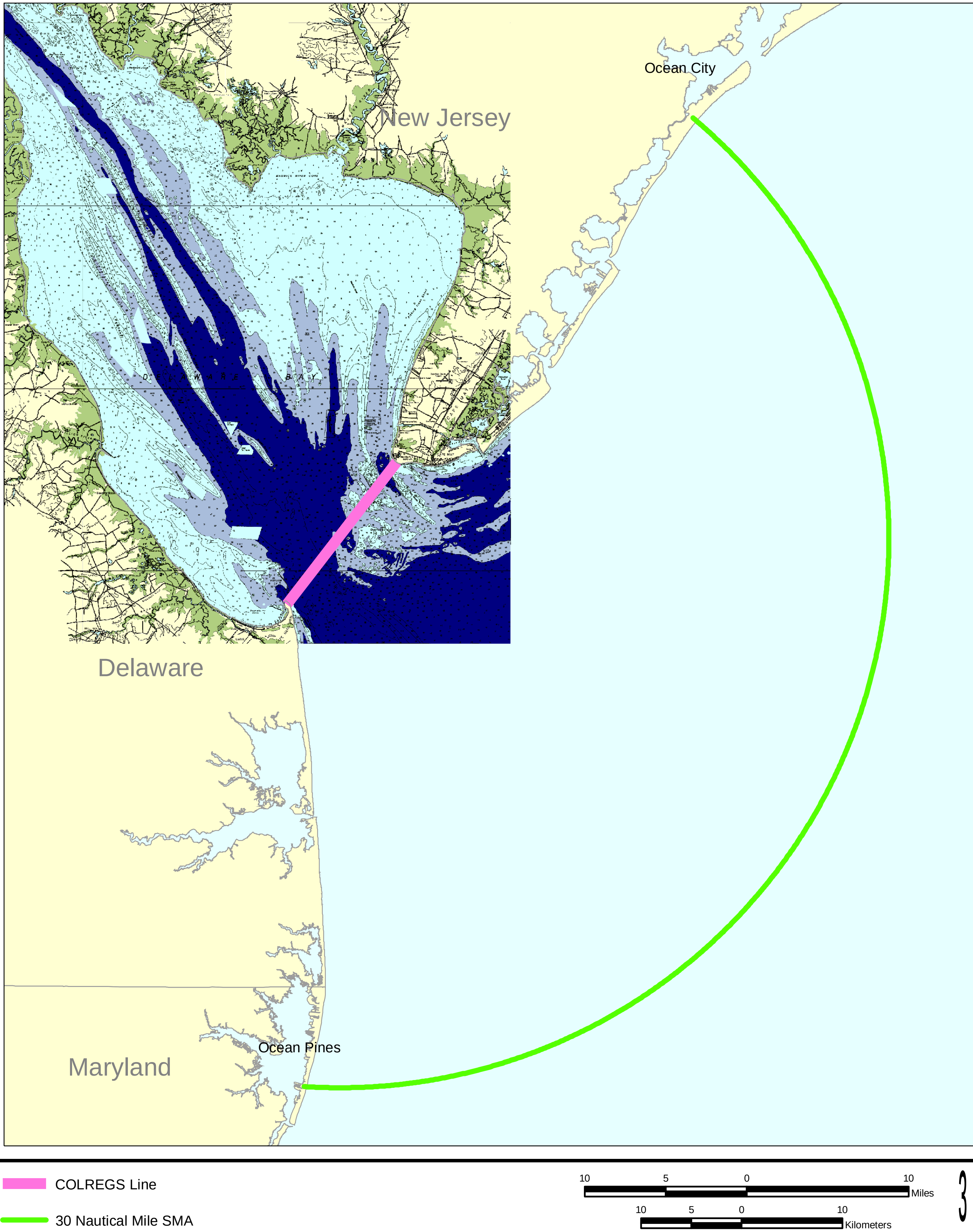
10 5 0 10 Kilometers

Figure 2-4

3

This Page Intentionally Left Blank

Delaware Bay Seasonal Management Area (SMA)

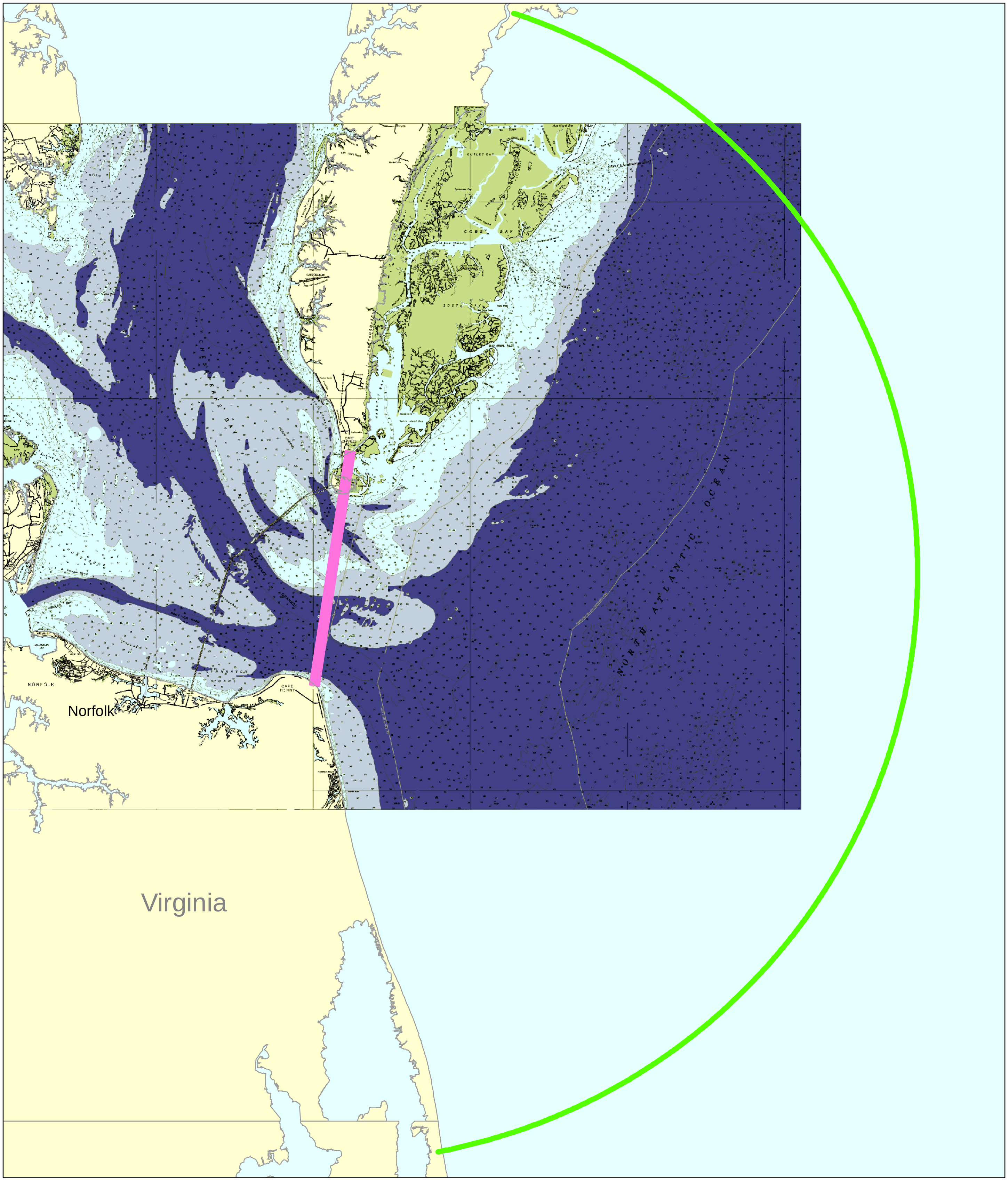


Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-5

This Page Intentionally Left Blank

Chesapeake Bay Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

10 5 0 10 Miles

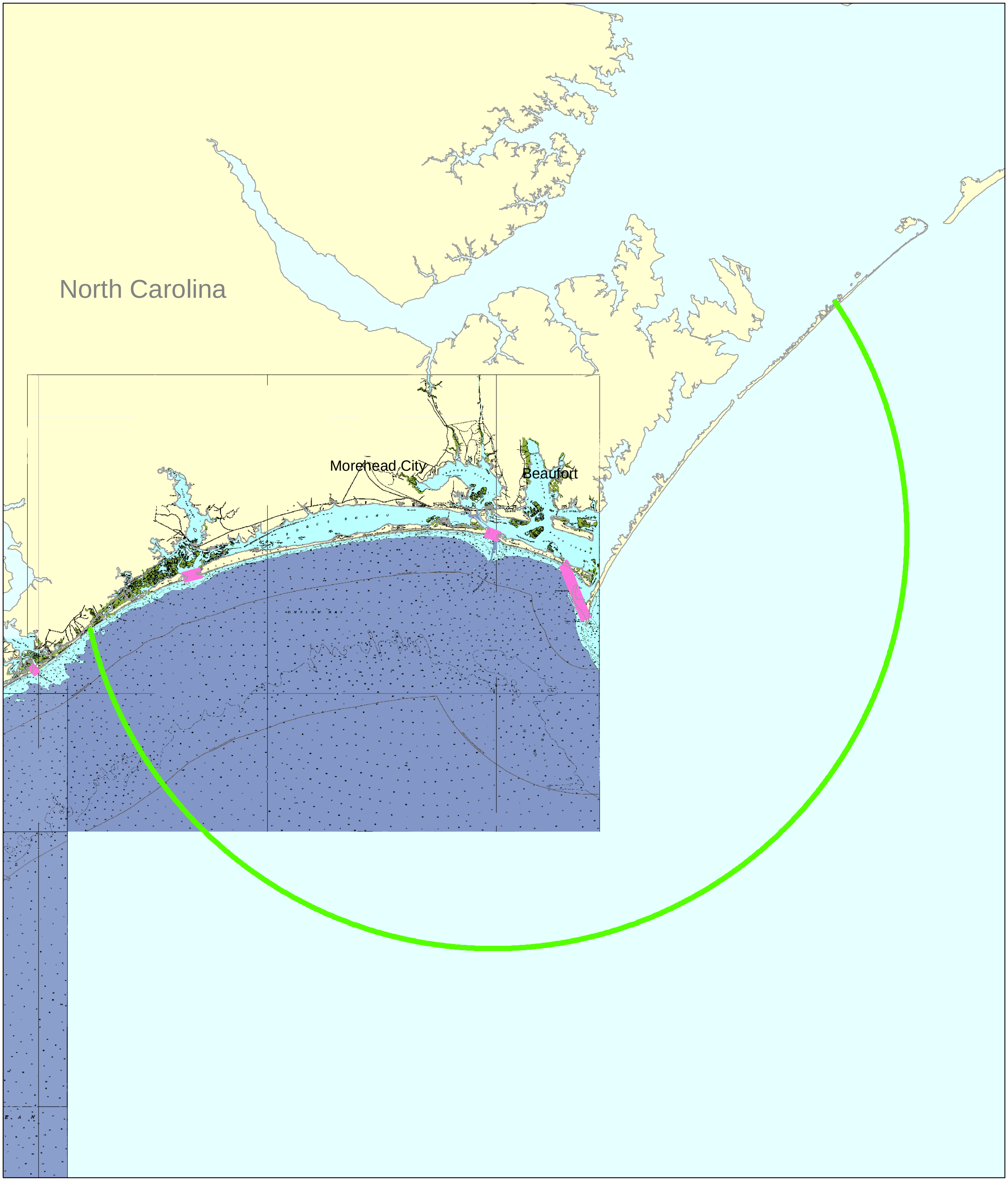
10 5 0 10 Kilometers

Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-6

This Page Intentionally Left Blank

Morehead City & Beaufort, NC Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

Note: COLREGS lines are approximate and this chart should not be used for navigation.

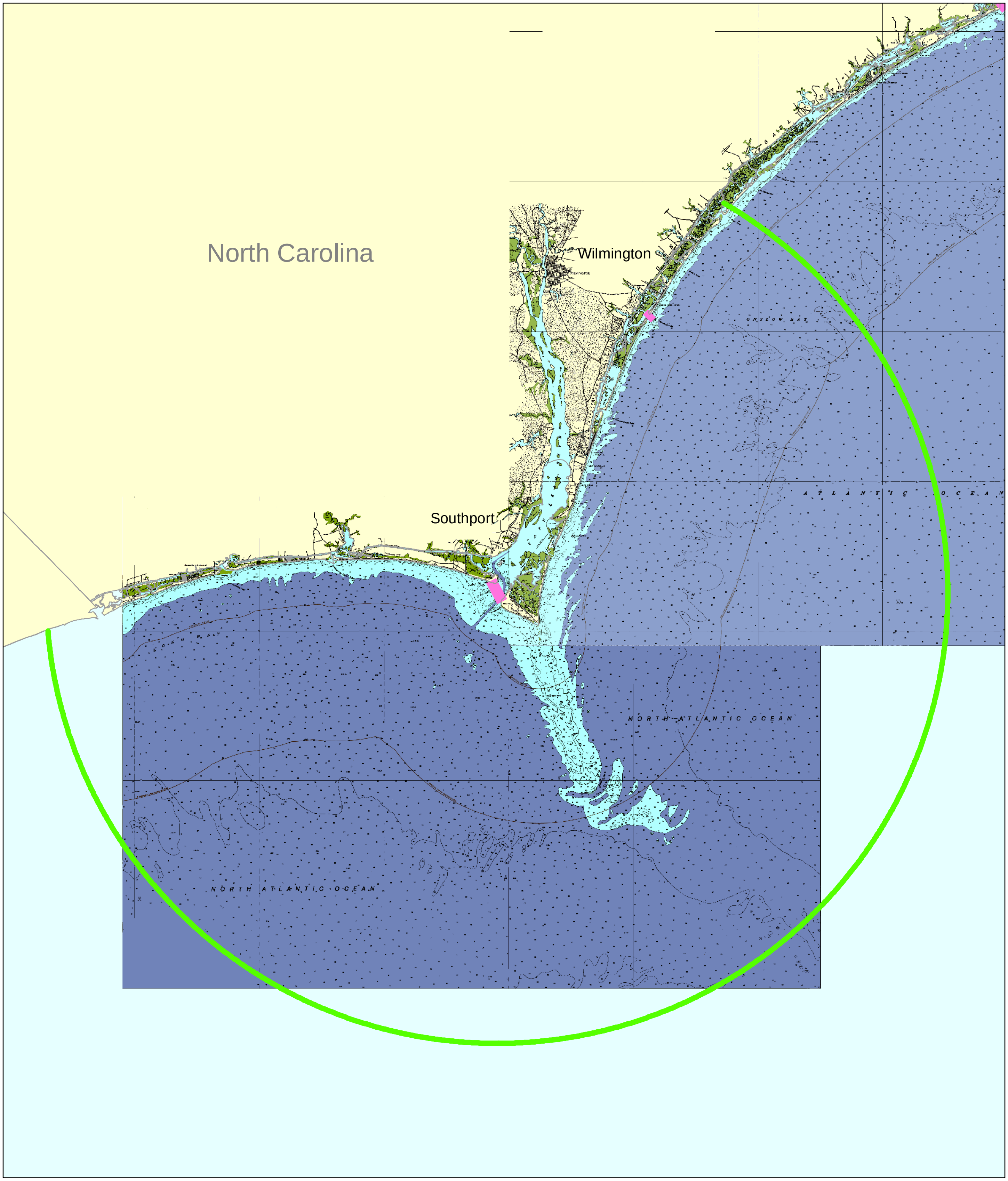
10 5 0 10 Miles

10 5 0 10 Kilometers

Figure 2-7

This Page Intentionally Left Blank

Wilmington, NC Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

Note: COLREGS lines are approximate and this chart should not be used for navigation.

10 5 0 10 Miles

10 5 0 10 Kilometers

Figure 2-8

This Page Intentionally Left Blank

Georgetown, SC Seasonal Management Area (SMA)

COLREGS Line

30 Nautical Mile SMA

10 5 0 10 Miles

10 5 0 10 Kilometers

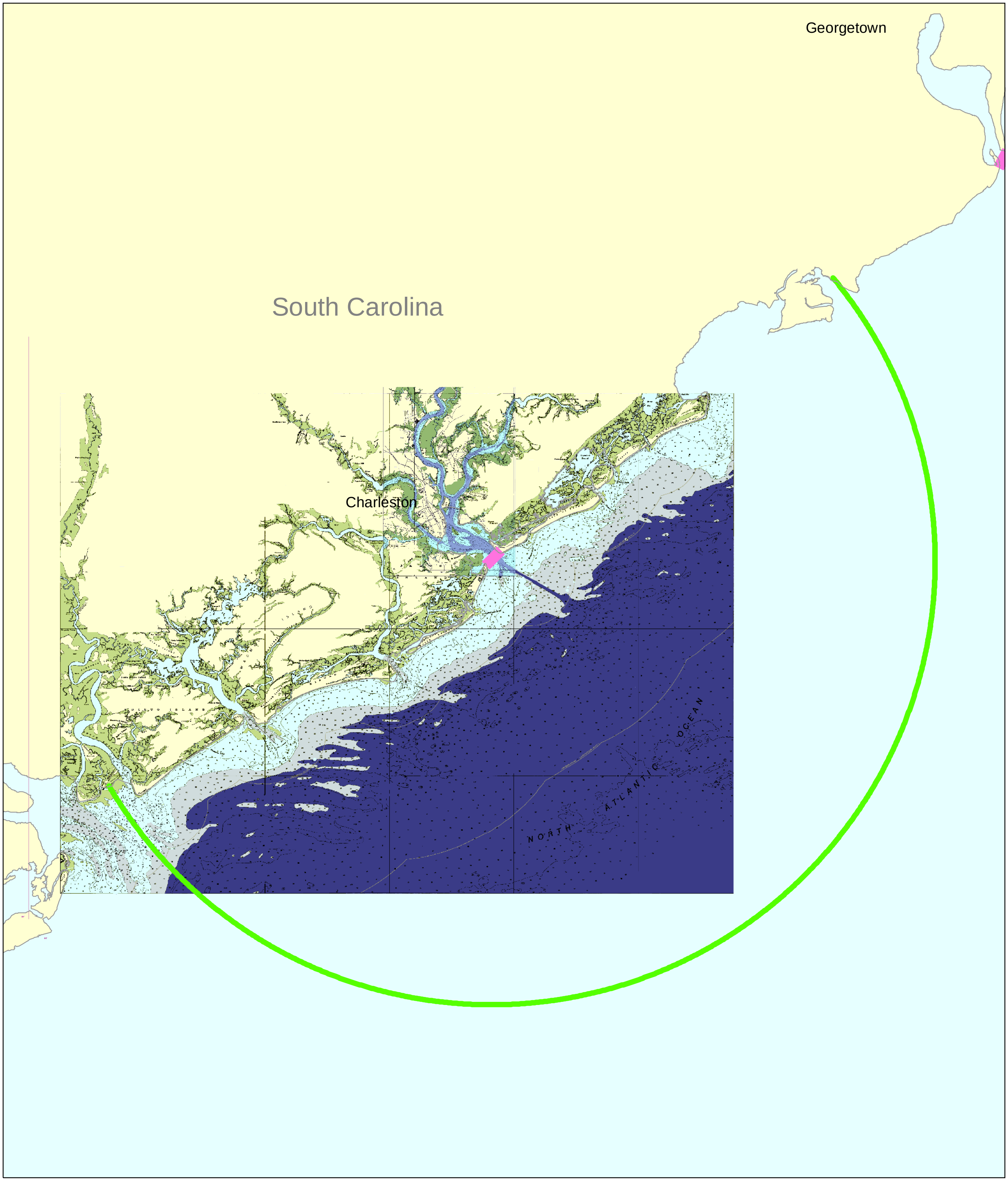
Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-9

3

This Page Intentionally Left Blank

Charleston, SC Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

10 5 0 10 Miles

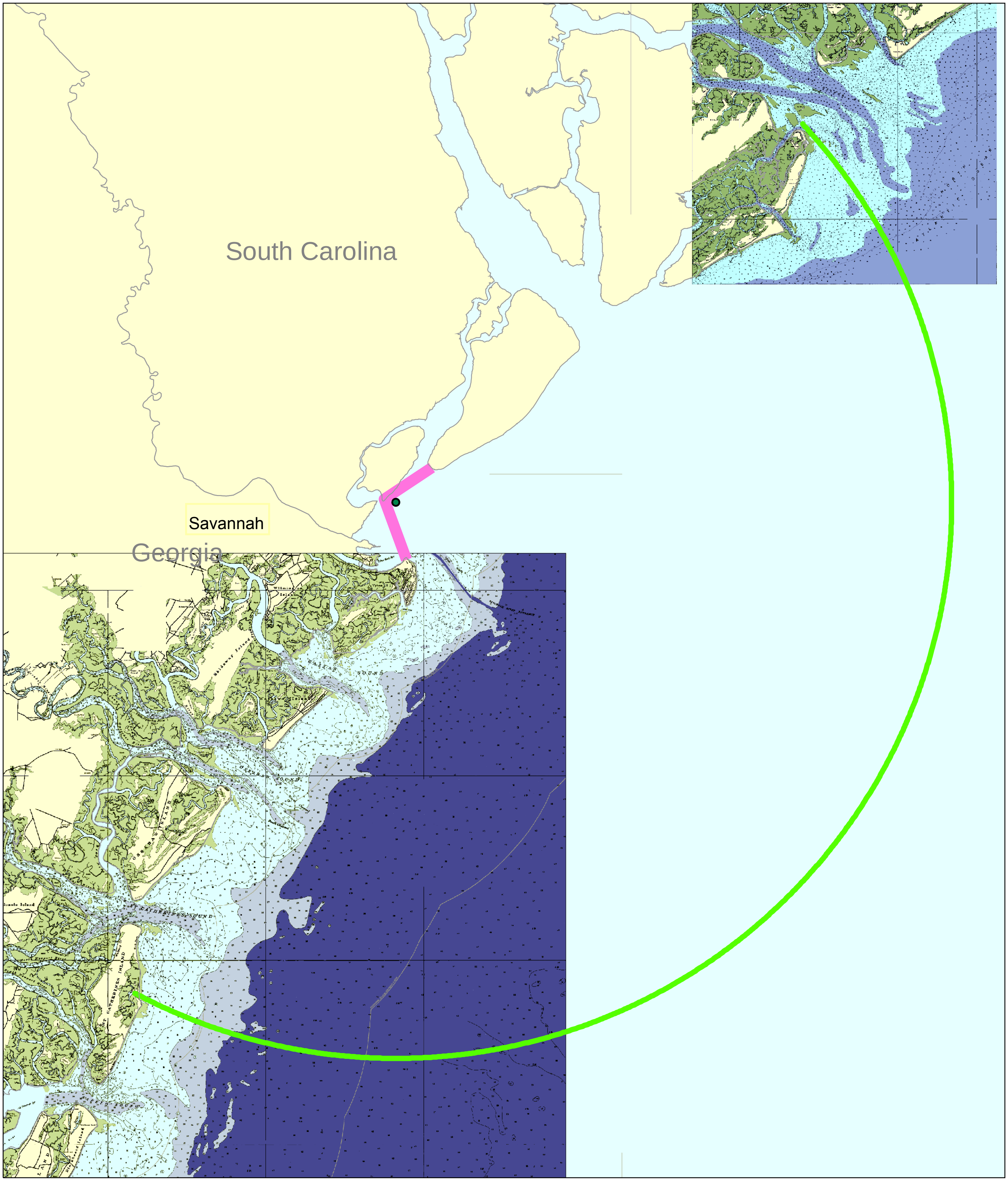
10 5 0 10 Kilometers

Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-10

This Page Intentionally Left Blank

Savannah, GA Seasonal Management Area (SMA)



COLREGS Line

30 Nautical Mile SMA

10 5 0 10 Miles

10 5 0 10 Kilometers

Note: COLREGS lines are approximate and this chart should not be used for navigation.

Figure 2-11

This Page Intentionally Left Blank

2.1.2.2 COLREGS Demarcation Lines

The COLREGS demarcation lines, which were developed by the Convention on International Regulations for Preventing Collisions at Sea 1972 (72 COLREGS), demarcate harbor entrances and provide the baseline for the 30 nm (56 km) zones around the ports in the MAUS. These lines have been established to delineate the waters where mariners must comply with the 72 COLREGS and the Inland Navigational Rules Act of 1980 (Inland Rules). The waters inside of the lines are Inland Rules Waters and the waters outside of these lines are COLREGS Waters. Vessels transiting in waters inside these lines (Inland Rules Waters) would not have to adhere to speed restrictions or any operational measure. All vessels transiting seaward of the COLREGS lines would be required to adhere to speed restrictions and other operational measures in the 30 nm (56 km) designated zones. The applicable COLREGS lines for the MAUS ports are provided in Appendix C.

2.1.2.3 Operational Measures

Within the designated SMAs and during designated times, uniform speed restrictions would apply to all vessels 65 ft (19.8 m) or longer. As previously noted, speeds of 10, 12, or 14 knots are being considered.

2.1.3 Northeastern United States

Right whales use the NEUS region mostly for foraging activities. Data indicate that right whales concentrate their feeding efforts in four distinct zones of the NEUS region: Cape Cod Bay, Off Race Point, the Great South Channel, and the Gulf of Maine. Proposed measures for the NEUS vary with the zone considered. Together, they include designation of new shipping lanes, and speed restrictions (10, 12, or 14 knots) within SMAs and DMAs.

2.1.3.1 Cape Cod Bay

Area and Time

Right whales feed in Cape Cod Bay winter through spring while food is abundant. Cape Cod Bay was designated as a right whale critical habitat in 1994, as it is an important feeding and aggregation area for the right whale. (The critical habitat petition referred to in Section 2.1.1 also requested the expansion and combination of the Cape Cod Bay and Great South Channel critical habitat areas. NMFS concluded that this request was unwarranted at the time, but analysis is underway about redefining the areas).

The Cape Cod Bay SMA covers the entire bay, including the Cape Cod Bay Critical Habitat and the entire area directly west of the critical habitat to the shoreline, with a northern boundary of 42°12’N latitude (Figure 1-3).

Operational restrictions would apply to this management area, corresponding with right whale occurrence.

Operational Measures

NMFS proposes to restrict vessel speed throughout the Cape Cod Bay SMA from January 1 to May 15. In addition, assuming navigational risks relative to the routes being proposed are not indicated by the USCG PARS analysis, routes providing reduction in the risk of collisions between vessels and whales would be established. Routes are being considered from Cape Cod Canal through right whale critical habitat, on the western side of the bay, towards Massachusetts Bay and other points north (see Figure 2-12). Mariners would be required to abide by the speed restrictions in recommended routes that are located within SMAs. Recommended shipping routes would be established to minimize the travel distance through Cape Cod Bay critical habitat for ships entering and leaving the port of Provincetown from Cape Cod Canal or from the north, by routing ships along the edges of the critical habitat (NMFS, 2004e). The coordinates for the proposed shipping lanes are listed in Table 2-2.

Table 2-2
Coordinates of Proposed Shipping Lanes in Cape Cod Bay

LAT (deg)	LON (deg)	LAT (deg-min-sec)	LON (deg-min-sec)
-70.4896772	41.7885455	-70° 29' 22.83792"	41° 47' 18.7638"
-70.4827343	41.8146559	-70° 28' 57.84348"	41° 48' 52.76124"
-70.5424946	42.1675345	-70° 32' 32.98056"	42° 10' 3.1242"
-70.8654784	42.3844524	-70° 51' 55.72224"	42° 23' 4.02864"
-70.8502658	42.3967622	-70° 51' 0.95688"	42° 23' 48.34392"
-70.5239957	42.1778024	-70° 31' 26.38452"	42° 10' 40.08864"
-70.4869337	42.2550552	-70° 29' 12.96132"	42° 15' 18.19872"
-70.4657938	42.2492941	-70° 27' 56.85768"	42° 14' 57.45876"
-70.505568	42.1664195	-70° 30' 20.0448"	42° 9' 59.1102"
-70.1920919	42.0055935	-70° 11' 31.53084"	42° 0' 20.1366"
-70.2047347	41.991752	-70° 12' 17.04492"	41° 59' 30.3072"
-70.4923409	42.1392357	-70° 29' 32.42724"	42° 8' 21.24852"
-70.437294	41.814436	-70° 26' 14.2584"	41° 48' 51.9696"
-70.4458163	41.782085	-70° 26' 44.93868"	41° 46' 55.506"

2.1.3.2 Off Race Point Area

Area and Time

Race Point is a specific location at the tip of Cape Cod, and the Off Race Point SMA is located around the northern end of Cape Cod. As food resources in Cape Cod Bay diminish toward the end of April, right whales begin to migrate offshore to the Great South Channel in search of prey aggregations. Before reaching the Great South Channel, right whales tend to transit or aggregate in neighboring areas, such as Stellwagen Bank, areas east of Stellwagen Bank, and the northern end of Provincetown Slope, which is the area east of Cape Cod to the Great South Channel. For the purposes of this EIS, the areas are referred to as the “Off Race Point” area; a box approximately 50 nm by 50 nm to the north and east of Cape Cod. Based on right whale sighting data and vessel traffic patterns, the Off Race Point area (Figure 1-3) within which the proposed measures would apply, is defined by the following latitudes and longitudes.

Proposed Shipping Lanes in Cape Cod Bay

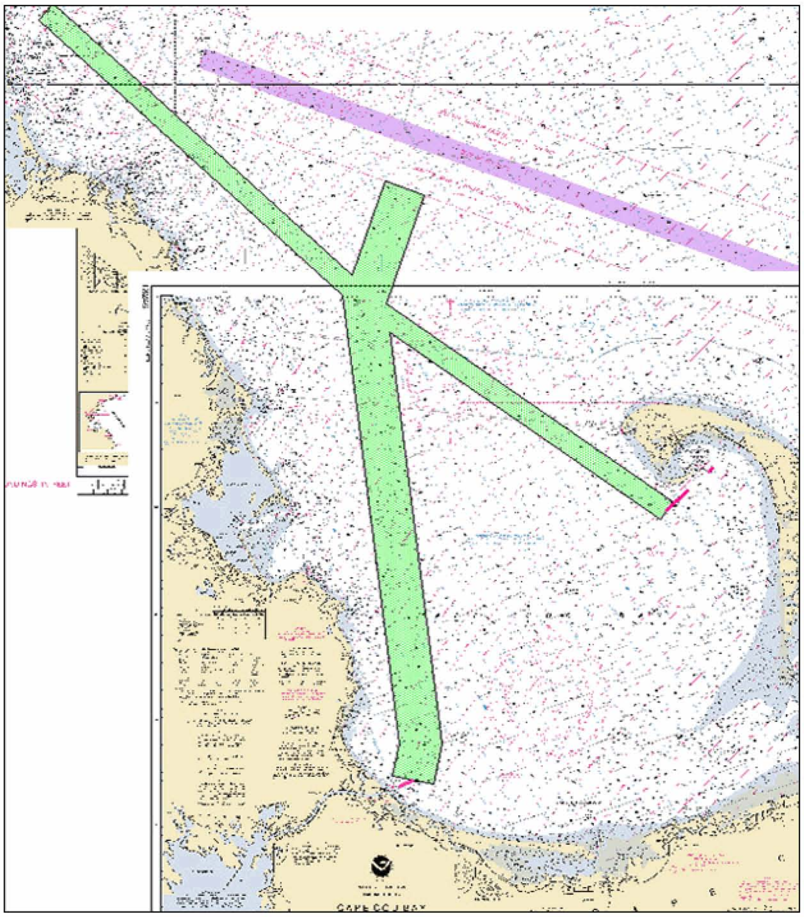


Figure 2-12

This Page Intentionally Left Blank

Location	Latitude (N)	Longitude (W)	Comment
NW Corner	42° 30’	70° 30’	
NE Corner	42° 30’	69° 45’	
SE Corner	41° 40’	69° 45’	
Southern Mid-point	41° 40’	69° 57’	Continues North along the eastern shore of Cape Cod to the next point
Western Center-point	42° 04.8’	70° 10’	(Northern tip of Cape Cod)
Western Center-point	42° 12’	70° 15’	(NE corner of critical habitat)
SW Corner	42° 12’	70° 30’	(NW corner of critical habitat)

Ship traffic within the Off Race Point area is heavy, primarily in and out of Boston Harbor, thereby exposing right whales to the possibility of ship strikes. In fact, Boston was the most frequently reported destination for ships that traveled through designated critical habitat areas; 69 percent of the 2,146 ships that reported to the Northeast MSRS were headed for Boston (Ward-Geiger *et al*., 2005). Operational restrictions would apply to the Off Race Point area from March 1 to April 30, consistent with historic right whale sighting information.

Operational Measures

During the designated time of year, mariners within the Off Race Point area would be required to abide by speed restrictions or to route around the area.

2.1.3.3 Great South Channel

Area and Time

During spring and early summer, large numbers of right whales aggregate in the Great South Channel, a designated critical habitat and an important feeding ground. This critical habitat area is located in the southern portion of the Great South Channel management area (Figure 1-3). At times, more than half the entire right whale population is feeding in or passing through the Great South Channel. Some individuals are rarely, if ever, observed in other feeding grounds (such as the Bay of Fundy) at this time of year.

Based on right whale sighting and recent survey data, the designated area in the Great South Channel within which the proposed measures would apply including part of Georges Bank (Figure 1-3), is defined by the following latitudes and longitudes:

Location	Latitude (N)	Longitude (W)
NW Corner	42° 30’	69° 45’
NE Corner	42° 30’	67° 27’
SE Corner	42° 09’	67° 08.4’
Southern Mid-point	41° 00’	69° 05’
SW Corner	41° 40’	69° 45’

The Great South Channel experiences heavy commercial ship traffic; analysis of reports to the MSRS identified three high-use traffic corridors that extend across Great South Channel critical habitat (Ward-Geiger *et al*., 2005). Thus vessel collisions with right whales are a serious risk in spring and early summer feeding season. Operational restrictions would apply to the Great South Channel area from April 1 to July 31, corresponding with the peak period of right whale presence.

Operational Measures

All vessels 65 ft (19.8 m) and over would be required to adhere to speed restrictions in the Great South Channel management area, including the critical habitat area from April 1 to July 31. As previously noted, three speed limits are being considered: 10, 12, and 14 knots.

2.1.3.4 Gulf of Maine

Area and Time

For the purposes of this EIS, the Gulf of Maine area is considered to be all waters within the US jurisdiction north of aforementioned NEUS management areas. Operational restrictions would apply to the Gulf of Maine area at all times.

Operational Measures

The Gulf of Maine would be subject to DMAs until better data are available to support seasonal management or implementation of other specific measures. A description of the triggers for and area of a DMA is provided in Section 2.1.4.

2.1.3.5 Summary of Proposed Operational Measures in the NEUS Region

A summary of the proposed measures in the NEUS region is presented in Table 2-3.

Table 2-3
Summary of Proposed Operational Measures in the NEUS Region

Area	Type of Measure	Period When Applicable
Cape Cod Bay	Speed restrictions in the CCB seasonal management area and portions of the shipping lanes within this area	January 1 to May 15
Off Race Point Area	Speed restrictions in the Off Race Point SMA	March 1 to April 30
Great South Channel	Speed restrictions in the Great South Channel management area, including critical habitat	April 1 to July 31
Gulf of Maine	DMAs	Year round

2.1.4 All Areas

In addition to the region-specific measures previously described, all areas within the Atlantic Ocean (US Territorial waters and EEZ) would be subject to the designation of DMAs as described below.

DMAs consist of a circular buffer zone drawn around a core area of whale sightings that would protect certain aggregations against ship strikes outside of the times and locations of SMAs. The size of the buffer is determined by the number of whales sighted in a specific area, which is described below. Vessels in that area would be required to travel at a reduced speed or route around.

Certain right whale aggregations, locations, and behaviors would trigger the implementation of a DMA, and are based on the ALWTRP DAM trigger criteria, which was developed by Clapham and Pace (2001). In addition, several new triggers that are being proposed for DMA implementation. These additional triggers account for whale aggregations and behavior that would make a whale highly vulnerable to ship strikes. A DMA action would be triggered by a single reliable report from a qualified individual[6] of an aggregation of three or more right whales within 75 square nautical miles (nm^2) (257 km^2), such that right whale density is equal to or greater than 0.04 right whales per nm^2 (3.43 km^2), which is equivalent to four right whales per 100 nm^2 (343 km^2). The following conditions would also trigger the designation of a DMA:

1. A concentration of three or more right whales.
2. One or more whales within a TSS, recommended shipping route, or within a mid-Atlantic 30 nm (56 km) port entrance zone and the whales show no evidence of continued coast-wise transiting (e.g., they appear to be nonmigratory or feeding).

Once a DMA is triggered, NMFS is considering the use of the following procedures and criteria to establish a DMA:

1. A circle with a radius of at least 2.8 nm (5.2 km) would be drawn around the location of each individual sighting. This radius would be adjusted for the number of observed whales, so that a density of four right whales per 100 nm^2 (343 km^2) is maintained. Information on how to calculate the length of the radius can be found in the Final Rule to amend the regulations that implement the ALWTRP (67 FR 1133).
2. If any circle or group of contiguous circles includes three or more right whales, this core area and its surrounding waters would be a candidate DMA zone.

Once NMFS identifies a core area containing three or more whales, the agency would expand this initial core area to provide a buffer in which the whales could move and still be protected. NMFS will determine the extent to the DMA zones as follows:

1. A large circular zone would be drawn extending 15 nm (27.8 km) from the perimeter of a circle around each core area.
2. The DMA would be a polygon drawn outside, but tangential to, the circular buffer zone(s), defined by the latitudinal and longitudinal coordinates of its corners.

A DMA would remain in effect for a minimum of 15 days from the date of the initial designation and automatically expire after that period if NMFS does not modify the duration of the DMA. The period may be changed if subsequent surveys within the 15-day period demonstrate (a) whales are no longer present in the zone, in which case the DMA would expire immediately upon making this determination; or (b) the aggregation had persisted, in which case NMFS would be extend the period for an additional 15 days from the date of the most recent sightings in the zone.

Mariners would be required to proceed at the designated restricted speed in the DMA or route around the area. As previously noted, three potential speeds are being considered in this EIS: 10, 12, and 14 knots.

---

[6] A qualified individual is an individual ascertained by NMFS to be reasonably able, through training or experience, to identify a right whale. Such individuals include, but are not limited to, NMFS staff, USCG and Navy personnel trained in whale identification, scientific research survey personnel, whale watch operators, naturalists, and mariners trained in whale species identification through disentanglement training or some other training program deemed adequate by NMFS. A reliable report is a credible right whale sighting based upon which a DAM zone would be triggered.

2.1.5 Summary of Proposed Operational Measures

A summary of the proposed operational measures is provided in Table 2-4.

Table 2-4
Summary of Proposed Operational Measures

Region	Proposed Measures	Areas of Application	Period of Application
Southeast (SEUS)	Speed restrictions in the Southeast SMA and shipping lanes	Ports of Jacksonville, Fl; Fernandina, FL; Brunswick, GA; and SE management area	November 15 to April 15
Mid-Atlantic (MAUS)	SMAs around nine port areas with speed restrictions	South & east of Block Island Sound (Montauk Point to western end of Martha's Vineyard)	November 1 to April 30
		Ports of New York & New Jersey	
		Delaware Bay (Ports of Philadelphia & Wilmington)	
		Entrance to Chesapeake Bay (Ports of Hampton Roads & Baltimore)	
		Ports of Morehead City & Beaufort, NC	
		Port of Wilmington, NC	
		Port of Georgetown, SC	
		Port of Charleston, SC	
		Port of Savannah, GA	
Northeast (NEUS)	Speed restrictions in the CCB seasonal management area and shipping lanes	Cape Cod Bay	January 1 to May 15
	Speed restrictions in the ORP seasonal management area	Off Race Point	March 1 to April 30
	Speed restrictions in GSC seasonal management area	Great South Channel	April 1 to July 31
	DMAs	Gulf of Maine area	Year round
All Three Regions	DMAs	US territorial waters and EEZ	Year round

2.2 Alternatives Considered in This EIS

Aside from Alternative 1, each of the alternatives considered in this EIS implements the operational measures described in Section 2.1, from none at all, (Alternative 1: No Action) to individual measures, (Alternatives 2, 3, and 4) a combination, (Alternative 5) and finally a subset of the operational measures (Alternative 6). In some cases, the measures proposed for implementation under a given alternative have been modified to ensure that the alternative is a reasonable and feasible option to meet NMFS' purpose and need. For all alternatives that include speed restrictions, the EIS evaluates three potential maximum speeds: 10, 12, and 14 knots. The final rule will identify the final speed restriction.

2.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, none of the operational measures would be implemented. Mariners would not be subject to new regulations to reduce right whale ship strikes. NMFS would continue to implement existing measures and programs to reduce the likelihood of right whale mortalities from ship strikes. Research would continue and existing technologies would be used to determine whale locations and pass this information on to mariners. Other ongoing activities would include the use of aerial surveys to notify mariners of right whale sighting locations, the operation of MSRS, support of Recovery Plan Implementation Teams, education and outreach programs for mariners, and ongoing research on technological solutions. The Strategy's other components (see Section 1.3) may be implemented, and existing conservation measures (see Section 1.2) would remain active.

Alternative 1 is not a reasonable alternative because existing conservation measures have not sufficiently reduced the threat of ship strike or improved chances for recovery. Therefore, this alternative does not meet the requirements of the ESA and the MMPA, and NMFS would not be able to fulfill its mandate to protect the endangered North Atlantic right whale as specified in these two statutes. However, it is analyzed throughout the EIS per the Council on Environmental Quality's regulations, because it provides a baseline against which to assess the impacts of the action alternatives.

2.2.2 Alternative 2 – Dynamic Management Areas

Alternative 2 would incorporate the elements of Alternative 1 (i.e., continuing existing conservation measures) plus the DMA component of the proposed operational measures, as described in Section 2.1.4. DMAs would be defined, as warranted by right whale sightings, in all areas within the Atlantic Ocean (US Territorial waters and EEZ).

Successful implementation of this alternative would depend on maintaining survey efforts and ensuring that efforts are made to make, record, and make available the specific sighting locations. Therefore, it would require a commitment to continuing aircraft surveillance coverage and expanding coverage in the mid-Atlantic, as necessary. This alternative would require a larger commitment of resources than the other alternatives as aerial surveys are time intensive and expensive. Aerial surveys can also present human safety issues when there is inclement weather or low visibility.

2.2.3 Alternative 3 – Speed Restrictions in Designated Areas

This alternative includes the elements of Alternative 1 plus certain speed restrictions in designated areas. Since speed restrictions would be the only measure implemented under this alternative, the areas and times applied to these restrictions would be different from the areas and times for similar restrictions proposed as part of the entire set of measures described in Section 2.1. Specifically, the designated areas considered under this alternative are both larger in size and would extend for a greater length of time, with the exception of those located in the SEUS, where speed restrictions would be in place for a shorter length of time. There are no routing measures and no DMAs proposed under Alternative 3. The proposed restrictions would apply as follows:

- In the NEUS region, year-round restrictions within all waters in the Seasonal Area Management (SAM) zones designated in the ALWTRP. There are currently two SAM zones in the Northeast: SAM West, in effect from March 1 to April 30; and SAM East, in effect from May 1 to July 31. The boundary between SAM West and SAM East is 69°24'W longitude. These areas adjoin, although are exclusive of, Cape Cod Bay and the Great South Channel critical habitats (NMFS, 2005a). The preferred alternatives considered in the ALWTRP DEIS propose to expand these zones. The proposed SAM zones are shown in Figure 2-13. By the time the operational measures of the Strategy are implemented, it is likely that the expanded zones in the ALWTRP would be operational; therefore, these would be the application zones for this alternative.
- In the MAUS region, restrictions from October 1 to April 30. The restricted area would include all waters 25 nm (46 km) out from the US coastline between Providence, RI/New London, CT (Block Island Sound), and Savannah, GA.
- In the SEUS region, restrictions from December 1 to March 31. The restricted area would include all waters within the MSRS WHALESSOUTH reporting area (Section 1.2.1.2) and the presently designated right whale critical habitat (Figure 2-14).

2.2.4 Alternative 4 – Recommended Shipping Routes

This alternative includes all the elements of Alternative 1 plus the recommended shipping routes component of the proposed operational measures, as described in Sections 2.1.1 (for the SEUS region) and 2.1.3 (for the NEUS region), and an ATBA in the Great South Channel. The shipping lanes would be operational in the NEUS from January 1 to April 30 and in the SEUS from December 1 through March 31. Alternative 4 does not propose speed restrictions in these shipping lanes. No measures would apply to the MAUS region.

The Great South Channel management area (see 2.1.3.3) would be designated an ATBA in Alternative 4. This ATBA would be proposed to the International Maritime Organization (IMO) for endorsement. If accepted by the IMO and when implemented, the ATBA would apply to all ships 300 gross registered tonnage (GRT) and above. These ships would be expected to avoid the area on a voluntary basis from April 1 to July 31. Vessels under 300 GRT but 65 ft (19.8 m) long or more would be subject to uniform speed restrictions within the ATBA.

Additionally, as part of Alternative 4, NOAA is proposing a shift in the Boston Traffic Separation Scheme (TSS) to avoid high density aggregations of whales at the northern end of Cape Cod Bay and Stellwagen Bank (Figure 2-15). A 12 degree (not in latitude and longitude) northern rotation of the east-west leg of the Boston TSS has been proposed. The proposed change would increase the length of the TSS by approximately 3.75 nm (6.9 km). The second component of the proposed amendment would narrow each lane of the TSS from two miles to one and a half miles in width; however, the separation zone between the two lanes would remain unchanged at its current one mile width. The interagency review process was completed in

Expanded Seasonal Area Management (SAM) Areas

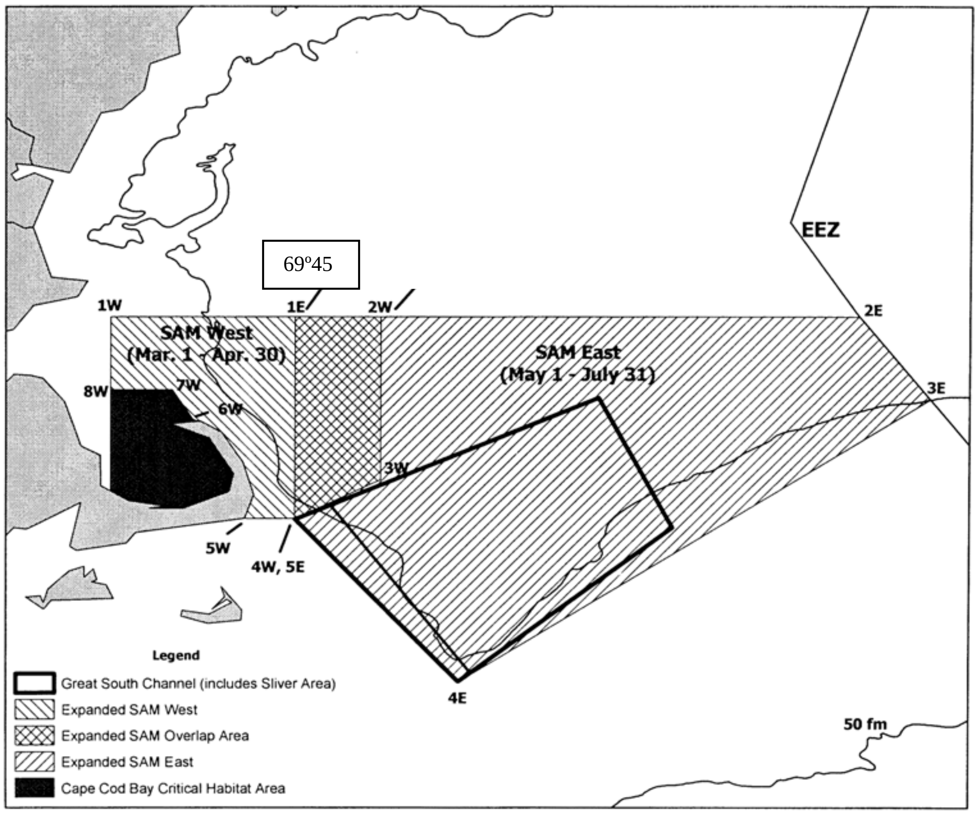


Figure 2-13

This Page Intentionally Left Blank

Alternative 3 – U.S. East Coast Proposed Regulatory Areas

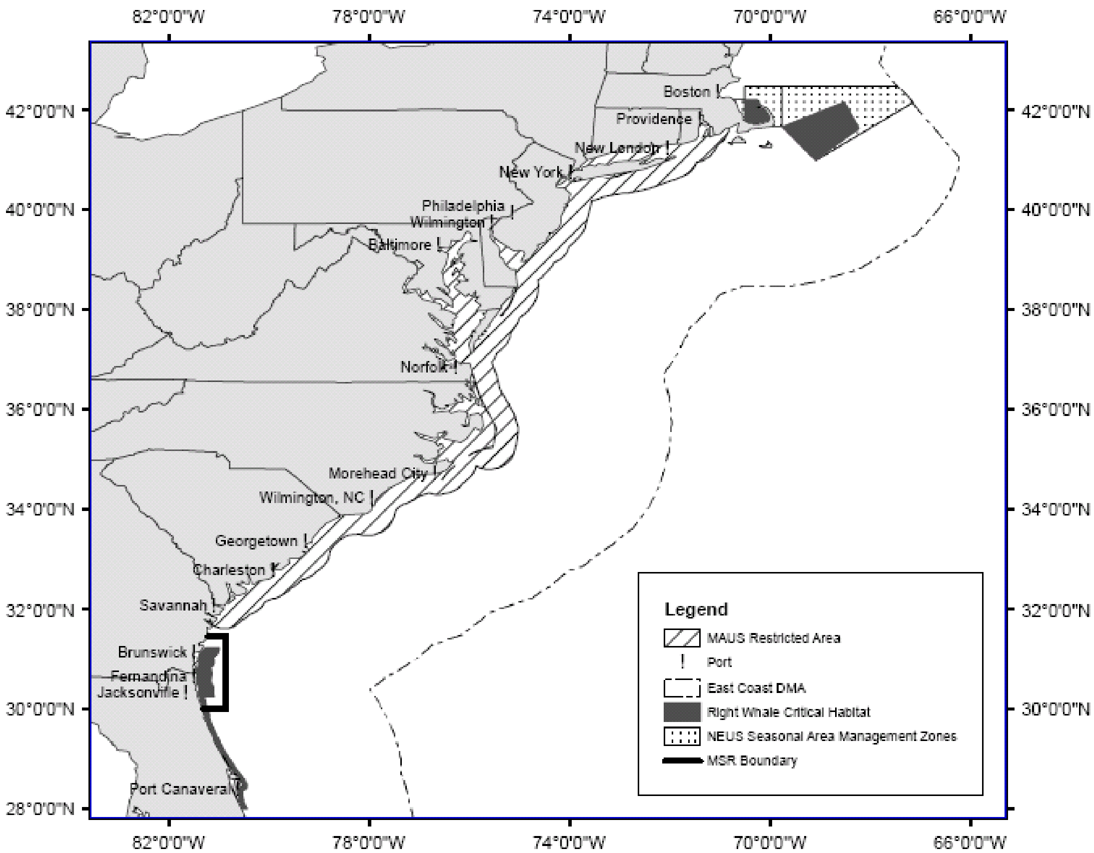
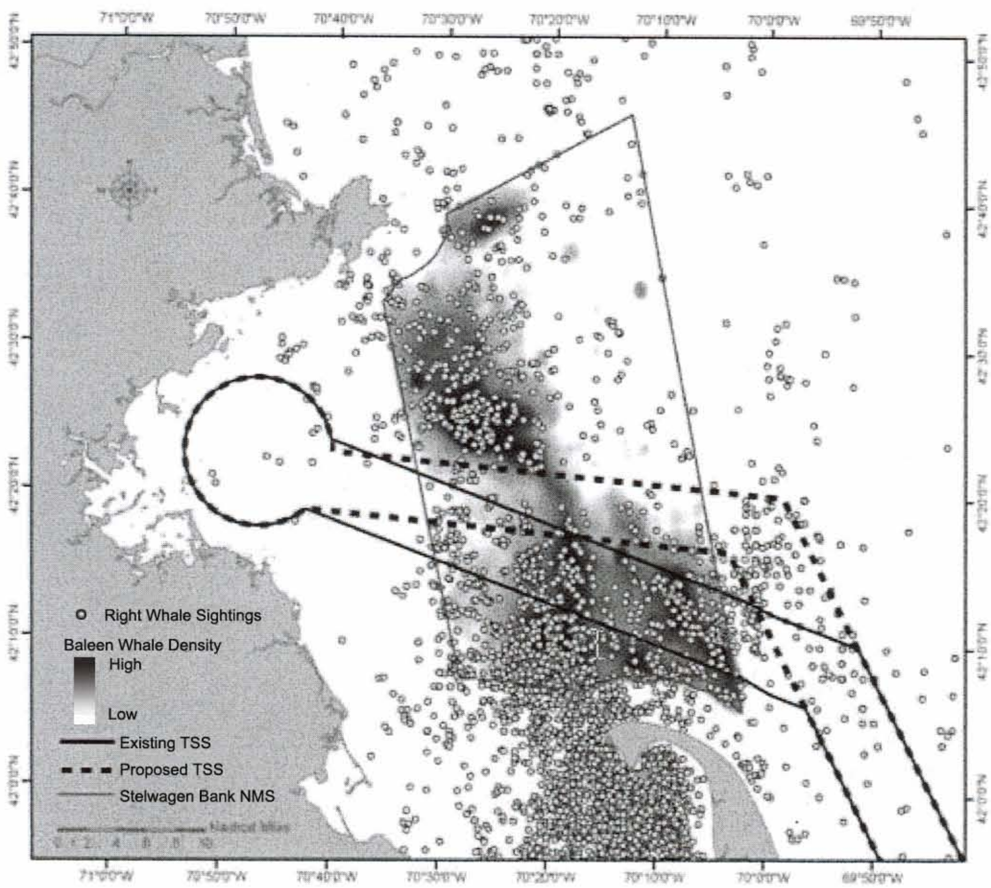


Figure 2-14

This Page Intentionally Left Blank

Distribution of Right Whales
Relative to the Existing & Proposed Boston TSS



**Note: Baleen Whale Density is also depicted.*

Figure 2-15

This Page Intentionally Left Blank

March of 2006, and the proposal was submitted to the IMO in April 2006. If endorsed by the IMO, NOAA expects to make the change to the TSS in 2007. The shifted segment is defined by the following coordinates.

Location	Latitude (N)	Longitude (W)
NW Corner	42° 22' 47.50"	70° 40' 13.15"
NE Corner	42° 20' 7.08"	69° 58' 30.83"
SW Corner	42° 18' 55.12"	70° 42' 33.77"
SE Corner	42° 16' 26.04"	70° 3' 31.50"

2.2.5 Alternative 5 – Combination of Measures

This alternative would include all elements of Alternatives 1 to 4 as previously described. Therefore, it would implement all the operational measures described in Section 2.1, and additionally incorporate the modified speed restriction areas and dates that are part of Alternative 3, the Great South Channel ATBA, and the proposed change to the Boston TSS proposed under Alternative 4. Alternative 5 is similar to Alternative 6, although it includes speed restrictions in larger areas and for a greater length in time (Section 2.2.3), and the additional routing requirements mentioned above (Section 2.2.4). As Alternative 5 includes all of the operational measures (regulatory and nonregulatory) it also provides the highest level of protection to the right whale population.

2.2.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Under Alternative 6, the preferred alternative, NMFS would implement the operational measures as initially identified in the Right Whale Ship Strike Reduction Strategy and described in Section 2.1, except for the ATBA and Boston TSS, the nonregulatory measures analyzed in Alternative 4 and 5. These nonregulatory measures are ultimately an IMO action from a United States proposal, and are not proposed as a part of the proposed rule.

2.2.7 Summary of Alternatives

Table 2-5 summarizes the alternatives considered in this EIS.

2.3 Alternatives Considered and Dismissed from Further Analysis

Based on consultations, meetings, and public comments involving participants from NMFS, other Federal agencies, state agencies, concerned citizens and citizen groups, environmental organizations, and the shipping industry, many potential operational measures were identified that might be considered to reduce right whale ship strikes. This section discusses alternatives that were considered and dismissed from further analysis because the measures did not meet the purpose and need of the EIS because they:

Table 2-5
Summary of Alternatives Considered in this EIS

Operational Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
New routing requirements	No	No	No	Yes, in SEUS and NEUS regions, plus proposed modification to Boston TSS, and ATBA.	Yes, in SEUS and NEUS regions, plus proposed modification to Boston TSS, and ATBA.	Yes, in SEUS and NEUS regions
DMAs	No	Yes, in US Territorial waters and the EEZ	No	No	Yes	Yes, in SEUS, MAUS, and NEUS regions
SMAs	No	No	No	No	No	Yes, in SEUS, MAUS and NEUS regions
Speed restrictions	No	Yes, associated with DMAs	Yes, within specific areas in each implementation region, year round in NEUS region and seasonal in MAUS and SEUS regions.	No	Yes, associated with DMAs, and within the areas defined for Alternative 3	Yes, associated with DMAs, and all SMAs.

- Were not sufficiently protective of right whales.
- Imposed too many restrictions on the shipping industry or would significantly hinder maritime commerce.
- Failed to allow the agency to fulfill its mandate and/or required too much in terms of agency resources.
- Were based on currently unavailable technology.

Measures potentially applicable to more than one geographic area are addressed in Sections 2.3.1 to 2.3.8. Sections 2.3.9 to 2.3.13 address dismissed alternatives that were region-specific.

2.3.1 Speed Restrictions 8 Knots or less or over 14 Knots

NMFS dismissed alternatives involving speeds at or less than 8 knots because these speeds might affect the vessel's maneuverability and would result in undue economic hardship to the shipping industry. Although a speed restriction of 8 knots or less would significantly reduce the severity and number of ship strikes, it would also have an economic impact several magnitudes higher than that of the range of speed restrictions considered in the alternatives. Therefore, speed restrictions at this lower end of the spectrum would not meet the purpose and need.

Speeds greater than 14 knots, on the other hand, would have significantly less economic impacts. However, speed restrictions at this higher end of the spectrum would not meet the purpose and need because they would not substantially reduce the risk of ship strikes since the majority of historical ship strikes occurred with vessels traveling at 14 knots or faster (Jensen and Silber, 2003; Laist *et al*., 2001).

2.3.2 Restrictions for Vessels less than 65 Feet

Although vessels less than 65 ft (19.8 m) in length may cause damage to right whales, the majority of ship strike records involve large ships. Smaller, faster vessels with planning hulls have shallow drafts and are highly maneuverable, resulting in lower risk. Similarly sized vessels with single positive displacement hulls are limited in speed by their hull speed[7], which is proportional to their waterline length; therefore these vessels also have a lesser chance of seriously injuring or killing a whale. Consequently, NMFS dismissed any alternatives that would include restriction to vessels less than 65 ft (19.8 m) in length.

2.3.3 Satellite Tagging

NMFS dismissed the option of attaching implantable satellite tags to all or nearly all individual right whales for tracking and avoidance from further consideration because satellite tags are difficult to attach to whales, often have a short useful life, and may cause health problems, as a few tagged whales have shown swelling at the implantation sites. Even if tags could be successfully and safely attached to most or all whales and real-time information on the location of the whales could be transmitted to ships, mariners would need to avoid collisions and such avoidance would still require slowing down or entirely avoiding certain area maneuvers that are not always possible or feasible. Therefore, in light of potential health concerns of putting implantable tags in a significant number of right whales and technological and logistical constraints associated with tagging, this option was considered unreasonable and was dismissed from further consideration.

2.3.4 Escort Boats Equipped with Acoustic Detection and/or Deterrence Devices

Under this option, escort boats would accompany vessels in the vicinity of regulated port areas and while transiting in critical habitat areas. The escort boat would be equipped with detection or acoustic deterrence devices. A detection device would inform the captain of the presence of whales in the area; a deterrence device would emit some kind of acoustic alert that would encourage the whale to stay away from the ship. However, the kind of technology required for this system does not yet exist and the cost of developing and implementing it (including outfitting the escort boats) would be prohibitive. In addition, studies have shown that the behavioral changes demonstrated when right whales are exposed alarm devices may actually increase their risk of ship strike (Nowacek *et al*., 2003). Last, there are concerns about the impact of adding new sources of noise to the ocean. Consequently, NMFS is not considering this alternative further.

[7] The maximum speed of a ship with a displacement hull is dependent upon the waterline length of the vessel. This speed is called the hull speed. The longer the hull, the higher the hull speed.

2.3.5 Limit Port Approaches to Daylight Transits Only

The premise for this potential measure is that vessels cannot spot a right whale at night; therefore, vessels would limit their travel through whale-sensitive areas to daytime only. However, there is little expectation that vessel crews could reliably, consistently, and under all sea conditions, spot a right whale even in daylight. Further, sighting a whale does not ensure that the mariner would be able to then avoid the whale. This measure would significantly hinder maritime commerce for little potential return. Therefore, NMFS dismissed this option from further consideration.

2.3.6 Voluntary Measures

NMFS also dismissed from further consideration voluntary compliance implementing suggested —as opposed to mandatory—operational measures. Shipping companies that would choose to participate would suffer a competitive disadvantage compared to the companies that would choose not to participate, and therefore, few companies would likely choose to participate. As a result, merely voluntary measures would not fulfill NMFS requirements under the ESA. The relatively low initial compliance rate for the MSRS (Section 1.2.1.2) confirms that without associated education and enforcement programs, a ship strike reduction strategy would have very limited success. Therefore, voluntary measures would not be a viable alternative to meet NMFS purpose and need.

2.3.7 Requiring Trained Marine Mammal Observers on Commercial Shipping Vessels

NMFS has considered requiring the posting of trained marine mammal observers on vessels 65 ft (19.8 m) and greater to detect whales in advance of vessels. However, there are several limitations associated with this measure that preclude it from being a viable ship strike prevention measure. The bridge of most commercial shipping vessels is toward the aft of the ship, which would limit the observer's field of view and prevent the individual from sighting a whale directly in front of the vessel. Further, the probability of an observer sighting a whale in rough seas or in times of low visibility are limited, and null during the night. In the event that a whale is sighted by the observer, depending on the location of the whale relative to the vessel, there might not be sufficient time for the captain to slow the vessel or change direction to avoid the whale. For these reasons, NMFS is not considering this measure further in this EIS.

2.3.8 Including Federal Vessels

NMFS has considered including vessels owned or operated by, or under contract to, Federal agencies into one or more of the alternatives. NMFS believes that the national security, navigational and human safety missions of some agencies may be compromised by mandatory vessel speed restrictions. As mentioned in Section 1.8.3, NMFS will be reviewing the Federal actions involving vessel operations to determine where ESA Section 7 consultations would be appropriate. NMFS also requests all Federal agencies to voluntarily observe the conditions of the proposed regulations when and where their missions are not compromised.

2.3.9 Management Measures South of the SEUS Critical Habitat

Extending the Southeast management area south of the SEUS critical habitat boundary was found to be unnecessary, though the critical habitat extends south of that area, 5 nm (9.3 km) from the coast, down to Port Canaveral. The waters are shallow, keeping deep draft and other vessels offshore. The pilot buoy for Port Canaveral is 3 nm (5.6 km) from the coast. Most vessels calling at Port Canaveral take on a pilot and would have to slow well before the pilot buoy. No operational measures for this area are appropriate; therefore, this consideration is dismissed from further analysis.

2.3.10 New Shipping Lanes in the MAUS Region

The option to define new shipping routes in the MAUS region is not reasonable because of the expansive size of the area, right whale migratory patterns in this region are somewhat unpredictable, and there are not many existing shipping lanes in the MAUS. Defining new shipping lanes in the MAUS region would unnecessarily constrain the shipping industry without resulting in any substantial benefits to the right whale population. Therefore, NMFS is not considering this option in the EIS.

2.3.11 Implement an MSRS in the MAUS Region

Implementing an MSRS in the MAUS region was dismissed from further analysis because the MAUS region is a relatively narrow migratory corridor for right whales, and few if any sustained aggregations occur in this area. Migrating whales are difficult to spot via surveys; the whales, generally in transit, are more difficult to sight, thus only a small amount of real-time information would be transmitted back to a ship. Also, the sighting locations are likely to be short-lived due to whale movement. Another factor that makes implementation of an MSRS impractical is the large expanse of waters in the MAUS region where whales might be found. Finally, whales' presence varies seasonally in the MAUS, which would complicate compliance with the MSRS. Overall, the conservation benefits of this measure likely would not outweigh the resources needed to operate and maintain the system. Therefore, implementation of an MSRS in the MAUS area is not a reasonable alternative and NMFS is not considering this measure further in this EIS.

2.3.12 Expand Existing MSRS into the Gulf of Maine

Many of the vessels over 300 GRT entering the Gulf of Maine transit through the existing MSRS reporting area in the Northeast. Whale sightings throughout the Gulf of Maine (within the area of responsibility of the First Coast Guard District) are reported to ships via the MSRS, NAVTEX[8], and Broadcast Notice to Mariners. Therefore, formal extension of the MSRS to the Gulf of Maine is unwarranted, and NMFS is not considering this option further in this EIS. NMFS is planning a comprehensive outreach and education program that would accomplish the same

[8] NAVTEX is an IMO-designated communication system used to transmit urgent marine safety information to ships worldwide. In the US, NAVTEX is broadcast from USCG facilities.

goals as an MSRS without the additional regulatory burden to address those operators and areas (tugs and tows, small ports and pilots) not necessarily covered by the existing MSRS.

2.3.13 Seasonal Management Measures in the Gulf of Maine

While right whales do occur in this area, the occurrence is neither regular nor periodic. Neither where nor when a right whale or aggregation of right whales will appear can be predicted in advance. Therefore, definition of SMAs in the Gulf of Maine area is unwarranted and would unnecessarily burden the shipping industry with little advantage to right whales. Consequently, NMFS is not considering this option further in this EIS.

3 AFFECTED ENVIRONMENT

This chapter describes the environment that may be potentially affected by the implementation of the proposed operational measures. The following areas are addressed: biological resources (including the right whale and other marine species); physical environment; and the economic environment, with a focus on the shipping industry. The geographical area considered spans the East Coast of the United States (US) from Maine to northern Florida, and includes state waters (out to 3 nm [5.6 km]); US territorial waters (out to 12 nm [22.2 km]); and the US Exclusive Economic Zone (out to 200 nm [370.4 km]). Many of the proposed operational measures would be in application within 30 nm (55.6 km) of the coast, where right whales are usually found. As previously noted, for the purposes of the proposed operational measures and this EIS, the area under consideration is divided among the southeastern United States (SEUS), mid-Atlantic United States (MAUS), and the northeastern United States (NEUS) regions. The extent of each region is described in Section 1.3.

3.1 North Atlantic Right Whale Biology

Right whales are mysticetes (baleen whales), mainly inhabiting coastal and continental shelf waters. In the western North Atlantic Ocean, right whales have the following six main habitat areas, shown in Figure 3-1:

1. Coastal waters off the SEUS (mostly off Florida and Georgia)
2. Cape Cod Bay
3. Massachusetts Bay
4. Great South Channel (east of Cape Cod)
5. Bay of Fundy (Canada)
6. Scotian Shelf

The general right whale seasonal migration patterns are relatively well documented, though some right whales, especially males and nonpregnant adult females, may not follow specific patterns. Typically, pregnant females, females with young calves, and juveniles, as well as a few atypical individuals migrate seasonally along the eastern seaboard of the US and Canada between calving grounds in the south and feeding areas in the north, generally via near shore waters in the mid-Atlantic (Figure 3-1). The peak migration periods are November/December and March/April. In waters along the US mid-Atlantic, most sightings occur within 30 nm (56 km) of the coastline and in waters less than 20 fathoms (36.6 m) deep (Knowlton *et al*., 2002). Whales generally migrate alone or in mother-calf pairs. Males and nonpregnant females are sometimes observed in the calving grounds; however, it is unknown where the bulk of the noncalving population spends the winter. More research and data are needed to fully understand right whale biology and behavior.

3.1.1 Reproduction

3.1.1.1 Habitat

The SEUS region is the only known calving and nursery area for the western stock of the North Atlantic right whale. Right whales give birth in the shallow coastal waters off the coasts of Georgia and Florida during the winter months. Mothers and calves arrive in this region from November to December and remain in the calving grounds until March or April, when they migrate north.

On June 3, 1994, NMFS designated waters along the Georgia and northeastern Florida coasts as right whale critical habitat (Figure 1-1). The SEUS region Northern Right Whale Critical Habitat includes the coastal waters between the latitudes of 31°15' N and 30°15' N from the coast out 15 nm (28 km) and the coastal waters between the latitudes of 30°15' N and 28°00' N from the coast out 5 nm (9.3 km) (50 CFR 226). As many as 90 animals have been seen in a given year in the SEUS region.

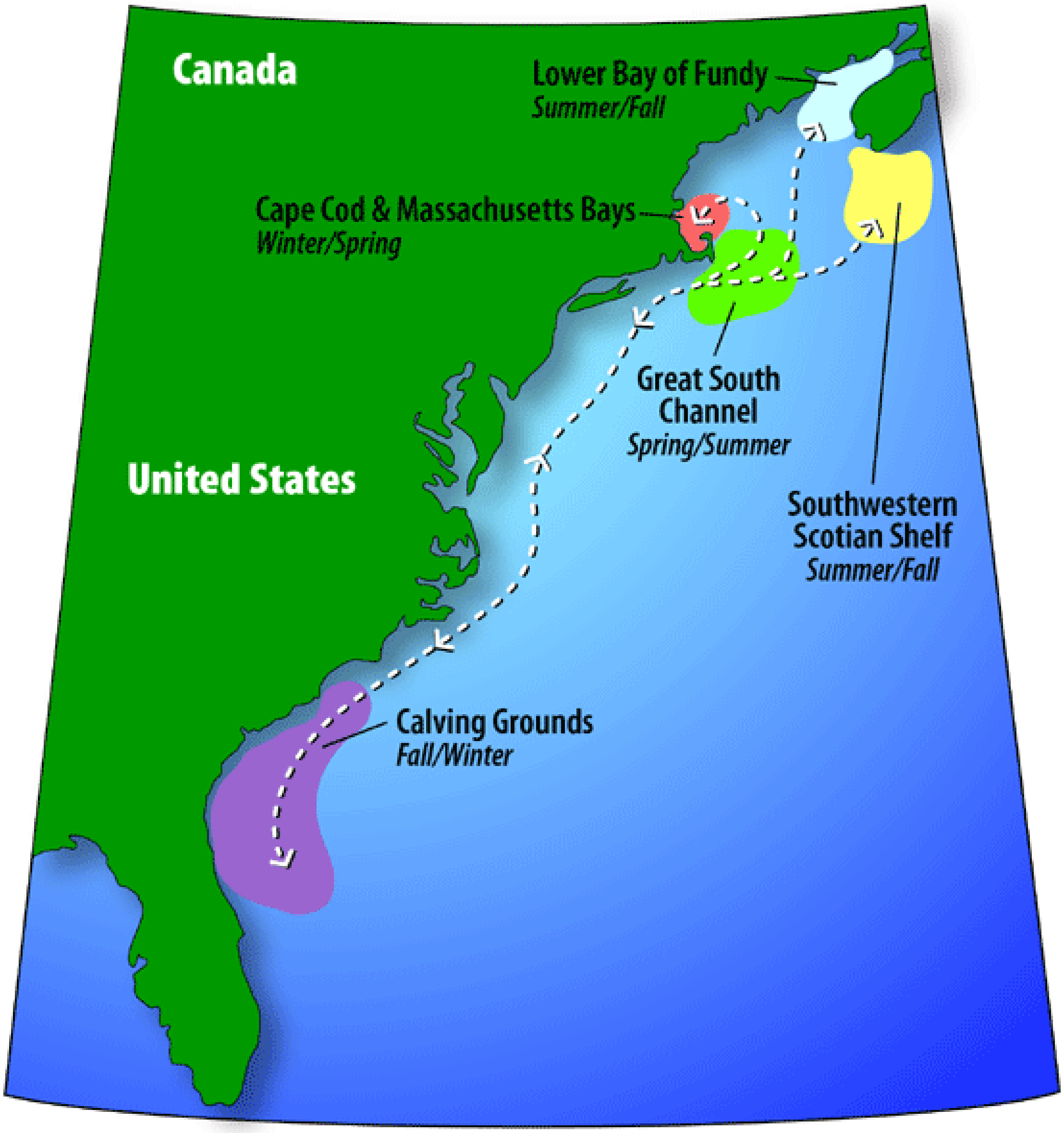
3.1.1.2 Behavior

Right whales engage in competitive mating behavior. They form mating aggregations, and several males compete for a single adult female. The female produces vocalizations to attract males, and males compete for a position adjacent to the female to gain the best chance of mating (Kraus and Hatch, 2001). It is possible that more than one male actually mates with a given female. Mating aggregations have been observed year-round and may serve other social purposes as well. Males have no role in raising the calf. Although mating behaviors have been observed from time to time, exact breeding habitat areas are unknown.

Females usually reach sexual maturity at the age of 7 to 10 years and about 60 percent of the current female population is estimated to be reproductively mature (Hamilton *et al.*, 1998a *in* NMFS 2005b). A new method to assess reproductive status measuring estrogens, progestins, androgens, and other metabolites in right whale fecal samples has recently been developed (Rolland *et al.*, 2005). This technique may allow for a more accurate determination of the age of sexual maturation than the current method that uses the mean age of first calving (Rolland *et al.*, 2005). Gestation lasts from 12 to 16 months. The mother and calf remain close until weaning, which generally occurs when the calf is 10 to 12 months old. Mother-calf pairs tend to remain separate from other pairs. The female then requires one or two years of reproductive rest to recoup the high energy investment necessary to give birth to and raise a calf (Kraus and Hatch, 2001).

Until recently, the average calving interval for North Atlantic right whale females has been increasing, from 3.67 years in 1980–1992 (Knowlton *et al.*, 1994) to 5.8 years in 1990–1998 (Kraus *et al.*, 2001). In addition to the increased calving interval, calf production and recruitment (the number of calves born each year that survive and become part of the population) were low in the 80s and 90s. Poor reproductive performance in the past could present a significant natural obstacle to population recovery, although recent trends indicate the population may be recovering from the reproductive problems in the 1990s. In April 2000 a workshop, *Cause of Reproductive Failure in North Atlantic Right Whales: New Avenues of Research*, identified factors contributing to this poor performance (Reeves *et al.*, 2000). They are as follows:

North Atlantic Right Whale Habitat and Migration Route



Source: E. Paul Oberlander, Woods Hole Oceanographic Institute Graphic Services

Figure 3-1

This Page Intentionally Left Blank

- Environmental contaminants and endocrine disruptors
- Body condition/nutritional stress
- Genetics
- Infectious diseases
- Marine biotoxins

Right whales may be exposed to a variety of anthropogenic chemical contaminants throughout their range, which can lead to reproductive dysfunction. Theoretically, a loss of genetic diversity can lead to "inbreeding depression," where inbreeding adversely affects a population's reproduction and recruitment rates. Genetic factors might be affected by external factors, including toxic chemicals and poor nutrition (Reeves *et al.*, 2000). Nutrition is directly related to the availability of food, which is dependent on many oceanographic factors, and to a lesser extent, climate. Nutrition has an effect on the reproductive process in both sexes at many levels, and poor nutrition reduces reproductive success (Reeves *et al.*, 2000). Right whale calving rates and reproductive success are likely related to the regional abundance of the copepod (planktonic crustacean) species, *Calanus finmarchicus* that is hereinafter referred to as *C. finmarchicus* (Greene and Pershing, 2004). Competition for food with other species and climate variability decrease food availability and also reduce reproductive success (Kraus *et al.,* 2001).

"The North Atlantic Oscillation (NAO) is a complex climatic phenomenon in the North Atlantic Ocean (especially associated with fluctuations of climate between Iceland and the Azores). It is characterised predominantly by cyclical fluctuations of air pressure and changes in storm tracks across the North Atlantic."[1] The NAO index measures the difference in sea-level pressure between the subtropical high (Azores) and the subpolar (Iceland) low. During a positive phase[2] in the NAO index during the 1980s, slope water temperatures were warmer than average in the Gulf of Maine and *C. finmarchicus* abundance was relatively high. Modeling studies indicate that the stable calving rates of right whales in the 1980's were related to the high abundance in *C. finmarchicus* during this time (Greene *et al*., 2003). Then a decrease in the NAO index in the mid-1990s resulted in low *C. finmarchicus* abundance in the late 1990s, and coincided with declining calving rates from 1993 to 2001 (Greene *et al*., 2003).

This declining reproductive success in the past has been noticed only in the North Atlantic right whale when compared to other baleen whales (NMFS, 2005a). It is, however, variable, like the factors influencing it. Annual calf production was relatively low from 1993 to 2000, averaging around 12 calves (Greene *et al*., 2003). After 2001, calf production increased, although was still variable: 31 in 2001, 21 in 2002, 19 in 2003, 16 in 2004, and 28 in 2005 (Kraus *et al.*, 2005). The 2005 calving season resulted in the birth of 28 calves, the second highest number on record since the 2000–2001 season, when 31 calves were born. This recent increase in births has to be balanced against the observed increase in mortality rate over the period from 1980 to 1998 to a level of 4 (± 1 percent). The total estimated human-caused mortality and serious injury to right whales from 1999 through 2003 is 3.2 per year, a 1.2 increase from the previous estimate (1997 through 2001). This increase in mortality rate could actually reduce the population growth rate

[1] http://en.wikipedia.org
[2] A positive phase occurs when subtropical pressures are higher than normal and subpolar pressures are lower than normal, resulting in above average temperatures in the eastern US (http://www.cpc.ncep.noaa.gov/data/teledoc/nao.shtml).

10 to 12 percent per year (Kraus *et al.*, 2005). Therefore, the negative effect of the mortality rate on the population growth rate may overweigh the positive contribution of calves born during certain years.

3.1.2 Feeding

Like most mysticetes, right whales fast during the winter calving season and feed during the summer. They may also feed opportunistically while migrating (NMFS, 2003c).

3.1.2.1 Prey

Right whales primarily feed on a *C. finmarchicus*, a type of copepod, which is one of the small-to-microscopic organisms that compose zooplankton, the animal equivalent of phytoplankton. Right whales feed by filtering water through their baleen. Right whales target an older copepodite stage of *C. finmarchicus*, fifth copepodite (C5) (Baumgartner *et al*., 2003). At certain times of the year, this stage is generally in a resting state in deep waters, referred to as diapause (Sameoto and Herman, 1990; Miller *et al*., 1991). Although *C. finmarchicus* aggregate at certain depths, they can be found throughout the water column. Optimal right whale foraging is dependent on the location of dense prey patches.

3.1.2.2 Habitat

From late winter to early fall, North Atlantic right whale distribution tends to correlate with the location of *C. finmarchicus*, which is mostly in temperate to subarctic waters. Main feeding grounds are in the north in the spring and early summer, where particularly dense patches of prey occur. The main feeding areas are:

- Cape Cod Bay (late winter)
- Great South Channel (spring)
- Bay of Fundy (summer and early fall)

As these feeding grounds are vital to right whale survival, the areas in US waters were designated as right whale critical habitat by NMFS on June 3, 1994. Two critical habitat areas included the Great South Channel, and portions of Cape Cod Bay and Stellwagen Bank (Figure 1-3). The Great South Channel critical habitat is bounded by the following longitudes and latitudes:

41° 40’ N	69° 45’ W
41° 00’ N	69° 05’ W
41° 38’ N	68° 13’W
42° 10’ N	68° 31’W

The Cape Cod Bay critical habitat is bounded on the south and east by the interior shoreline of Cape Cod (50 CFR 226) and on the north and west by the following longitudes and latitudes:

42° 04.8’ N	70° 10’ W
42° 12’ N	70° 15’ W
42° 12’ N	70° 30’ W
41° 46.8’ N	70° 30’ W

While whales have been sighted year round in Cape Cod Bay, the peak period of feeding in that area is January to May. Whales primarily concentrate in the eastern part of the bay, but as the season progresses, aggregations are seen in the central and southern portions with some sightings in the western part. Right whales spend about one-third of their time surface feeding in the Cape Cod/Massachusetts Bay and Gulf of Maine areas, which may increase ship strike and entanglement risk from buoy line and surface system lines.

From Cape Cod Bay right whales move to the feeding grounds in the Great South Channel, the northern Gulf of Maine, and other areas via the Off Race Point area (Figure 1-3). While in the Great South Channel (April to June with occasional appearances year-round), right whales spend approximately 10 percent of the time feeding at the surface and 90 percent of the time feeding at lower depths (Goodyear, 1996). Concentrations of whales feeding in the Great South Channel may extend into the northern edge area of Georges Bank as well. Feeding areas of sporadic high use or semiregular use in the Gulf of Maine include areas near the entrance to Portland, Maine, such as Platts Bank, Jeffreys Ledge, and Cashes Ledge. In late summer and fall, adult males typically feed along the Scotian Shelf (Browns and Baccaro Banks) of Canada, while mother-calf pairs and juveniles are more likely found feeding in the Bay of Fundy (Figure 3-1) (Perry *et al.*, 1999). One-third of females do not utilize the Bay of Fundy feeding grounds, which suggests that there are still unidentified feeding grounds (Schaef *et al.*, 1993). The depth that right whales feed depends on the location of the prey in the water column; right whales spend a significant amount of time feeding below the surface in the Bay of Fundy, where most *C. finmarchicus* aggregate just above the bottom mixed layer (Baumgartner and Mate, 2003).

While the majority of right whales feeding in the northeast can be found in areas with high abundance of *C. finmarchicus*, there is an exception in the deep basins of the Gulf of Maine. A study conducted on satellite-tagged right whales in the lower Bay of Fundy during 1989 to 1991 and in 2000 found that the tagged animals did not frequent the deep basins of the Gulf of Maine and Scotian Shelf, where copepods are thought to be abundant (Baumgartner and Mate, 2005). This is probably because deeper dives allow less feeding time and less energetic benefit per dive (Baumgartner and Mate, 2003).

3.1.2.3 Feeding Behavior

Right whales use their baleen to filter food from the mouthfuls of water they collect and then expel. Whales obtain most of their food energy (91.1 percent) by feeding during deep dives, and the remainder (9.9 percent) through surface feeding (Goodyear, 1996). Deep dives occur at depths over 100 ft (30.5 m). When right whales feed at the surface, they skim feed by swimming slowly along the surface with their mouths open collecting dense batches of prey.

Foraging dives occur at depths of 10 meters or more (Reynolds and Rommel, 1999), and if the animal finds a dense patch of prey, it commonly meanders through the area turning frequently to consume as much food as possible. Although the practice of foraging while submerged consumes more energy than skim feeding at the surface, deeper-water copepods are more abundant, have higher caloric content, and are less active than surface ones (Baumgartner *et al.*, 2003). Longer intervals at the surface between foraging dives have been observed for reproductively active females and their calves, which makes this population segment more susceptible to ship strikes (Baumgartner and Mate, 2003).

Right whales usually feed alone, although several individuals may feed simultaneously in the same general area of dense prey patches. Given that other animals have similar diets, some competition for prey may exist with species such as the sei whale and some planktivorous fish species (NMFS, 2003b).

3.1.3 Socializing

Right whale socializing behavior typically involves surface activities in which whales may be in physical contact with each other. This type of behavior is known as a surface active group (SAG) and usually involves a single adult female or focal female surrounded by up to 34 males maneuvering to approach the female. Vocalizations are common and may include calls by the focal female to attract males and increase competition for mating (Kraus and Hatch, 2001). The socializing can include turning, rolling, and lifting flippers into the air.

Social activities may increase the risk of entanglement with fishing gear or ship strike. Being heavily engaged in, and intent on, a particular activity such as feeding, socializing, or mating, probably reduces whales' awareness of external threats, thereby increasing their vulnerability to oncoming ships. On the other hand, the size of the aggregation may also increase the probability that a mariner will spot the whales and take appropriate action to avoid a ship strike.

3.1.4 Diving Behavior

Because of their high blubber content, right whales are positively buoyant animals (Nowacek *et al.*, 2001). Combined with slow swimming, their buoyancy hinders rapid descents, which could be one of the reasons right whales often fail to avoid oncoming vessels. On the other hand, the same buoyancy allows for ascents with little or no energy expenditure, because the animal naturally floats toward the surface. Such buoyancy may contribute to ship strikes because a whale may have difficulty either aborting or modifying a free ascent or descending quickly enough to avoid a ship (Nowacek *et al*., 2001).

A study conducted in Grand Manan Basin in the Lower Bay of Fundy, a late summer feeding ground, examined levels of paralytic shellfish poisoning (PSP) toxins in *C. finmarchicus*, right whales' primary food source. Ingesting large amounts of prey that contains PSP can cause neuropathology, respiratory difficulties, and impaired diving capabilities. Surface aggregations of *C. finmarchicus* have higher PSP toxin levels than deeper copepods (Durbin *et al.*, 2002). Limits on their diving can affect food consumption, which, in turn, can affect their reproductive potential.

3.1.5 Vocalization

Although information has only recently become available on vocalizations by North Atlantic right whales, their sounds are thought to be similar to those of southern right whales. Their vocalizations differ in frequency depending on the type of call and the behavior associated with the call. Right whale vocalizations are typically underwater moans and pulsed calls, with most signal energy under 400 hertz (Hz) (Watkins and Schevill, 1972 *in* Wartzok and Ketten, 1999). One of the more common sounds made by right whales is the "up call," a frequency-modulated upsweep in the 50–200 Hz range (Mellinger, 2004).

In a study on vocalization rates of North Atlantic right whales in Cape Cod, Great South Channel, and the Bay of Fundy, several different types of right whale sounds were recorded using a towed hydrophone array and digital acoustic recording tags (DTAGs) (Matthew *et al.*, 2001). “Moans” ranged from 50 to 500 Hz and lasted 0.4–1.5 seconds, and varied in amplitude and frequency. “Gunshots” were broadband and impulsive, and similar to “slaps” (Clark, 1982; 1983 *in* Matthews et al., 2001). Low-frequency calls had a constant frequency, around 60–80 Hz, and durations from 0.5 to 10 seconds. Moan rates (per aggregation per hour) were related to the size of aggregations: groups of 10 or more whales had the highest rates (~70–700/hr), followed by small groups of less than 10 whales with moan rates of (< 60/hr); individuals rarely produced moans (<10/hr).

Passive acoustic methods of detecting whale calls may be a viable management tool to determine the presence of right whales. Scientists at Cornell University are currently working with passive acoustic technology to detect right whale sounds. Ten autonomous recording devices or ‘pop ups’ were deployed throughout Stellwagen Bank National Marine Sanctuary in 2006 to record the presence/absence of right whales. This study is in support of the effort to reposition the Boston Traffic Separation Scheme. While this method may be shaping certain ship strike policies, additional research is required before it can be utilized to predict right whale distribution and gather real-time monitoring information that may aid in reducing ship strikes.

During sexual and social activities, right whales are quite vocal. When SAGs form, as described in Section 3.1.3, the female calls frequently and males have been observed to produce gunshot-like sounds (Parks, 2003). These sounds have been recorded being made by whales that are alone without appearing to attract other whales (Parks, 2003). The focal female in a social group produces calls at frequencies of 400 HZ and higher that last 0.5–2.8 seconds at an average rate of about 12 per minute (Kraus and Hatch, 2001). These vocalizations are thought to be a mating call from the females to males within an audible distance. Mothers and calves vocalize while the mother is feeding away from the calf; these calls are known as “contact calls” (Reeves, 2000).

3.1.6 Hearing

3.1.6.1 Hearing Characteristics

Although it has not been tested, it is generally accepted that right whale hearing is in the low frequency range, which conforms to the ranges of other mysticetes (baleen whales), whereas odontocetes (toothed whales) vocalize and hear high frequency sounds (Ketten, 1998). The assumption that right whales hear in the low frequency range is based on ear structure and inferences from vocalization characteristics, although there are no audiograms to confirm this.

If there were no anthropogenic sources of noise in the ocean, then whales might be able to hear sounds from other whales and vocalize more effectively. However, there are many sources of low frequency noises from human activities that overlap with the low frequency calls of mysticetes.

Research has been conducted on the effects of vessel noise on certain species of large whales (NMFS, 2003b), although there are still unknowns about right whale hearing capacities. Research suggests that right whale hearing is concentrated in the low frequency range, thus some high frequency noise such as propellers might not be detected (Terhune and Verboom, 1999).

Large vessels cause the most lethal and serious injury to whales and also produce low frequency sounds which may interfere with right whale hearing (Koschinski, 2002).

The ability of a right whale to detect a vessel is related to a variety of factors including bottom reflections, frequency of sounds, location of the whale with respect the vessel, and its depth in the water column. Multipath propagation of vessel noise may confuse the whale as to the direction the ship is going and generally is problematic with low frequency noise. Ships generate higher noise levels towards the stern of the boat than in front of the bow, and even louder noises directly under the ship, so there might be instances in which a whale would not actually hear a vessel until after it has passed. Ship noises are not as loud near the surface as they are 5–10 meters beneath, due to the reflective nature of the surface (Terhune and Verboom, 1999). This is known as the Lloyd-mirror effect, which is amplified in the low frequency range, in calm sea states, and when the source and/or receiver are near the surface (Richardson *et al*., 1995). Therefore, in certain conditions, a whale might be less likely to hear a vessel when the whale is at or near the surface, where it is at a high risk of being struck by a vessel.

3.1.6.2 Masking

Background ambient noise, or underwater noise, including that produced by human activities (dredging, shipping, seismic exploration, and drilling for oil), may interfere with or mask the ability of a marine mammal to detect sound signals, such as calls from other animals (Richardson *et al.*, 1995). Some mysticetes may alter the frequencies of their communication sounds to reduce masking (Richardson *et al.*, 1995).

Masking may also prevent right whales from being able to detect and avoid approaching vessels because they might not be able to distinguish the sound of an approaching ship from the ambient noise in the ocean, although this hypothesis has not been tested. Areas where there is continuous loud distant shipping may mask the sound of individual ships until they are too close (Terhune and Verboom, 1999), which may make right whales more susceptible to ship strikes. Vessel noise may have started as a masking issue where whales could not locate the sound of an individual ship and evolved into becoming habituated or are used to this noise to the point where they no longer react to the noise.

3.1.6.3 Habituation and Behavioral Reactions

Habituation is where whales may not respond to vessel noise because they have become accustomed to continuous noise in areas of heavy vessel traffic and as a result, are less reactive.

Aside from masking and habituation, there are additional factors that interfere with a whales' ability to hear approaching vessels. Even though research indicates that right whales should be able to hear vessels, they do not appear to avoid vessels. Several researchers have confirmed that right whales should be able to hear approaching vessels, which emit sounds in a range they can perceive. Parks (2003) established that whales have the ability to locate a sound and even remember where it originated from for around 20 minutes after the sound stops.

Aside from hearing and detection issues, a whale must perceive a ship as a threat to avoid it, and unless a given individual has had a previous close encounter with a ship, survived, and learned the threat, the urge to avoid a ship may not be great.

One study utilized an archival DTAG to record whale behavioral reaction to an alert signal, vessel noise, other whale social sounds, and a silent control (Nowacek *et al.*, 2003). The whales did not have a significant response to any of the signals other than an alert signal broadcast ranging from 500 to 4,500 HZ. In response to the alert signal whales abandoned current foraging dives, began a high power ascent, remained at or near the surface for the duration of the exposure, and spent more time at subsurface depths (1–10 m) (Nowacek *et al.,* 2003). This increased time just below the surface could substantially increase their risk of ship strike because whales are susceptible to being struck but are not visible at the surface. The consequences of the whales' altered behavior, aside from increased risk of ship strike, are reduced foraging time and an excess use of energy, a problem for an endangered species. The whale's lack of response to a vessel noise stimulus from a container ship and from passing vessels indicated that whales are unlikely to respond to the sounds of approaching vessels even when they can hear them (Nowacek *et al.,* 2003). A second study that utilized a DTAG had similar results. The scientists played a recording of a tanker using an underwater sound source and observed no response to a tagged whale 600 meters away (Johnson and Tyack, 2003). This nonavoidance behavior could be an indication that right whales have become habituated to the vessel noise in the ocean and therefore do not feel the need to respond to the noise or may not perceive it as a threat. These various hypotheses aside, it has not been established why the species is so susceptible to strikes.

3.1.6.4 Effects of Ocean Noise on Cetaceans

The potential effects of noise on cetacean ears range from tissue damage to a reduction in hearing sensitivity. Neither would be expected to occur as a result of vessel noise; however, this section provides a brief description of hearing sensitivity so the reader is aware of the full range of the effects of noise on cetaceans.

Exposure to certain high intensity underwater noises can cause a reduction in hearing sensitivity in cetaceans. This change in the threshold of hearing can either be temporary, in which case it is referred to as temporary threshold shift (TTS), where the animal recovers, or permanent, which is referred to as permanent threshold shift (PTS) (ICES, 2005; Kastack *et al*., 2005). TTS levels for odontocetes are high, although noise induced TTS has not been observed in mysticetes (Kastack *et al*., 2005). PTS in cetaceans has not been observed, and is usually extrapolated. TTS generally results from high intensity, acute sources of noise and is unlikely to occur from the low frequency, ambient noise from vessels.

3.2 Biology of other Marine Species

North Atlantic right whales exist in an interrelated biological environment. This section describes other species whose ranges coincide with that of the right whale. Section 3.3 describes the physical environment.

3.2.1 Other Marine Mammals

While all marine mammals are protected by the MMPA, some stocks are healthy, and thus are not described in detail in this EIS. Along the East Coast of the US, such species include:

- Atlantic spotted dolphin (*Stenella frontalis*)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Spinner dolphin (*Stenella longirostris*)
- Harbor porpoise (*Phocoena phocoena*)
- Bryde's whale (*Balaenoptera edeni*)
- Short-beaked common dolphin (*Delphinus delphis*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Minke whale (*Balaenoptera acutorostrata*)
- Killer whale (*Orcinus orca*)
- Short-finned pilot whale (*Globicephala macrorhyncus*)
- Long-finned pilot whale (*Globicephala melas*)
- Pygmy sperm whale (*Kogia breviceps*)
- Dwarf sperm whale (*Kogia sima*)
- Risso's dolphin (*Grampus griseus*)
- Harbor seal (*Phoca vitulina*)

However, other species of marine mammals in that area are listed as endangered under the ESA or depleted[3] under the MMPA. These species are listed in Table 3-1.

Like the right whale, a number of these marine mammal species are affected by ship strikes. The species known to be most commonly struck are the fin whale and the humpback whale, but there are also records of ship strikes to the gray, minke, sperm, southern right, blue, Bryde's, sei, and killer whales. Most reported ship strikes involving large whales worldwide occur in the western North Atlantic and mid-Atlantic. Most large whale ship strikes result in death (Jensen and Silber, 2003).

Table 3-1
Domestic Depleted and ESA-listed or Candidate Marine Mammal Stocks Occurring in or Near the Western Range of the North Atlantic Right Whale

Common Name	Scientific Name	Status*
Blue whale	*Balaenoptera musculus*	E
Fin whale	*Balaenoptera physalus*	E
Humpback whale	*Megaptera novaeangliae*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter macrocephalus*	E
West Indian manatee	*Trichechus manatus*	E
Bottlenose dolphin (US mid-Atlantic coastal migratory stock)	*Tursiops truncatus*	D

* E = endangered; D = depleted. **Sources:** NMFS, 2004c; USFWS, 2004.

[3] A depleted species is defined in the MMPA as a species or population stock that is below Optimum Sustainable Population (OSP) or if the species is listed as endangered under the ESA (16 U.S.C. 1362).

Blue Whale

The blue whale (*Balaenoptera musculus*) is the largest baleen whale. Blue whales are listed as endangered under the ESA and protected under the MMPA. They are found worldwide and are separated into populations in the North Atlantic, North Pacific, and Southern Hemisphere. The blue whale has been subdivided into three subspecies: *B. musculus intermedia* found in Antarctic waters, *B. musculus musculus* in the Northern Hemisphere, and *B. musculus brevicauda* (the "pygmy" blue whale) in the southern Indian Ocean and southwest Pacific Ocean.[4]

The pre-exploitation population size of the North Atlantic blue whale ranged from 1,100 to 1,500 individuals; current estimates range from 100 to 555 whales. The current minimum population estimate for the western North Atlantic stock is 308 whales. The distribution of blue whales in the western North Atlantic ranges from the Arctic to at least mid-latitude waters (NMFS, 2005c). This species primarily feeds north of the Gulf of St. Lawrence during spring and summer. Blue whales are pelagic, so they are primarily found in deep, offshore waters and are rare in shallow shelf waters. Blue whales have been killed or seriously injured by ship strikes; one occurrence in the North Atlantic in 1998 and several in California in the early 1990s.

Fin Whale

The MMPA stock assessment reports for the fin whale recognize one stock in the US North Atlantic (western North Atlantic) and three stocks in the North Pacific (California, Oregon, and Washington). The species is listed as endangered under the ESA. Fin whales range from the Arctic to the Greater Antilles. The best population estimate for this species in the western North Atlantic is 2,814 individuals, based on a 1999 shipboard and aerial survey of waters from Georges Bank to the mouth of the Gulf of St. Lawrence (Waring *et al.*, 2001). They occur widely in the mid-Atlantic throughout the year, with concentrations from Cape Cod north in summer and from Cape Cod south in winter, and are typically associated with the continental shelf and continental shelf edge. The New England coast is a major feeding ground for fin whales from spring to fall. It is assumed that fin whales breed in the middle North Atlantic, with mating and calving occurring from November to March; however, the location of their wintering grounds is poorly known. Fin whales are one of the species most frequently involved in ship strikes; the average observed annual mortality due to ship strikes is 0.4 fin whales per year for the period 1997–2001.

Humpback Whale

The humpback whale (*Megaptera novaeangliae*) is a mid-sized baleen whale. Humpback whales were listed as endangered throughout their range on June 2, 1970, under the ESA, and are considered depleted under the MMPA. It is estimated that there are fewer than 7,000 humpbacks in US waters. The best population estimate for the Gulf of Maine stock is a minimum of 647 whales (NMFS, 2005c). The four recognized stocks (based on geographically distinct winter ranges) of humpback whales in the US are: the Gulf of Maine stock (previously known as the western North Atlantic stock), the eastern North Pacific stock (previously known as the California-Oregon-Washington stock), the central North Pacific stock, and the western North Pacific stock (NMFS, 2003b). The humpback whale is distributed worldwide in all ocean basins, though it is less common in Arctic waters. Humpback whales migrate seasonally. In the winter, the breeding season, most humpback whales are found in temperate and tropical waters of both

[4] http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/blue_whale.doc

hemispheres. In summer, the feeding season, most are in waters of high biological productivity, usually in higher latitudes. There are 44 records of vessel collisions with humpback whales since 1975 (Jensen and Silber, 2003).

Sei Whale

For management purposes, there are two stocks of sei whales; the Labrador stock and the Nova Scotia stock; and only the latter is considered here. The range of the Nova Scotia stock includes the continental shelf waters of the NEUS and extends northeastward to south of Newfoundland (NMFS, 2003b). The population size of sei whales in US North Atlantic waters is unknown. During the feeding season, sei whales are found at the northern bound of their range, in Nova Scotia. In the spring and summer, they occur in the southern end of their range, which includes the Gulf of Maine and Georges Bank (NMFS, 2003b). The sei whale typically occurs in deeper waters characteristic of the continental shelf edge region (Hain *et al*., 1985 in NMFS, 2003b). They primarily feed on euphausiids and copepods, and have been known to travel to inshore feeding habitats in years of abundant copepods. These areas are late summer feeding grounds for right whales as well. Sei whales in the western North Atlantic occasionally suffer from ship strikes, although records are fewer than for other large whale species such as humpback and fin whales, perhaps due to an offshore distribution. NMFS' stranding and entanglement records from 1997 through 2001 yield an average of 0.2 human-caused mortalities of sei whales per year as a result of recorded ship strikes in New York in 2001 and Boston in 1994.

Sperm Whale

Sperm whales (*Physeter macrocephalus*) are the largest of the odontocetes (toothed whales). Sperm whales are found throughout the world's oceans in deep waters between about 60°N and 60°S latitudes. They are highly social animals. The basic social unit consists of a mixed group of adult females, calves, and some juveniles, usually 20–40 individuals in all. They prey on large mesopelagic (living at depths from 200 to 1,000 meters [656 to 3,280 ft]) squid, other cephalopods (e.g., octopus), demersal (living near the bottom), and occasionally benthic (bottom dwelling) fish. Sperm whales are capable of diving to depths of more than 1,000 meters (3,281 ft) for durations of more than 60 minutes.

There are five stocks of sperm whales, the North Atlantic stock being the only one that overlaps geographically with the right whale. In winter, sperm whales tend to concentrate east and northeast of Cape Hatteras. In spring, the center of distribution shifts northward to areas east of Delaware and Virginia, and the whales are found throughout the central portion of the mid-Atlantic and in the southern portion of Georges Bank. In summer, sperm whales occur east and north of Georges Bank, into the Northeast Channel region and the continental shelf (inshore of the 100 meter isobath) south of New England, where they are most plentiful in the fall (NMFS, 2003b).

The minimum population estimate for the western North Atlantic sperm whale stock is 3,505 individuals. The sperm whale was listed as endangered throughout its range on June 2, 1970, under the ESA and is also protected under the MMPA. There is a potential for sperm whales to be killed or seriously injured by ship strikes. In May 1994, a sperm whale was involved in a ship strike south of Nova Scotia, and in May 2000, a merchant ship reported a ship strike in Block Canyon, New Jersey (NMFS, 2005c).

West Indian Manatee

The West Indian species is divided into two subspecies: the Antillean manatee (*Trichechus manatus manatus*) and the Florida manatee (*Trichechus manatus latirostris*). Only the latter is considered here. The Florida manatee lives mainly in the waters off the coasts of Florida but has been known to occur in southeastern Georgia and even Virginia to the north and Louisiana to the west. In the winter, manatees are generally found in south Florida, though some have also been known to winter further north in naturally and artificially warm waters. The population of Florida manatees is unknown, although it is considered to include at least 1,800 animals.[5] The Florida manatee is listed as endangered under the ESA. Manatees are often struck by recreational vessels.

Bottlenose Dolphin

The bottlenose dolphin is found worldwide in temperate and tropical inshore waters. Sighting data indicate that bottlenose dolphins are distributed along the coast, across the continental shelf, over the continental shelf edge, and in waters over the continental slope with a bottom depth greater than 1,000 meters (3,300 ft). There are two genetically distinct stocks of bottlenose dolphin off the Atlantic coast: the western North Atlantic coastal and western North Atlantic offshore stocks. The coastal stock is smaller and generally not found in waters deeper than 25 meters (82 ft). It is continuously distributed along the Atlantic Coast south of Long Island, around Florida and along the Gulf of Mexico coast (NMFS, 2003b). This stock is migratory and winters south of Cape Hatteras, North Carolina.

The offshore stock can be found in waters deeper than 25 meters (82 ft) and generally occurs along the continental shelf break and into slope waters. Aerial surveys of the offshore stock indicated that it extends along the entire continental shelf break from Georges Bank to Cape Hatteras during spring and summer (CETAP 1982; Kenney 1990 in NMFS, 2003b). In fall, there were more sightings in the south than other portions of the survey area, and there were few to no sightings in the winter in the central portion of the survey area (NMFS, 2003b). "The offshore ecotype was found exclusively seaward of 34 km and in waters deeper than 34 m. Within 7.5 km of shore, all animals were of the coastal ecotype." (NMFS, 2003b)

3.2.2 Sea Turtles

All six species of sea turtles occurring in US waters are listed under the ESA and all species have recovery plans finalized between 1991 and 1998, and several are currently being revised. These plans contain information on each species and are included here by reference. One species, the olive Ridley turtle (*Lepidochelys olivacea*), is predominantly tropical and is not considered here. The other five species are listed in Table 3-2. Fishery bycatch, habitat loss, egg poaching, marine debris, beach nourishment, and artificial lighting are common threats to sea turtles. Sea turtles in coastal waters and the open ocean are affected by ship strikes as well.

[5] http://www.fws.gov/northflorida/Manatee/manatees.htm

Table 3-2
Sea Turtles Occurring in US East Coast Waters

Common Name	Scientific Name	Status*
Green turtle	*Chelonia mydas*	E, T**
Hawksbill turtle	*Eretmochelys imbricata*	E
Kemp's Ridley turtle	*Lepidochelys kempi*	E
Leatherback turtle	*Dermochelys coriacea*	E
Loggerhead turtle	*Caretta caretta*	T

* E = endangered; T = threatened.
** Status assigned according to population. **Source:** NMFS, 2004a.

Green Turtle

The green turtle is a global species found in tropical and subtropical waters. Hatchlings are pelagic, or occur in the water column of the open ocean. Adults spend most of their time in tropical shallow, nearshore areas; however, they are known to undertake long oceanic migrations between nesting and foraging habitats.

All green turtle populations are threatened except the breeding populations of Florida and the Pacific Coast of Mexico, which are endangered. Since the 1978 listing, the populations have not significantly improved (NMFS, 2004a). There are a number of threats to green turtles, from capture in commercial fisheries, predation, and anthropogenic threats at nesting beaches, to systematic harvest in certain countries. Boating activities may also cause injury or death to green turtles through collisions or propeller wounds.

Hawksbill Turtle

Hawksbill sea turtles are found in the tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. They are found along the continental US coastline from Massachusetts southward; however, sightings north of Florida are rare. Like the green turtle, post-hatchling hawksbills are pelagic; adults return to a variety of shallow coastal habitats, including rocky outcrops, coral reefs, lagoons on oceanic islands, and estuaries.

The hawksbill was listed as endangered under the ESA in 1970 (NMFS, 2004a). In addition to other human-caused threats to Hawksbill turtles, they also may incur propeller wounds or other injury from vessel collisions in areas with concentrated vessel traffic.

Kemp's Ridley Turtle

The Kemp's Ridley turtle has a more limited range than other sea turtles. Adult distribution is generally restricted to the coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Nesting occurs primarily in one area near Rancho Nuevo in southern Tamaulipas, which is on the northeastern coast of Mexico. There are also a few scattered nests in Texas, Florida, South Carolina, and North Carolina.

The Kemp's Ridley turtle was listed as endangered in 1970. After long periods of decline, today the population appears to be in the early stages of recovery due to protective measures (NMFS, 2004a). The Kemp's Ridley turtle recovery plan contains additional information and is incorporated by reference (NMFS and USFWS, 1992b). Kemp's Ridley turtles have the potential to be injured by propellers or collisions with vessels.

Leatherback Turtle

The leatherback is the largest extant turtle species (NMFS, 2004a). Leatherback turtles are found worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Adult leatherbacks are highly mobile and are believed to be the most pelagic of all sea turtles. Females are often observed near the edge of the continental shelf, but do not nest as frequently as other turtle species found in US waters.

Leatherbacks were listed as endangered in 1970. Boating activities may result in direct injury or death through collision impact or propeller wounds.

Loggerhead Turtle

Loggerhead sea turtles are found in tropical, subtropical, and temperate waters throughout the world. The loggerhead is the most abundant sea turtle in US coastal waters. They frequent continental shelves, bays, estuaries, and lagoons.

Loggerheads were listed as threatened in 1978 and their status has not changed. It appears that the nesting populations in South Carolina and Georgia may be declining, while the Florida nesting population seems to be stable.

3.2.3 Seabirds

Seabirds are birds whose normal habitat and food source is the sea; coastal, offshore, or pelagic waters (Harrison, 1983). Seabirds include loons (*Gaviiformes*), grebes (*Podicipediformes*), albatrosses, fulmars, prions, petrels, shearwaters, storm-petrels, diving petrels (*Procellariiformes*), pelicans, boobies, gannets, cormorants, shags, frigatebirds, tropicbirds, anhingas (*Pelecaniformes*), shorebirds, skuas, jaegers, gulls, terns, auks, and puffins (*Charadriiformes*).

Table 3-3 lists the seabird species protected under the ESA. The *Environmental Assessment of Proposed Regulations to Govern Interactions between Marine Mammals and Commercial Fishing Operations, under Section 118 of the Marine Mammal Protection Act* (NMFS, 1995) contains more detailed data on seabirds and is incorporated here by reference.

Table 3-3
ESA-listed Seabirds Occurring along the US East Coast

Common Name	Scientific Name	Status*
Piping plover	*Charadrius melodus*	T
Brown pelican	*Pelecanus occidentalis*	E, R**
Least tern	*Sterna antillarum*	E
Roseate tern	*Sterna dougallii dougallii*	E, T**

* E = endangered; T = threatened; R = recovered (delisted).
** Status assigned according to population. **Sources:** USFWS, 2004.

3.2.4 Protected Anadromous and Marine Fishes

Table 3-4 shows anadromous (living in salt water but reproducing in fresh water) and marine fish species found along the US East Coast that are endangered or threatened under the ESA, or are species of concern for ESA listing. No catadromous (living in fresh water but reproducing in salt water) fishes are listed or are candidates for listing under the ESA.

Table 3-4
Endangered, Threatened, and Candidate Anadromous and Marine Fishes Occurring along the US East Coast

Common Name	Scientific Name	Status*
Atlantic salmon	*Salmo salar*	E
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	SC
Barndoor skate	*Raja laevis*	SC
Dusky shark	*Carcharhinus obscurus*	SC
Goliath grouper	*Epinephelus itajara*	SC
Mangrove rivulus	*Rivulus marmoratus*	SC
Nassau grouper	*Epinephelus striatus*	SC
Night shark	*Carcharhinus signatus*	SC
Opossum pipefish	*Microphis brachyurus*	SC
Sandtiger shark	*Odontaspis Taurus*	SC
Shortnose sturgeon	*Acipenser brevirostrum*	E
Smalltooth sawfish	*Pristis pectinata*	E
Speckled hind	*Epinephelus drummondhayi*	SC
Warsaw grouper	*Epinephelus nigritus*	SC
White Marlin	*Tetrapturus albidus*	SC

* E = endangered; SC = species of concern (are those species for which uncertainties exist regarding status and threats, information is lacking, and listing is not currently being considered).
Sources: NMFS, 2004b and www.nmfs.noaa.gov/pr/species/concern.

A recovery plan exists for the shortnose sturgeon and is incorporated here by reference (NMFS, 1998).

3.2.5 Marine Resources Not Addressed in the EIS

Essential fish habitat (EFH) is not addressed in this EIS because the operational measures would not have an effect on EFH. *Sargassum* mats (i.e., large mats of pelagic brown algae) are frequently found floating on the surface along the East Coast of the US. *Sargassum* mats are EFH for several marine species, such as fish, juvenile sea turtles, and a few marine mammals. Other designated EFHs are subsurface and, therefore, would not be of concern for the implementation of the operational measures. Plankton, benthic organisms, and some fish are not discussed in this section as they would not be affected by the proposed action and alternatives.

3.3 Physical Environment

North Atlantic right whales range from maritime Canada south through the US East Coast to northern Florida. This section describes the specific physical and geographical features within this range. In the Southeast, right whales generally occur in nearshore continental shelf waters (Garrison, 2005), and although they have been sighted offshore, the frequency with which right whales occur in offshore waters in the southeastern US remains unclear (NMFS, 2005f). In the mid-Atlantic, right whales are most commonly found within 30 nm (55.6 km) of the coast (94 percent of recorded sighting) and in depths of up to 60 ft (18.3 m) (71.5 percent of recorded sightings). Only rarely do they occur at depths above 150 ft (45.7 m; 93 percent of recorded sightings occur at depths of up to 150 ft) (Knowlton *et al*., 2002). In contrast to the other two regions, right whales are frequently known to occur in far offshore waters in the Northeast. The information on the physical environment, including water depth, sea floor topography, sediment types, water composition and quality are provided because there are correlations between these attributes and right whale habitat use.

3.3.1 Bathymetry and Substrate

A brief description of bathymetry (i.e., ocean depth and physical features) and bottom sediment types is included in this EIS because certain seafloor features and sediment types are particularly conducive to right whale foraging. Patches of right whales primary food source, *C. finmarchicus*, are found at specific depths in the water column. Right whales aggregate in areas where there is an abundance of prey.

3.3.1.1 General Features

Several geophysical features are common to all three regions considered, including the continental shelf, the continental slope, the continental rise, and the abyssal plain. The continental shelf is a broad, sea floor platform that, although submerged, is a part of the continental mass. Along the Atlantic Coast, the continental shelf extends from the shoreline to a depth of about 660 ft (200 m). It ends at shelf break or shelf edge, usually marked by a noticeable increase in slope, as the continental shelf joins the steeper continental slope, leading to the continental rise. The continental rise is a zone approximately 54–540 nm (100–1,000 km) wide at the base of the continental slope, marked by a gentle seaward gradient ending in the abyssal plain. Figure 3-2 depicts these features by using a color scale to show water depth. Submarine canyons, are steep, v-shaped valleys that cut through the continental slope, continental rise, and, less commonly, the continental shelf.

3.3.1.2 Gulf of Maine/Georges Bank (NEUS Region)

The Gulf of Maine/Georges Bank area includes several important right whale habitat areas. In addition to Cape Cod Bay and Great South Channel critical habitat, right whales are known to occur in Jeffrey’s Ledge, the Bay of Fundy, Platts Bank, and other physiographic areas in the Gulf of Maine. Figure 3-3 depicts the bathymetry in the Gulf of Maine/NEUS region, which includes the waters between Nova Scotia and the Bay of Fundy, and also Cape Cod. Georges Bank extends to the southeast of the gulf. The continental shelf in this area is a relatively narrow band surrounding deeper basins. Two of the larger inner basins, Jordan Basin and Wilkinson Basin, are separated by a broad ridge that extends southeastward from the coast of Maine toward Georges Bank. Georges Bank is the third largest basin in this region and is connected to the continental slope through the Northeast Channel, which also separates Georges Bank from the Scotian Shelf (Milliman and Imamura, 1992). Jeffrey’s Ledge and Stellwagen Bank are two of several large bathymetric features in the southern Gulf of Maine. Both are within Stellwagen

Bank National Marine Sanctuary (Figure 2-15), which spans approximately 22 miles in a southeast to northwest direction from Cape Cod to Cape Anne in the mouth of Massachusetts Bay (NOS, 1993b).

Figure 3-4 depicts sediment types in the Gulf of Maine/Georges Bank area. Jeffrey's Ledge, located on the northern edge of the Stellwagen Bank National Marine Sanctuary in depths less than 196.8 ft (164 m) is composed primarily of gravel and a gravel-sand mixture, with a sandy boundary to the southeast (NOS, 1993b). Stellwagen Bank, with depths less than 164 ft (50 m), is mainly sand or pebbly-sand, bounded on the east by gravel or a gravel-sand mixture (NOS, 1993b). The Gulf of Maine basin mostly consists of silty-clay or clayey-silt sediments. The seafloors of Stellwagen Basin and Cape Cod Bay are covered by clayey-silt. The outer rim of the Gulf of Maine (Nantucket Shoals, Georges Bank, and the Nova Scotian Shelf) consists of primarily sand and gravel. Sand is the principle sediment for the inner shelf off Cape Cod (NOS, 1993b).

Bottom layer characteristics and other physical oceanographic conditions determine where high density patches of copepods aggregate and, consequently, where right whales are likely to be found foraging. Baumgartner and Mate (2005) reported that right whales in the Gulf of Maine preferred certain bathymetric features over others. Observing that the whales frequently occurred at areas with depths of approximately 150 meters (shallow basins), the authors noted that "the structure, hydrography, and physical processes of these [shallow] basins may improve the availability, quality, and aggregation of *C. finmarchicus*, respectively, for foraging right whales." These areas were preferred over deep basins in the Gulf of Maine and Scotian Shelf (see also Section 3.1.2.1). For instance, Baumgartner and Mate found that whales occurred in areas with low bottom water temperatures, high surface salinity, and high surface stratification. Areas with low bottom water temperatures may support a higher abundance of *C. finmarchicus*, which would explain why the tagged whales preferred these areas (Baumgartner and Mate, 2005). Such correlations allow scientists to better predict the location of foraging whales.

Recent technology takes this relationship between oceanographic conditions and *C. finmarchicus* abundance one step further to predict right whale births. Data from Gulf of Maine Ocean Observing System (GoMOOS) Buoy N (in the Northeast Channel) can provide forecasts of right whale births based on water temperature at the Buoy. As mentioned in Section 3.1.1.2, the NAO affects water temperatures in the Atlantic Ocean and specifically, the Gulf of Maine. Water temperatures in turn, influence right whale's food supply, which affects reproduction and the number of calves born. "After a positive NAO index, whale food becomes plentiful, and right whales produce many calves. After a negative NAO index, food becomes scarce, resulting in few calves being born" (GoMOOS, 2006). Based on this data, 13 births are predicted in 2006 and 16 in 2007.

3.3.1.3 Middle Atlantic Bight (MAUS Region)

Figure 3-5 depicts the bathymetry of the Middle Atlantic Bight/MAUS region, which extends from Cape Cod and Nantucket Shoals to Cape Hatteras, North Carolina (Milliman and Imamura, 1992). Right whales occur throughout the Middle Atlantic Bight during fall and spring. Compared to bathymetry of the Gulf of Maine/Georges Bank area, the Middle Atlantic Bight bathymetry is relatively simple. Water depth usually increases regularly from the coast out to the shelf break. The depth of the break decreases from 150 meters south of Georges Bank to 50 meters off Cape Hatteras. The inner shelf is connected to Narragansett Bay, Long Island Sound,

Bathymetry in the Gulf of Maine

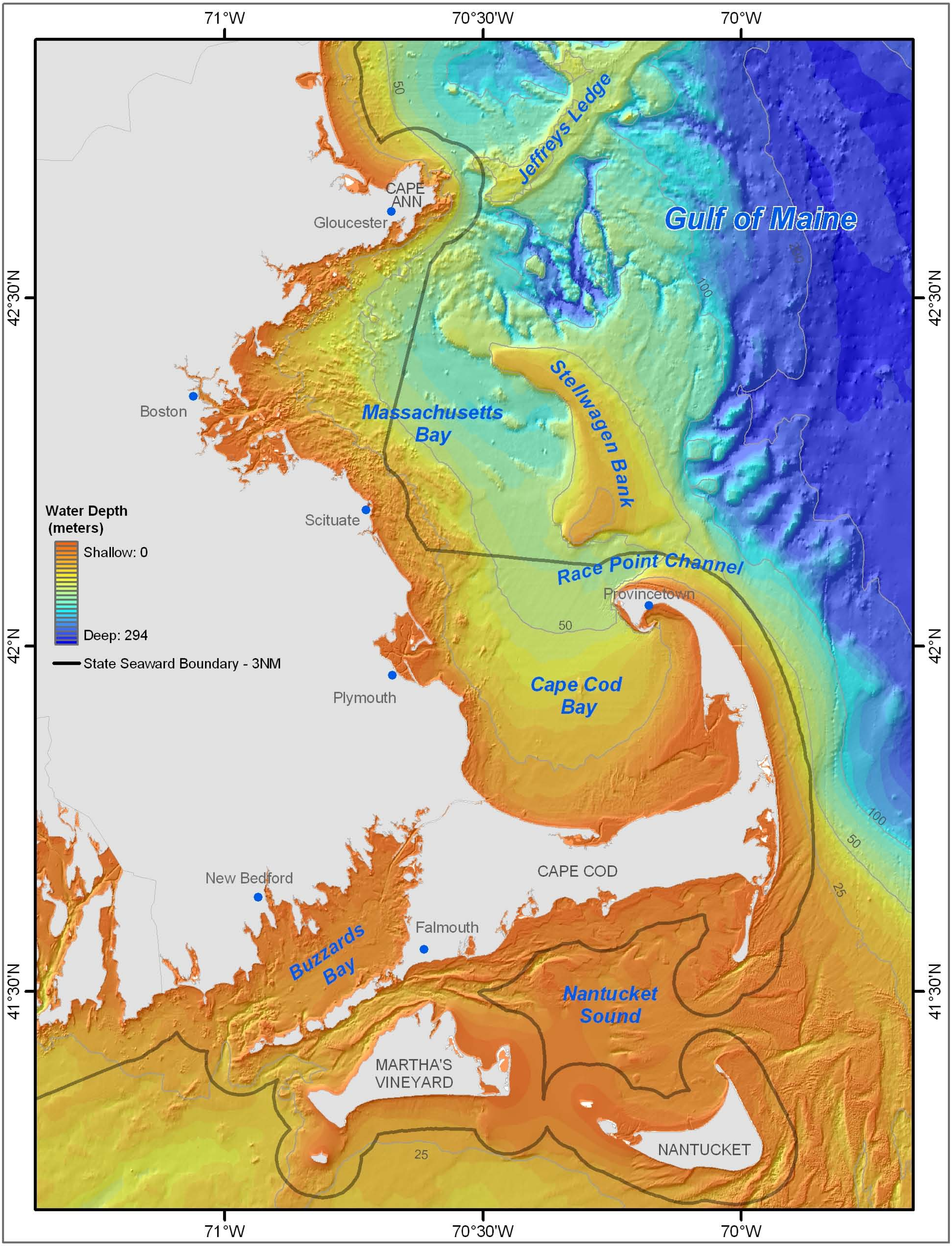
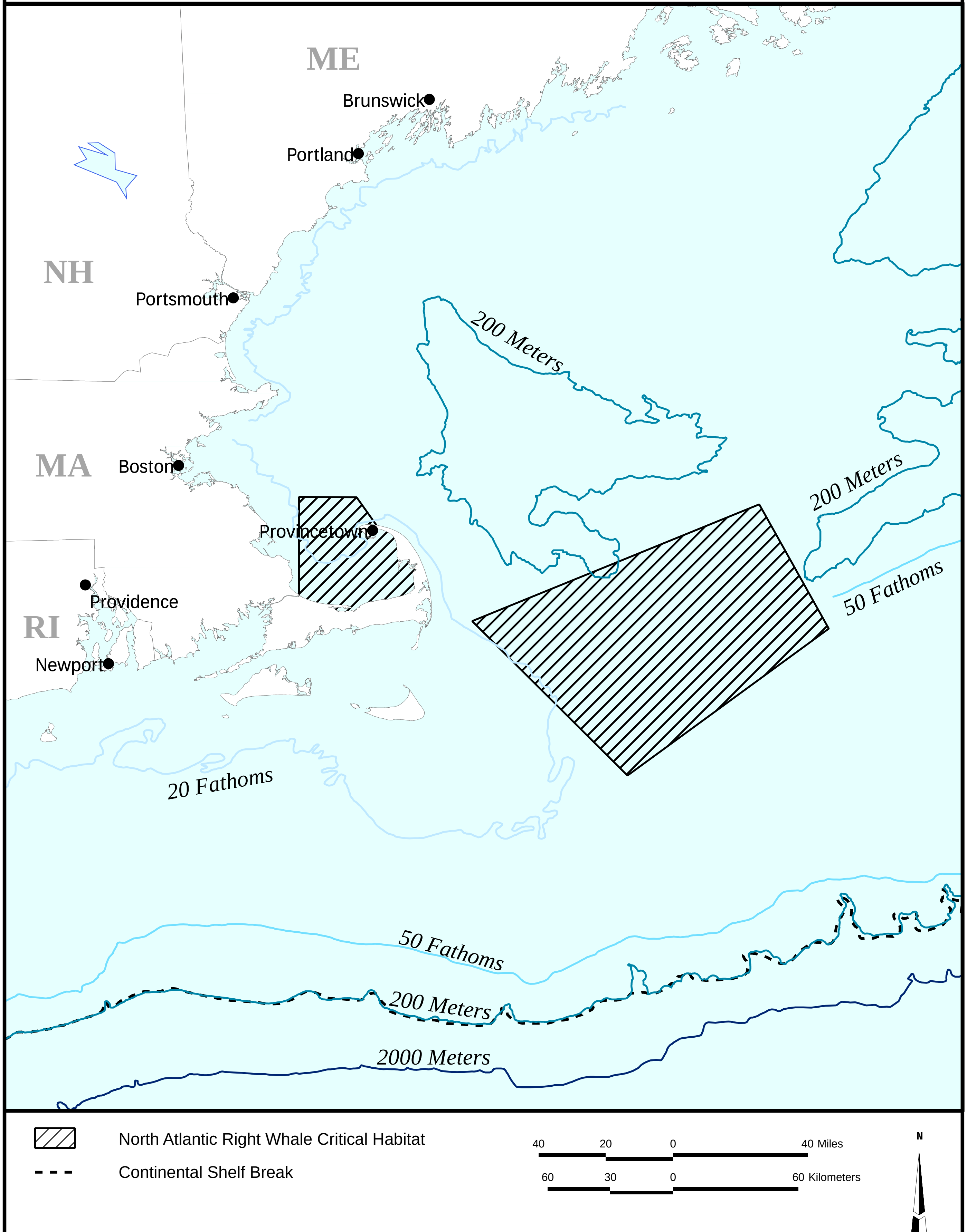


Figure 3-2

This Page Intentionally Left Blank

Bathymetry in the Northeastern United States

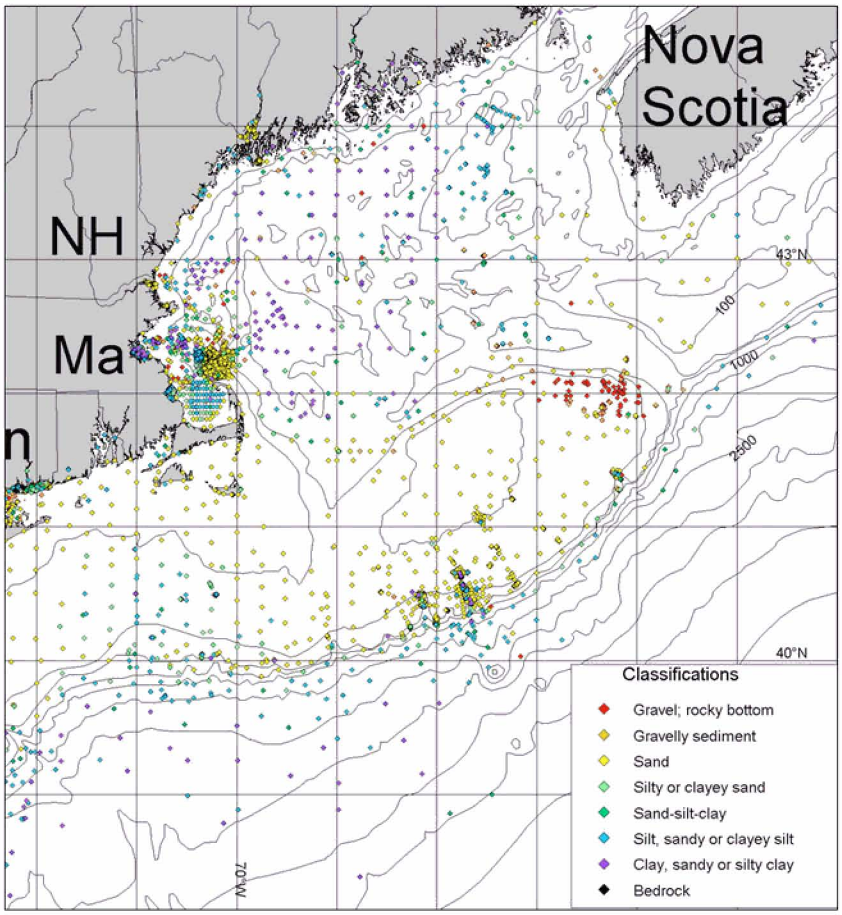


Note: Map data not projected.

Figure 3-3

This Page Intentionally Left Blank

Sediment Classification in Georges Bank / Gulf of Maine



USGS science for a changing world

Figure 3-4

This Page Intentionally Left Blank

Bathymetry in the Mid-Atlantic United States

North Atlantic Right Whale Critical Habitat

Continental Shelf Break

140 70 0 140 Miles

190 95 0 190 Kilometers

N

Note: Map data not projected.

Figure 3-5

This Page Intentionally Left Blank

the Hudson River, Delaware Bay, and Chesapeake Bay, the largest estuaries on the US eastern seaboard (Milliman and Imamura, 1992). At the shelf edge, the shelf gives way abruptly to the continental slope. The continental slope extends to water depths from 6,562 to 13,125 ft (2,000 to 4,000 m) (DoN, 2001).The (upper slope) area contains several submarine canyons, including Hudson Canyon, Hudson Shelf Valley, and Norfolk Canyon.

The continental shelf and continental slope of the Middle Atlantic Bight are covered with sand, silt, clay, and some gravel (DoN, 2001).

> Coastal areas of North Carolina have varying sedimentation rates, which results in diverse bottom composition. High sedimentation rates typify the area from Raleigh Bay northward, while the low sedimentation rates and scouring by currents in southern North Carolina, especially Onslow Bay, has led to the exposure of rock outcrops. Although sand dominates the sediments of the continental shelf, the concentration of sand typically declines with increasing water depth down the continental slope and rise, where clay and silt predominate. The sandy southern North Carolina continental slope is somewhat atypical, but north of Cape Hatteras silt and clay regain their dominance in continental slope sediments (DoN, 2002a).

Figure 3-6 depicts the sediment classifications in the mid-Atlantic from south Cape Cod to Albermarle Sound, and Figure 3-7 depicts the sediment classifications in the Carolina Trough.

3.3.1.4 South Atlantic Bight (SEUS Region)

Figure 3-8 depicts the bathymetry of the South Atlantic Bight/SEUS region. Right whales migrate through the northern portion of the South Atlantic Bight on their way to and from the calving grounds off the Georgia and Florida coast.

The South Atlantic Bight contains three large Cape areas: Raleigh Bay, Onslow Bay, and Long Bay (Milliman and Imamura, 1992). The dominant bathymetric features there are the continental shelf, the continental slope, and the Blake Plateau. The continental shelf slopes gently from the coast to approximately the 50 meters (164 ft) isobath (line connecting all points having the same depth), where it drops off to the 200 meters (656 ft) isobath. The continental slope is steeply angled and extends approximately from the 200 meters (656 ft) to the 700 meters (2,297 ft) isobath. The slope is widest off Jacksonville, FL (30°N).

> The Blake Plateau (Figure 3-9) is a large physiographic feature 71,250 nm^2 (228,000 km^2) in area, between 2,297 and 3,281 ft (700 and 1,000 m) in depth. The Gulf Stream flows along the Florida-Hatteras Slope over the Blake Plateau's western flank (DoN, 2002b).

Figure 3-9 depicts the sediment classifications in the SEUS region, including the Blake Plateau Basin. The substrate composition ranges from mixed fine sand and gravel near the coast to an increasingly higher percentage of calcium carbonate material at greater depths. There are also traces of gravelly sand, sand and clay, and fine-grained sand and silt found in deeper waters. Continental slope sediments in the south Atlantic area are primarily composed of silt and clay. The inner part of the Blake Plateau contains a minimal amount of sediments due to the sweeping action of the Gulf Stream. The Plateau is also covered by a thick layer of phosphoritic sediments and a thin layer of carbonate sands (DoN, 2002b).

Unlike the NEUS, where whale distribution is relative to prey abundance, in the SEUS, right whales have rarely been observed feeding (Kenney *et al*., 1986), thus other oceanographic variables had to be analyzed in order to predict distribution in this region. A recent study by Keller *et al*. (2006) compares right whale distribution in the southeastern calving grounds in relation to sea-surface temperatures (SST). The results of this study support a nonrandom distribution of whales in relation to SST; whales were sighted in waters with an overall mean SST of 14.3° C ± 2.1°. Sighting data in the EWS survey area, which mainly covers the southeastern critical habitat, was compared to SST data to determine whale location during resident months (January and February). The results suggest a southward shift in whale distribution toward warmer SSTs in the EWS area, while further south, right whales were concentrated in the northern portion that had cooler waters (Keller *et al*., 2006). Further, it appears that warm Gulf Stream waters (generally to the south and east of critical habitat) serve as a thermal limit for right whales, and have a role in their distribution within the calving grounds.

3.3.2 Water Quality

This section on water quality is divided into three subsections: Section 3.3.2.1 describes pollutants and the possible implications to right whales; Section 3.3.2.2 provides a brief overview of water quality in the coastal waters of the states along the US eastern seaboard; and Section 3.3.2.3 provides an overview of the regulatory framework for marine pollution.

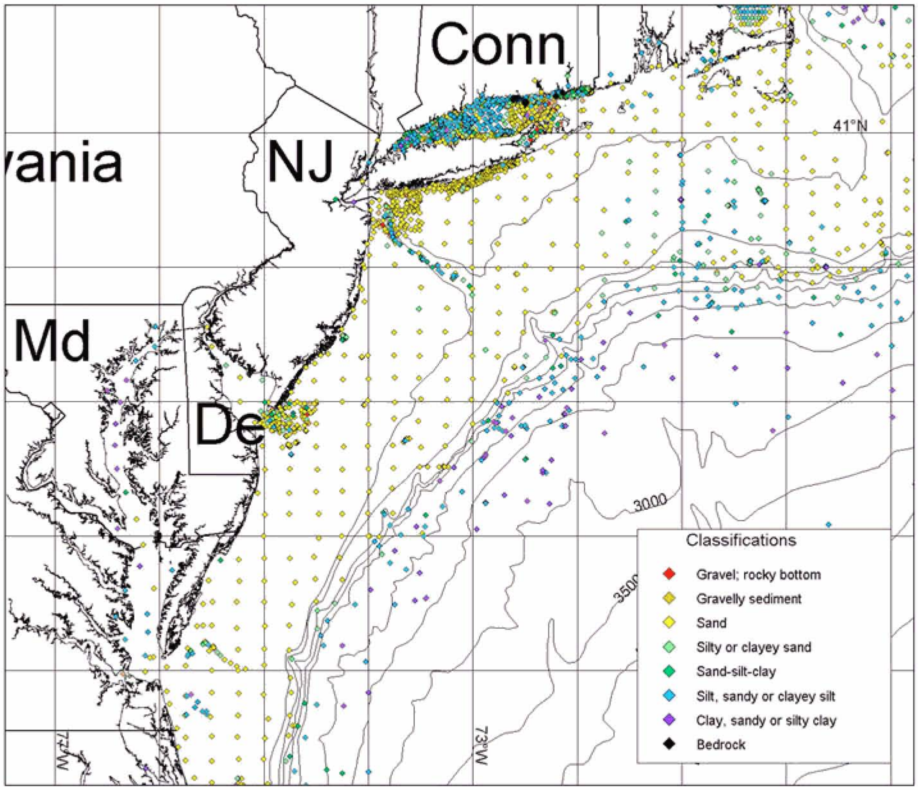
3.3.2.1 Implications of Water Pollution on Right Whale Health

Poor water quality may affect right whale health by reducing the quantity and diversity of the zooplankton on which they feed. Chemical pollutants may also affect whales through ingestion and long-term storage in the blubber (fat layer). Pollutants have a tendency to bioaccumulate, or increase in concentration the further up the food chain an animal is situated. For this reason, chemical pollutant levels in mysticetes, such as the right whale, are generally several orders of magnitude lower than the levels found in seals or odontocetes (toothed cetaceans) because seals and odontocetes feed on fish higher up in the food chain, whereas mysticetes feed on zooplankton, at the bottom of the chain (NMFS, 2005a).

Contaminants found in the coastal environment include suspended solids, organic debris, metals, synthetic organic compounds, nutrients, and pathogens. Chemical pollutants from oil spills, leaks, discharges, and organotins (leaching from hulls) may also enter the water as a side effect of shipping operations (Busbee *et al.*, 1999). The following contaminants are of particular concern with regard to right whale health (O' Shea *et al*., 1999; Reijnders *et al*. 2000).

- **Persistent organic pollutants:** PCBs, PCDDs, PCDFs, PAHs, DDT, chlordanes HCH, and other pesticides.
- **Flame retardants:** PBDEs (polybrominated diphenyl ethers) and other brominated flame retardants.
- **Plasticizers:** Phthalate esters.
- **Surfactants:** Alkyphenol ethoxylates (e.g., NPEO–nonylphenoletoxylates).
- **New-era pesticides and herbicides.**

Sediment Classification in the Mid-Atlantic
from Cape Cod to Albemarle Sound

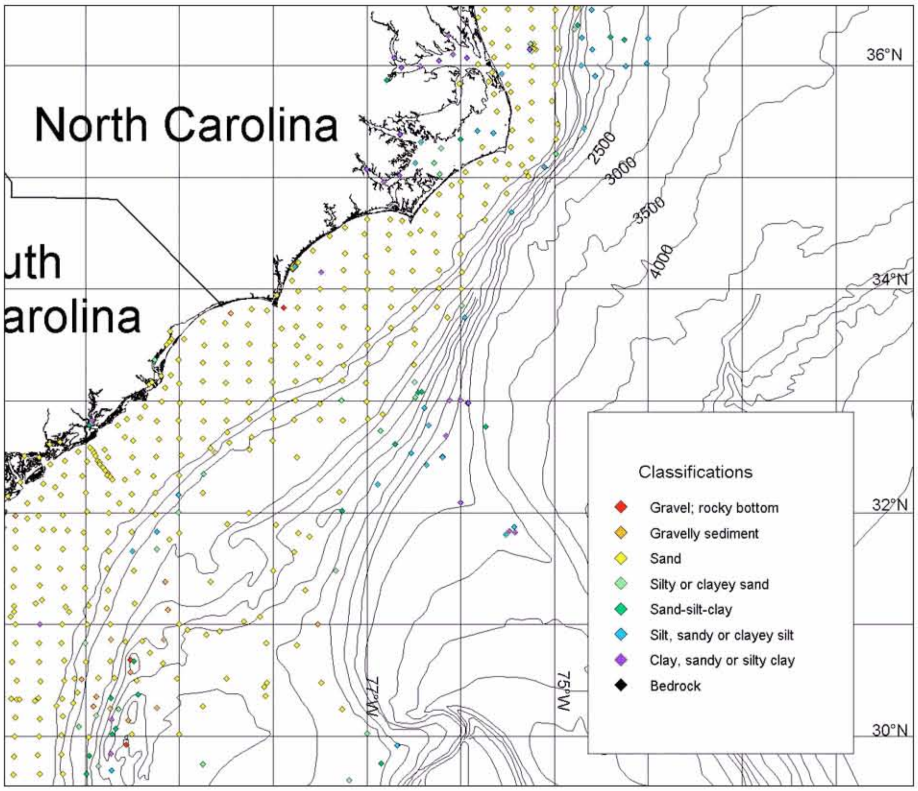


USGS science for a changing world

Figure 3-6

This Page Intentionally Left Blank

Sediment Classification in Carolina Trough

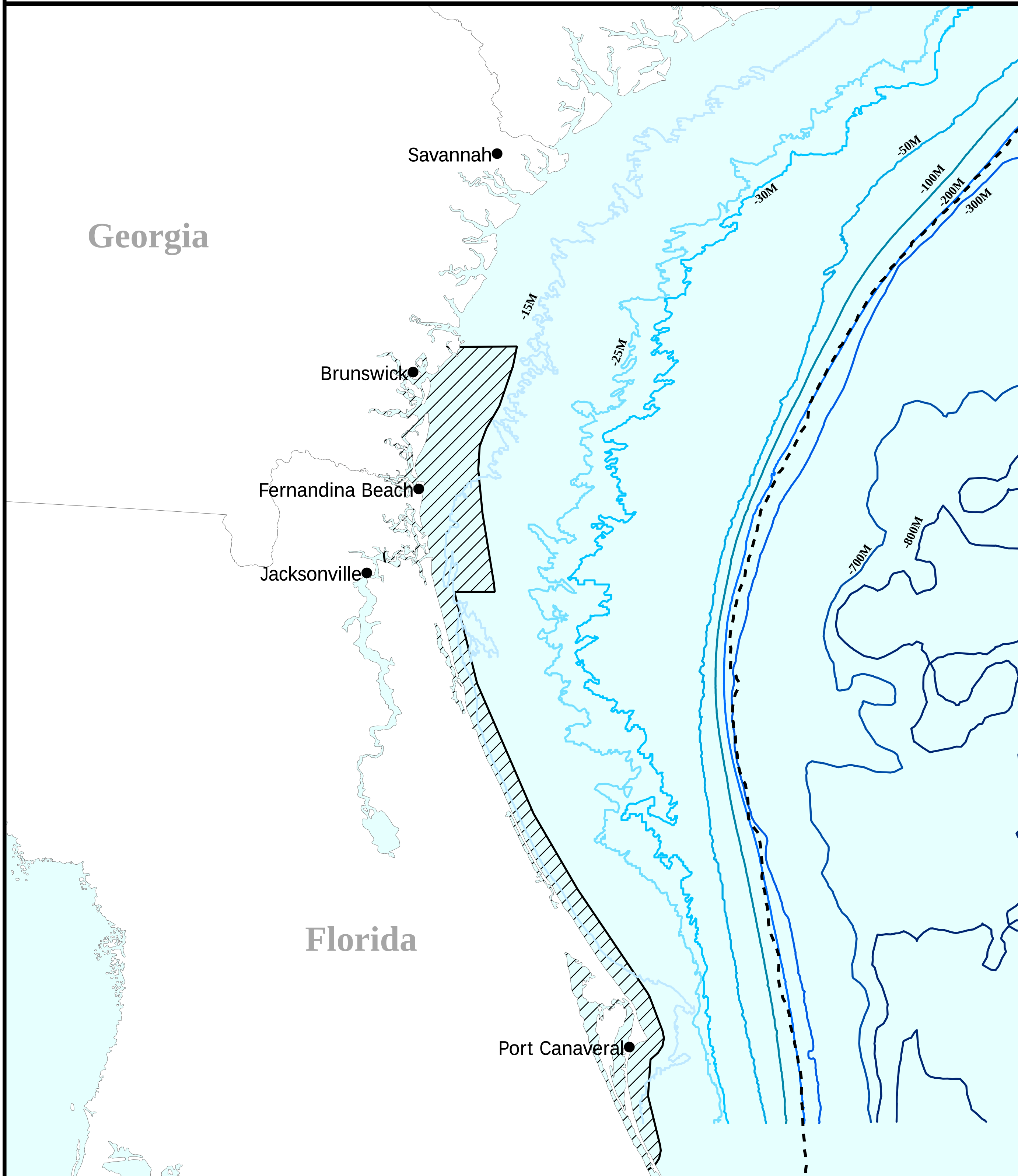


USGS science for a changing world

Figure 3-7

This Page Intentionally Left Blank

Bathymetry in the Southeastern United States



North Atlantic Right Whale Critical Habitat

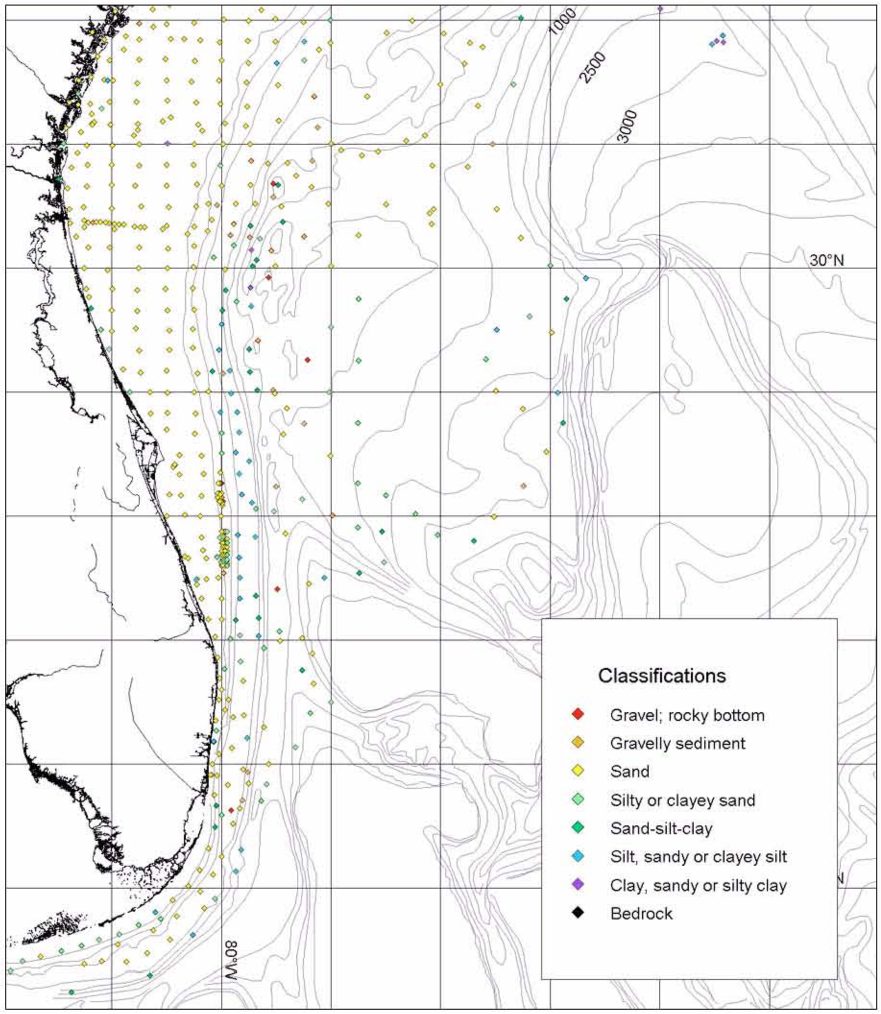
Continental Shelf Break

Note: Map data not projected.

Figure 3-8

This Page Intentionally Left Blank

Sediment Classification in the Blake Plateau Basin



USGS science for a changing world

Figure 3-9

This Page Intentionally Left Blank

- **Municipal and industrial effluents:** Endocrine disrupting compounds (e.g., synthetic estrogens, natural hormones, pulp byproducts).
- **Anti-fouling agents:** Organotins and replacement compounds.
- **Dielectric fluids:** PCB replacements (e.g., PCNs–polychlorinated napthalenes, PBBs–polybrominated biphenyls).
- **Aquaculture related chemicals:** Antibiotics, pesticides.
- **Metals:** Methyl mercury (MeHg).

Concentrations of organochlorines; including DDT, PCBs, HCHs, aldrin, and dieldrin; have been observed in many species of marine mammals, including right whales. PCBs have been found in samples of North Atlantic right whale blubber (Weisbrod *et al*., 2000) and, at low levels, in zooplankton sampled from Cape Cod Bay (Reeves *et al*., 2001). PCBs, DDT, and other organochlorines have been detected in northern right whale samples from the Bay of Fundy, Browns, and Baccarro Banks (Woodley *et al.*, 1991 *in* NMFS, 2005a). Whereas contaminants have been detected, it is not known if levels detected are sufficiently high to be detrimental.

Another source of pollutants that may have an effect on right whale health is biotoxins. Biotoxins are highly toxic compounds produced by harmful algal blooms (HABs).[6] Five major classes of biotoxins are associated with HABs: saxitoxins (responsible for paralytic shellfish poisoning), brevatoxins (responsible for neurotoxic shellfish poisoning in the SEUS), domoic acid (amnesic shellfish poisoning), okasdaic acid and dinophysistoxins (diarrhetic shellfish poisoning), and ciguatoxins. The first of three of these classes have been implicated in marine mammal mortality events (Reeves *et al*., 2001). While there is no evidence to date that right whales have been adversely affected by these biotoxins, they are present in right whale habitat and have been known to cause a loss of equilibrium and respiratory distress and to have feeding implications (Reeves *et al*., 2001).

Pollutants also are generated by vessels at sea, but discharges are regulated in state and Federal waters out to the Contiguous Zone. "Graywater" and "blackwater" are two types of waste discharges from vessels at sea. Graywater contains nonsewage waste from showers, baths, sinks, and laundries. It may contain food waste, oil and grease, cleaning products, and detergents. Blackwater is sewage, which is discharged according to the regulations described in Section 3.3.2.3 (Table 3-5). Discharges of untreated sewage in unregulated waters may cause eutrophication, or an influx of high levels of nurtrients, which can lead to excessive plant growth that can consume the oxygen in the water. This limits the oxygen available to other species and, in extreme causes, can harm or kill other organisms in the water. Marine engines can discharge oils, lubricants, and fuel. Discharges of bilge and ballast water may include residual oil, lubricants, and fuel (as well as biological organisms).

---

[6] Algae are photosynthetic plant-like organisms that live in water. Most species of algae or phytoplankton are not harmful and serve as the energy producers at the base of the food chain. Occasionally, the algae grow very fast or "bloom" and accumulate into dense, visible patches near the surface of the water. "Red Tide" is a common name this situation where certain phytoplankton species contain redish pigments and bloom such that the waters appears red (NMFS, 2005a).

Table 3-5
Regulatory Requirements for Marine Vessel Pollution

Waste	Law or Regulation	Requirements and Thresholds
Blackwater (Sewage)	US Clean Water Act	Discharges of untreated sewage or sewage with a fecal coliform bacterial count greater than 200 colonies per 100 milliliters, or total suspended solids exceeding 150 milligrams per 100 milliliters are not allowed within 3 nautical miles of the shoreline. Requires a certified operable Marine Sanitation Device (MSD) on every vessel (US and foreign) with an installed toilet.
	MARPOL Annex IV	The discharge of sewage into the sea is prohibited, except when: the ship is discharging ground-up and disinfected sewage using a system approved by the administration at a distance of more than 4 nautical miles from the nearest land, or sewage that is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land; or the ship has in operation an approved sewage treatment plant which has been certified by the administration. The effluent shall not produce visible floating solids in, nor cause the discoloration of, the surrounding water.
Graywater	US Clean Water Act	No restrictions on discharging graywater.
Solid Wastes, Marine Debris	MARPOL Annex V	Dumping floatable dunnage, lining, and packing material is prohibited within 25 miles of shore. The disposal of plastics is prohibited. Dumping other un-ground garbage is prohibited within 12 miles. Incinerator ash is typically considered nonhazardous, and may be disposed of at sea in accordance with International Convention for the Prevention of Pollution from Ships annex V. Ash identified as being hazardous must be disposed of ashore in accordance with Resource Conservation and Recovery Act.
Toxic Wastes	Resource Conservation and Recovery Act	Dry cleaning solvent (perchlorethylene [PERC]); batteries including lead acid, lithium, and nickel cadmium; some print shop waste; and photo processing waste containing silver in excess of 5 parts per million are classified as hazardous waste under the Resource Conservation and Recovery Act and must be handled accordingly.
Oil	US Oil Pollution Act	No visible sheen or oil content greater than 15 parts per million within 12 miles. Oily waste must be retained onboard and discharged at an appropriate reception facility.
	MARPOL Annex I	All vessels of any type more than 400 gross tons traveling over international waters are required to have an approved Shipboard Oil Pollution Emergency Plan (SOPEP). Vessel must be equipped as far as practicable and reasonable with installations to ensure the storage of oil residues onboard and their discharge to reception facilities, or into the sea providing the ship is more than 12 nautical miles from the nearest land, the oil content of the effluent is less than 100 parts per million, and the ship has in operation an oil discharge monitoring and control system, oil-water separating equipment, and oil filtering system or other installation.

Source: NPS, 2003.

3.3.2.2 State Water Quality

Each state has water quality standards that are approved by the US Environmental Protection Agency (EPA). The EPA compiles state water quality reports (Clean Water Act section 305[b]) into the National Assessment Database. All of the information in this section is from the 2002 National Assessment Database (EPA, 2002). In several cases, data were unavailable for coastal and ocean waters, in which case the category "bays and estuaries" was used, which encompasses some coastal waters. Water quality is fairly localized and, therefore, may vary within a particular region even though only one rating has been assigned. Also, near-coastal water quality may not be a good indicator of offshore water quality. The water quality categories that the EPA utilizes are based on the designated uses assigned to the waters, activities such as swimming, propagation of aquatic life, etc. These nationally developed water quality standards are:

- **Good:** Waters fully support all of their designated uses.
- **Threatened:** Waters currently support all of their designated uses, but one of more of those uses may become impaired in the future if pollution control actions are not taken.
- **Impaired:** Waters cannot support one or more of their designated uses.

If a state has threatened or impaired waters, the state description will also include causes of impairment and sources that generate these pollutants, or impairments.

NEUS Region

Maine

Maine's assessed[7] waters overall water quality attainment for ocean and near coastal waters was rated 100 percent good for the state-designated use of fish, shellfish, and wildlife protection and propagation.

Massachusetts

Massachusetts' assessed waters overall water quality attainment for bays and estuaries was rated 65.83 percent good and 34.17 percent impaired for fish, shellfish, and wildlife protection and propagation. Recreational waters were 82.07 percent good and 17.93 percent impaired. Waters designated for aquatic life harvesting (aquaculture) were 9.32 percent good and 90.68 percent impaired. Waters designated for aesthetic value were rated 89.75 percent good and 10.25 percent impaired. The top causes of impairment were pathogens, total toxics, priority organics, nutrients, and organic enrichment. Major sources of contaminants were unknown sources, municipal (urbanized high density area), and combined sewer overflows.

Cape Cod Bay Monitoring Project

The Provincetown Center for Coast Studies (PCCS) organizes various research projects in Cape Cod Bay, including extensive habitat studies. These projects monitor water quality and the composition and distribution of planktonic species as indicators of the health of the bay and availability of food for right whales.

PCCS began a new project with the Massachusetts Water Resources Authority in response to the relocation of a municipal wastewater discharge outfall tunnel 9 miles into Massachusetts Bay and about 36 miles from Cape Cod Bay. There were concerns that this nitrogen-rich sewage effluent would affect zooplankton diversity. The study concluded that nitrogen from the sewage is being assimilated by autotrophic organisms without affecting the diversity of the plankton community. Therefore, there have been no measurable changes to the dynamic food web in the short term. However, the short-term analysis of data at a limited number of sample sites raises the question of possible long-term effects that have not yet developed. Thus, in the future the project may shift focus to assess the potential cumulative or chronic effects to buffer the effluent over the long-term (Moore *et al.*, 2005). Continued monitoring of Cape Cod Bay is vital to the

[7] Assessed refers to the total square miles of water that were monitored and sampled in the state.

recovery for right whales, as it is their major feeding ground, and this effluent is one of many possible factors that could change ecosystem parameters.

New Hampshire

New Hampshire's assessed measurements of near coastal and ocean waters resulted in ratings of 98.9 percent good and 1.1 percent impaired for recreation. Waters designated for aquatic life harvesting or areas that support coastal aquaculture were 100 percent impaired. The top three causes of impairments for these waters were dioxin, mercury, and polychlorinated biphenyls. The major source of these contaminants was atmospheric deposition of toxics.

Rhode Island

Rhode Island's assessed waters for coastal shorelines were rated 100 percent good for the state designated uses of recreation and aquatic life harvesting.

MAUS Region

Connecticut

Connecticut's assessed waters for overall water quality attainment are categorized as bays and estuaries, although this category includes offshore waters in Long Island Sound as well as coastal waters and beaches. For the designated use of recreation, the sampled waters were rated 87.34 percent good, 7.81 percent threatened, and 4.85 percent impaired. For fish, shellfish, and wildlife protection and propagation, waters were rated 61.25 percent good, 0.05 percent threatened, and 38.7 percent impaired. Waters designated for aquatic life harvesting were rated 68.86 percent good and 31.14 percent impaired. The top five causes for impairment were nutrients, organic enrichment, pathogens, indicator bacteria, and nitrogen/ammonia. Major sources for contaminants were that the area is an urbanized high density area, municipal point source discharges, waterfowl, and combined sewer overflows.

New York

Water quality for New York's coastal shoreline-assessed waters was 100 percent good for the state designated use of fish, shellfish, and wildlife protection and propagation.

New Jersey

Water quality for New Jersey's near coastal and ocean-assessed waters was 21.2 percent good and 78.8 percent impaired for the use of fish, shellfish, and wildlife protection and propagation. No causes or sources for impairment were reported.

Delaware

Water quality for Delaware's coastal shoreline-assessed waters was 100 percent good for all three state designated uses. These uses are fish, shellfish, and wildlife protection, recreation, and industrial.

Maryland

Water quality for Maryland's assessed waters in bays and estuaries was 9.8 percent good and 90.20 percent impaired. No causes or sources for impairment were reported.

Virginia

Water quality for Virginia's assessed waters for bays and estuaries was 5.83 percent good and 29.76 percent threatened, and 64.41 percent impaired for fish, shellfish, and wildlife protection and propagation. Waters designated for recreation were rated as 95.7 percent good, 0.03 percent threatened, and 4.27 percent impaired. Waters designated for aquatic life harvesting were 79 percent good, 13.48 percent threatened, and 7.53 percent impaired. Some of the causes of impairment were nutrients, turbidity, organic enrichment and low dissolved oxygen. The major sources of contaminants were municipal point source discharges, industrial point discharges, and nonpoint sources.

North Carolina

North Carolina's state water quality data were not reported on the EPA website. The "Water quality assessment and impaired waters list (2004 Integrated 305(b) and 303 (d) reports)" can be found at North Carolina's division of water quality website:
http://h2o.enr.state.nc.us/tmdl/General_303d.htm

South Carolina

South Carolina's assessed waters for bays and estuaries were rated as 81.36 percent good and 18.64 percent impaired for fish, shellfish, and wildlife protection and propagation. Waters designated for recreation were 93.35 percent good and 6.65 percent impaired. The top causes for impairment were organic enrichment, pathogens, turbidity, metals, and pH. The major sources for contaminants were natural sources, unknown sources, and industrial point source discharge.

SEUS Region

Georgia

Georgia's assessed waters for overall water quality attainment in bays and estuaries were rated as 100 percent impaired for fish, shellfish, wildlife propagation, and aquatic life harvesting. The top causes for impairment were dissolved oxygen, fish consumption guidance, shellfishing ban, mercury, and polychlorinated biphenyls. The major sources of contaminants were industrial point source discharge, municipal point source discharges, and urban runoff/urban effects.

Florida

Florida's assessed waters for overall water quality attainment in bays and estuaries were rated 100 percent good for the state designated use of recreation.

3.3.2.3 Marine Pollution Regulatory Framework

Relevant international and Federal laws and regulations pertaining to water quality along the eastern cost of the US are listed below and summarized in Table 3-5. State laws and regulations are not identified because there would be no water quality impacts on state waters (out 3 nm [5.6 km]) from implementing the proposed measures.

The International Convention for the Prevention of Pollution from Ships, 1973, modified by the Protocol of 1978, also known as MARPOL 73/78 minimizes vessel pollution by regulating the disposal of wastes from vessel operations, including oil, chemicals, sewage, garbage, and other harmful substances into the ocean. Annex I of MARPOL requires the storage of oil residues and their discharge to reception facilities unless the oil content of effluent is less than 100 parts per million (ppm) and discharge is more than 12 nm (22 km) from the nearest land. Annex IV prohibits the discharge of sewage into the sea, with several exceptions. Annex V of MARPOL regulates the dumping of marine debris within 12 nm (22 km) of land. Vessels flagged under a country that is party to MARPOL 73/78 must comply with the requirements of the convention.

MARPOL 73/78 is implemented in the US by the Act to Prevent Pollution from Ships (33 U.S.C. § 1901), under the lead of the USCG. Under the act, dumping is regulated within the territorial sea (12 nm) and in some cases in the contiguous zone (24 nm). This legislation restricts the discharge of untreated sewage within 12 nm (22 km). It allows the discharge of treated effluent in coastal waters except in designated No Discharge Areas. Some vessels treat water prior to discharging it beyond 12 nm (22 km) or hold waste water and other solid waste until they reach a shoreside treatment facility.

Solid waste includes food waste, bottles, plastic containers, cardboard, and paper. Marine debris may include fishing gear, building materials, packing material, and other items (NPS, 2003). Solid waste and marine debris must be disposed of in accordance with Annex V of MARPOL (see preceding text). Solid waste, except for plastics[8], may be disposed of outside of 12 nm (22 km), and should not have an adverse effect on water quality. There is, however, the potential that marine animals (including sea turtle and sea birds) may accidentally ingest these items, which would have a negative effect on their health and could even cause death. Marine species may also become entangled in marine debris, which may cause injury, starvation, or death. Annex V is implemented and enforced in part by Regulation 9, which requires all ships of 400 GRT and above and every ship certified to carry 15 persons or more to maintain a Garbage Record Book, to record all disposal and incineration operations (IMO, 2004a).

The Federal Water Pollution Control Act or Clean Water Act (CWA) is the principal US law controlling pollution activities in the nation’s streams, lakes, and estuaries. The USCG and EPA share responsibilities to implement the act. A number of the provisions included in the CWA contribute directly and indirectly to maintaining the water quality of the marine environment. Specifically, one of the goals of the Act is to provide for the protection and propagation of fish, shellfish, and wildlife (33 U.S.C. § 1251 (a)(2)) (NMFS, 2005a). Under Section 402, any discharge of a pollutant from a point source to the navigable waters of the US or beyond must obtain a National Pollutant Discharge Elimination System (NPDES) permit (33 U.S.C. § 1342). Any discharge to the territorial sea or beyond must comply with the Ocean Discharge criteria established under Section 403 (33 U.S.C. § 1343), or a permit will not be issued. The CWA prohibits the discharge of untreated sewage within all navigable waters[9] of the US. Section 312 of the Act requires vessels with installed toilet facilities to contain marine sanitation devices, and if these devices treat the sewage, then the treated effluent may be discharged into coastal waters. Section 312 also allows the establishment of a No Discharge Area, where discharge of sewage from vessels is completely prohibited. The CWA has no restrictions on discharging gray water, which is water from showers, baths, sinks and laundries. States may have more stringent regulations on discharging gray water within state waters. The CWA generally prohibits discharges of oil and hazardous substances into coastal or ocean waters except when permitted under MARPOL 73/78.

[8] Annex V of MARPOL totally prohibits of the disposal of plastics anywhere into the sea, and severely restricts discharges of other garbage from ships into coastal waters and “Special Areas” (IMO, 2004a).

[9] The term “navigable waters” means the waters of the United States, including the territorial seas (33 U.S.C. § 1362).

The Oil Pollution Act of 1990 (33 U.S.C. § 2701 *et seq.*) establishes an extensive liability scheme designed to ensure that in the event of a spill of release of oil or other hazardous substances, the responsible parties are liable for the removal costs and damages resulting from the incident. Under the act, waste discharged in waters within 12 nm (22 km) of shore may not have a visible sheen or oil content greater than 15 ppm. Oily water must be retained onboard and discharged at an appropriate reception facility.

The Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. § 6901 *et seq.*) forbids the dumping at sea of the types of hazardous waste it regulates. If there is compliance with this law, then no hazardous wastes would be discharged in the ocean and there would be no impact on water quality.

The Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA, P.L. 92-532) has two basic aims: (1) to regulate international disposal of materials, and (2) to authorize related research. Title I of the Act, often referred to as the Ocean Dumping Act, prohibits dumping of all municipal sewage, sewage sludge, and industrial waste, and regulates the disposal of dredged material under a US Army Corps of Engineers permit. The EPA also designates sites and imposes strict tests for dredge material disposal. Research provisions concerning general and ocean disposal research are contained in Title II; Title III authorizes the establishment of marine sanctuaries; Title IV established a regional marine research program; and Title V addresses coastal water quality monitoring.

3.3.3 Air Quality

This section presents information on air quality standards, an overview of baseline domestic/international ship emissions, transport and dispersion of air pollutants within the context of regional vessel traffic, and the regulatory framework for marine pollution prevention. The EIS does not attempt to describe local air quality stemming from marine emissions, (as such information is not readily available); however, information on regional air quality at sea is provided where data is available (Section 3.3.3.4).

3.3.3.1 National Ambient Air Quality Standards

Criteria pollutants are those for which the EPA has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare (40 CFR 50). There are seven criteria pollutants with primary standards: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), particulate matter with aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), and particulate matter with aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$).

3.3.3.2 Air Pollutants from Marine Vessels

Marine engines emit air pollutants, especially hydrocarbons (HC), nitrogen oxides (NO_x), and sulfur oxides (SO_x). Greenhouse gases such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20) are also emitted during waterborne travel (EPA, 1999). The criteria pollutants from marine engines are shown below in Table 3-6.

Table 3-6
Criteria Pollutant Emissions from Marine Vessels, 1997

Pollutant	Quantity Emitted (thousand short tons)	Percent of Total Emissions of Pollutant
Carbon Monoxide (CO)	85	0.1
Nitrogen Oxides (NO_x)	235	1.0
Volatile Organic Compound (VOCs)	50	0.3
Sulfur Dioxide (SO_2)	245	1.2
Particulate Matter (PM_{10})	31	0.1
Particulate Matter ($PM_{2.5}$)	22	0.3
Lead (Pb)	NA	NA

Note: Percentage of emissions from traditionally inventoried sources (does not include agriculture and forestry, fugitive dust, or natural sources like windblown dust). Does not include recreational marine vessels.
Source: US Environmental Protection Agency, National Air Pollutant Emission Trends, 1900-1997.

Many factors determine emission levels and air impacts, including:

- Number of vessel trips.
- Emissions per volume of fuel consumed, per trip, or per distance traveled, by chemical.
- Distance traveled.
- Engine type, age, and emissions control technology.
- Fuel consumed (by type) – affects emissions per mile.
- Travel characteristics: speed, acceleration, etc. – affects emissions per mile.
- Climatic conditions (temperature, wind, rain, etc.) – affects dispersion/dilution of pollutants and formation of secondary pollutants.
- Population density – affects number of people exposed to pollution.
- Sensitivity of local ecosystems (EPA, 1999).

Engine make and type, size, speed and load are the most influential factors (Corbett and Koehler, 2003). Corbett and Koehler estimated the world fleet fuel consumption, calculated for all main and auxiliary engines in the internationally registered oceangoing fleet (including military vessels), is approximately 289 million metric tons annually (2003). However, the separate pollutants NO_x, SO_x, and CO_2 estimated in this model were higher than the actual fuel usage reported. The IMO estimates sulfur emissions from ships are about 4 percent of total global sulfur emissions at 4.5 to 6.5 million tons per year. These emissions are generally well dispersed except for certain high travel shipping routes (IMO, 2005). NO_x emissions are estimated to account for 7 percent of global emissions at 5 million tons per year and have regional impacts on acid rain and local port areas (IMO, 2005). Table 3-7 lists emission levels and fuel consumption for various cargo and passenger vessels.

Table 3-7
Modeled Cargo and Passenger Fleet Fuel Consumption and Emissions in 1996 and 2000 from the Main and Auxiliary Engines[a] at Normal Cruising Speed

Ship Type	N2O, kt		NOx, Mt		CO, kt		NMVOC, kt		PM, kt		SO2, Mt		CO2, Mt		Fuel Consump-tion, Mt	
	96	00	96	00	96	00	96	00	96	00	96	00	96	00	96	00
Liquefied gas tanker	0.3	0.4	0.3	0.3	27	31	9	10	24	29	0.2	0.2	13	16	4	5
Chemical tanker	0.4	0.5	0.3	0.4	30	39	10	13	25	34	0.2	0.3	14	19	5	6
Oil tanker	2.4	2.4	2.0	2.1	178	185	57	60	172	180	1.4	1.5	93	97	29	31
Bulk ships[b]	2.4	2.4	2.6	2.6	224	226	73	73	222	223	1.6	1.6	96	97	30	30
General cargo[c]	2.1	1.9	1.8	1.7	190	174	62	57	95	113	0.7	0.8	82	75	26	24
Container	1.6	2.3	1.6	2.3	150	214	49	69	124	166	0.9	1.2	64	91	20	29
Ro-ro ships[d]	0.8	0.8	0.7	0.8	72	76	23	25	33	48	0.2	0.3	31	33	10	10
Passenger vessels	0.3	0.4	0.3	0.4	31	38	10	12	15	21	0.1	0.2	13	16	4	5
Refrigerated cargo	0.3	0.3	0.3	0.3	29	28	9	9	15	15	0.1	0.1	12	12	4	4
Total ME	10.6	11.5	9.8	10.8	931	1010	302	327	726	829	5.5	6.2	419	455	132	144
Total (ME + AUX)	11.7	12.7	10.8	11.9	1024	1111	332	360	799	912	6.1	6.8	461	501	145	158

[a] Values are in Mt (106 t) or kt (103 t). ME, main engine(s); AUX, auxiliary engines.
[b] Bulk dry and bulk dry/oil vessels.
[c] Including passenger/general cargo vessels.
[d] Including passenger/RO-ro vessels.

Source: (Endresen *et al*., 2003)

3.3.3.3 Transport and Dispersion of Marine Air Pollutants

The transport and dispersion of air pollutants in the marine environment are influenced by many factors, including global and regional weather patterns. At the local level, wind speed and direction, vertical air temperature gradients, air-water temperature difference, and the amount of solar heating are primary factors affecting transport and dispersion of air pollutants (EPA, 2005a). As there are many factors that determine where air pollutants are transported and how well they are diluted, it is difficult to estimate the amount of pollutants from shipping vessels at sea transported to land and those that are taken up by the ocean without a complex model.

Oceangoing vessels are moving point sources that disperse emissions when transiting the ocean. These moving point sources result in transient, short-lived air quality impacts on receptors both on land and at sea. Elevated concentrations at receptor points resulting from nearby ships will last only a few minutes before the ship either moves away or as the plume centerline moves away from the receptors. The magnitude of transient emissions is also directly dependent on the closest passing distance between the ship and a receptor. In order for average concentrations from ship emissions to increase, the shipping density has to increase significantly in a sustained manner to the point where there would need to be numerous ships in the immediate area or else the emissions from each individual ship would have to increase. Generally a handful of ships are in a shipping channel at any given time. When there are significant decreases in ship to ship distances, certain navigational rules come into play due to safety considerations that will act to increase or maintain ship to ship distances. These measures will generally act to reduce the probability that any two ships' plumes will intersect and lead to elevated pollutant concentrations at receptors near or between ships. Barring any increases in per ship emissions, the only time when systematic increases in concentrations might be expected is when ships sail in a fixed formation like a naval formation or if a shipping lane decreases in area, which could result in a decrease in ship-to-ship distance in the formation.

If the proposed shipping lanes bring the average ship passage closer to a receptor, it is possible that average concentrations might increase at the receptor because for peak transient concentrations a reduction in ship—receptor distance results in larger pollutant concentrations. In the present study the proposed changes to the shipping lanes neither leads to increased near shore congestion, nor a shift in the average position of the channels.

3.3.3.4 Regional Vessel Traffic and Air Quality

The mid-Atlantic region has the heaviest vessel traffic of the three regions on the East Coast, with 21,657 vessel arrivals in 2004. The MAUS region encompasses the majority of the ports on the East Coast, and also includes the busiest port on the coast—New York/New Jersey (described in detail in Section 3.4.1.2). The SEUS has the second highest volume of vessel traffic on the East Coast, with 4,440 vessel arrivals in 2004. The northeastern region ranks third in overall vessel traffic with 2,570 arrivals in 2004.

Air quality at sea in the mid-Atlantic, a high vessel traffic region, has been measured in the vicinity of Wallops Island, Virginia through the Tropospheric Aerosol Radiative Forcing Observational Experiment (TARFOX). This study found that aerosol conditions in the region varied from relatively clean to moderately polluted. The sources of pollution included land-based sources on the East Coast of the US as well as mineral dust that has been transported from North Africa (Russell *et al*., 1999). Additional information on the TARFOX can be found at *www.geo.arc.nasa.gov/sgg/tarfox*.

Data are currently unavailable for air quality at sea in the SEUS.

Air quality over water in the Northeast, which has less vessel traffic than the other two regions, has been measured intensively during the New England Air Quality Study (NEAQS). This study confirmed via O_3 profiling light detection and rating (lidar) that ozone concentrations over water bodies such as the Gulf of Maine can be rather high in the first 1,000 meters during the middle of the day. In some cases ozone concentrations are considerably larger than the old 125 parts per billion (ppb) 1 hour NAAQS.[10] Observations made from the R/V Ron Brown (Senff *et al*., 2003) suggest that these concentrations persist over relatively large areas and cannot be considered transient, short-lived air quality impacts like those associated with ship plumes. Furthermore, given the elevated nature of these ozone enriched layers, back trajectories suggest that much of the ozone and ozone precursors had their origin in the New York City and Boston urban plumes. An observation relevant to shipping traffic is that over the ocean the near surface air chemistry is NO_x limited and NO_x injections by shipping plumes could further increase the already elevated ozone concentrations.

In addition to ozone, the NEAQS offshore observations found layers of high particulate matter (PM) concentrations that also seemed to originate from southwest of New England (Senff *et al*., 2003). Furthermore, some of layers that are more local in origin can be extremely thin due to the suppressed vertical mixing in the marine layer. The PM off the coast of New England is rather rich in secondary organic species when compared to other continental plumes like those off

[10] The allowable concentration of criteria pollutants is measured in one-hour intervals, which should not exceed the standard, 125 ppb for ozone. If the standards are exceeded, the area is in non-attainment for that pollutant.

China. However, sulfate is still a major fraction of the aerosol mass and shipping emissions will act to increase the offshore concentrations of aerosols.

3.3.3.5 Regulatory Framework for Marine Vessel Pollution Prevention

For the first time the Clean Air Act Amendments of 1990 provided the US EPA with a regulatory mandate to control nonroad emissions from marine engines. Since that period a number of regulatory milestones have been reached regarding emissions from marine vessels. Of all of the marine boat/ship categories defined by the US EPA and the USCG, large commercial (Category 1) ships contribute almost 85 percent of all open water HC + NO_x emissions according to an EPA document on control of emissions from marine diesel engines.[11] At the present time there are two sources of marine regulation that are producing or will produce significant emissions reductions from commercial shipping.

There is an international effort to prevent marine emissions. Regulations for reducing air pollution from ships were adopted in the 1997 Protocol to the International Convention on Marine Pollution (MARPOL) 73/78, and the new Annex VI entered into force on May 19, 2005. Marpol Annex VI sets limits on sulfur oxide and nitrogen oxide emissions from marine vessels and prohibits deliberate emissions of ozone depleting substances. It places a global cap of 4.5 percent mass per unit mass (m/m) on the sulfur content of fuel and includes a provision for IMO to monitor the worldwide average sulfur content of fuel. Annex VI also has a provision to establish special SO_x Emission Control Areas, where the sulfur content of fuel must not exceed 1.5 percent m/m or ships may add an exhaust gas cleaning system to the vessel (IMO, 2005). Other provisions include limits on NO_x emissions from diesel engines, prohibit onboard incineration of polychlorinated biphenyls (PCBs), and prohibit deliberate emissions of ozone depleting substances such as halons and chlorofluorocarbons (CFCs) (IMO, 2005).

The EPA is proposing a program to introduce more stringent emission standards for large marine diesel engines. The agency published an advanced notice of proposed rulemaking in the Federal Register on June 29, 2004, to announce the scope of the program to reduce NO_x and PM emissions from new marine diesel engines. Impacts of emissions on ozone may be reduced by lowering NO_x emissions in oceanic background regions (Endresen *et al.*, 2003). The US EPA has implemented an additional set of controls on the sulfur in marine engine fuels. By 2004 sulfur content in fuels are to be reduced by 99 percent, which will result in a reduction of PM sulfate from the fuel sulfur. Together the reduction of emissions in an EPA regulatory analysis was found to be 26 percent for HC, 29 percent for NO_x, and 38 percent for PM. A discussion of the regulatory particulars can be found in the EPA fact sheet, “Overview of EPA’s Emission Standards for Marine Engines” (EPA420-F-04-031).

3.3.4 Noise

Though noise in the marine environment has become a growing concern to the scientific community, there are few data available on the effects of noise on marine mammals. There are several sources of sound in the ocean. Natural sources of sound in the marine environment, such as the waves generated by wind, account for sound energy ranging from 1 Hz to 100 kHz (NRC, 2003). Anthropogenic sources of noise in the marine environment include oil and gas

[11] EPA420-R-99-026

exploration, military activities (sonar and explosives), and acoustic scientific research. However, noise emanating from large vessels is a constant, widespread source, while other sources occur in temporarily in specific locations.

Low frequency noise from vessels is in similar frequency ranges to those used by certain large whales (mysticetes) to communicate (~10–500 Hz) and may disrupt communication among the animals whereby biologically important sounds could be masked by (vessel and other) anthropogenic noise.

The amount of noise produced by large commercial vessels depends on vessel type, size, and operational mode. A major noise source is propeller cavitation (when air spaces created by the motion of propellers collapse) (NMFS, 2005d). Under certain conditions, slower speeds may reduce cavitation noises in some vessels. Vessel quieting technology also can reduce vessel noise. Generally, it is more efficient and economical to incorporate this technology into the design of a vessel, rather than retrofitting vessels already at sea.

Foreign waterborne trade has been steadily increasing over the years, and the number of large vessels is predicted to double over the next two to three decades (NMFS, 2005d). Due to this prediction, research on trends in shipping, marine ambient noise, and the effects of noise on marine mammals should be conducted. The status of current research as well as future research needs was identified in a symposium on shipping noise in marine mammals held by NOAA in May 2004. Although there are plans for developing a global acoustic monitoring network, at this time, there are no complete data sets on ocean noise levels in the geographic area of the strategy. Additionally, the ability to predict current levels of ambient noise and future trends that may result from changes in the sizes and number of vessels in the world's shipping fleet is inherently difficult to predict (Heitmeyer *et al.*, 2004).

3.4 Socioeconomic Characteristics

3.4.1 Port Areas, Existing Regulations, Traffic Corridors, and Vessel Types

3.4.1.1 Port Areas

Twenty-six port areas along the East Coast of the US are identified as having the highest potential to be affected by the proposed action. These port areas are listed in Table 3-8 and shown on Figure 3-10. For some purposes, the port areas have been grouped in port regions, as shown in the table.

3.4.1.2 Summary Descriptions of Port Areas and Operations

The following are brief descriptions of the facilities and operations at each of the port areas considered in this EIS. For some of the areas, more detailed descriptions are available in Appendix D.

Socioeconomic Study Areas

Figure 3-10

This Page Intentionally Left Blank

Table 3-8
Socioeconomic Study Area

Port Region	Port Area
Northeastern US – Gulf of Maine	Eastport, Maine Searsport, Maine Portland, Maine Portsmouth, New Hampshire
Northeastern US – Off Race Point	Salem, Massachusetts Boston, Massachusetts
Northeastern US – Cape Cod Bay	Cape Cod, Massachusetts
Mid-Atlantic – Block Island Sound	New Bedford, Massachusetts Providence, Rhode Island New London, Connecticut New Haven, Connecticut Bridgeport, Connecticut Long Island, New York
Mid-Atlantic Ports of New York/New Jersey	New York City, New York
Mid-Atlantic – Delaware Bay	Philadelphia, Pennsylvania*
Mid-Atlantic – Chesapeake Bay	Baltimore, Maryland Hampton Roads, Virginia
Mid-Atlantic Morehead City and Beaufort, North Carolina	Morehead City, North Carolina
Mid-Atlantic Wilmington, North Carolina	Wilmington, North Carolina
Mid-Atlantic Georgetown, South Carolina	Georgetown, South Carolina
Mid-Atlantic Charleston, South Carolina	Charleston, South Carolina
Mid-Atlantic Savannah, Georgia	Savannah, Georgia
Mid-Atlantic Brunswick, Georgia	Brunswick, Georgia
Southeastern United States	Fernandina, Florida Jacksonville, Florida Port Canaveral, Florida

***Note:** Wilmington, Delaware is also in Delaware Bay, but for the purposes of this analysis, is included with Philadelphia.

Eastport, Maine

Eastport is the easternmost port in the US. It is situated in a safe harbor behind Canada's Campobello Island. The waters of Passamaquoddy Bay and Cobscook Bay converge in Eastport, which, as a result, experiences some of the highest tidal ranges in the US. This massive flow keeps the local waters clean and productive. Eastport is home to one of the largest salmon aquaculture operations in the US. Eastport is also centrally located to many of Maine's forest products industries.[12]

Searsport, Maine

Searsport is located at the head of Penobscot Bay. The port has recently undergone a major reconstruction effort to better serve the needs of shippers moving products in and out of Maine, and through the onsite rail yard of the Montreal, Maine, and Atlantic Railway, to provide service to the heartlands of both the US and Canada.[12]

Portland, Maine

Portland Harbor, at the western end of Casco Bay, is the most important port on the coast of Maine. The ice-free harbor offers secure anchorage to deep draft vessels in all weather. There is

[12] Maine Port Authority: http://www.maineports.com/

considerable domestic and foreign commerce in petroleum products, paper, wood pulp, scrap metal, coal, salt, and containerized goods. Portland is also the Atlantic terminus pipeline for shipments of crude oil to Montreal and Ontario. In 1998, Portland became the largest port in the Northeast based on throughput tonnages. A rail system connects the port to a national network that also reaches into Canada, one of the reasons shippers bypass the crowded and more costly port cities of southern New England and the mid-Atlantic.

The port has 11 terminals and piers including several oil terminals, a passenger vessel terminal, and a fish pier. Portland hosts a variety of international cruise lines and frequent ferry services to maritime Canada operate from the port of Bar Harbor.[12]

Portsmouth, New Hampshire

With a deep natural harbor and river, Portsmouth is one of the oldest working ports in the US. The Piscataqua River Basin's recorded seafaring history began in 1603 with a visit by English explorer Martin Pring. In 1957 the New Hampshire State Legislature created the New Hampshire State Port Authority as an autonomous state agency overseen by a board of directors appointed by the Governor and Executive Council. Activity at the port includes pleasure boating and sport and commercial fishing in addition to bulk and general cargo transport to and from points worldwide. Portsmouth's strategic location makes it ideal for import/export traffic with European trading partners and with businesses in the Middle East, Africa, and the Pacific Rim.[13]

Boston, Massachusetts

Boston is the oldest continually active major port in the Western Hemisphere, and still growing. Since 1980, container traffic has tripled and Boston has become one of the most modern and efficient container ports in the country. Conley Terminal for containerized cargo shipments and Moran Terminal, currently leased to Boston Autoport for the import and distribution of automobiles, handle more than 1.3 million tons of general cargo, 1.5 million tons of nonfuel bulk cargos, and 12.8 million tons of bulk fuel cargos yearly.

The passenger ship industry is also expanding in Boston. Numerous four- and five-star cruise lines such as Cunard, Norwegian Majesty, Hapag-Lloyd, and Silversea regularly call at the port. With 101 passenger ships scheduled to call in the 2005 season, Cruiseport Boston is considered one of the fastest growing high-end cruise markets in the country. The Black Falcon Cruise Terminal, located in the Boston Marine Industrial Park will serve over 210,000 cruise passengers this year. Another full cruise season is planned for 2006 between the months of April and October (MASSPORT, 2005).

Boston also hosts a very large complex of privately owned petroleum and liquefied natural gas terminals, which supply more than 90 percent of Massachusetts' petroleum consumption needs. The port is home to two shipyards, numerous public and private ferry operations, world-renowned marine research institutions, marinas, and a major Coast Guard facility. It is also one of America's highest-value fishing ports.

The Boston Harbor Navigation Improvement Project currently underway will deepen portions of Boston's Inner Harbor and surrounding areas in order to allow a larger class of vessels to call in the Port. Upon completion of the dredging, the enhanced accessibility of Boston's channels will

[13] Port of Portsmouth profile: http://www.seacoastnh.com/business/port.html

improve the Port of Boston's competitive position and provide a substantial economic benefit to New England (MASSPORT, 2005).

Salem, Massachusetts

Salem, founded in 1626, has the second largest and deepest natural harbor of the commonwealth and is located on the northeastern coast of Massachusetts.[14] Salem's port facilities receive more than a million tons of coal and 3 million barrels of oil petroleum products each year. An ongoing major port expansion project will enlarge port capacity and allow for cruise vessel and ferry service. These improvements are expected to reestablish the regional prominence of this historic seaport.

Cape Cod, Massachusetts

Cape Cod Bay is enclosed by the Cape Cod peninsula on the south and east and the mainland of Massachusetts on the west. The Cape Cod Canal creates a shortcut for vessel traffic from Buzzard's Bay to Cape Cod Bay. Mariners traveling north or south can transit the canal instead of routing around Cape Cod. This canal is 480 feet wide and 32 feet deep at mean low water.[15] There is a small port in Provincetown on the tip of Cape Cod, which is utilized by commercial fishing vessels, whale watching vessels, small cruise boats, ferry boats, and other commercial and recreational vessels.

New Bedford, Massachusetts

New Bedford is located on the southeastern coast of Massachusetts. It provides access to New England and Canadian markets and has established itself as one of the busiest ports in the state. Since the early 1960s, New Bedford has been one of the area's largest handlers of perishable goods, servicing vessels from around the world. Shipments include fruit, vegetables, and bulk commodities of frozen fish and meat products. Currently, New Bedford has various vessel berths and is able to accommodate the largest refrigerated vessels afloat.[16] Commercial fishing is another dominant industry. Using Federal grants and local funds, the city and the Harbor Development Council (HDC) are planning a $1 million, 8,500-square-foot passenger terminal at State Pier to support passenger ferry service.

Providence, Rhode Island

Providence is New England's third largest city and the Northeast's premiere deep water multimodal port facility for international and domestic trade. The Port of Providence, or ProvPort, was officially founded in 1994 as a fully licensed, bonded Deep Water Port specializing in bulk and break-bulk commodities. Through historical links with China, the port has added trading connections with Central and South America, Europe, the Far East, Russia, Africa, Australia and New Zealand. More than 15 tons of cargo has passed through ProvPort since it opened, including such commodities as cement, chemicals, coal, heavy machinery, liquid petroleum products, lumber, and steel products.[17]

[14] Seaport Advisory Counctil webpage: http:www.mass.gov/seaports/salem.htm
[15] www.nae.usace.army.mil/recreati/ccc/navigation/navigation.htm
[16] Seaport Advisory Council: http://www.mass.gov/seaports/newbed.htm
[17] Providence Port Authority website: http://www.provport.com

New London, Connecticut

New London, Connecticut is located on Long Island Sound. The Port of New London is a historic whaling port, currently utilized by both commercial shipping vessels as well as passenger vessels. The Block Island Sound and Cross Sound Ferries operate out of this port. The USCG Academy and a naval submarine base are located in New London.

New Haven, Connecticut

The Port of New Haven is located on Long Island Sound. As the largest deepwater port in Connecticut, the Port of New Haven is an important contributor to the regional economy. In 2002, 55 percent of the waterborne commerce (by short tons) in Connecticut moved through New Haven. Since 2002, New Haven's port traffic has increased by 16.7 percent, and its share of Connecticut's total traffic has increased 13 percent. The Port primarily handles petroleum and manufactured goods.[18]

Bridgeport, Connecticut

The Bridgeport Port Authority was created in 1993. Currently, Bridgeport is underutilized but growing. The primary tenant is the Bridgeport-Port Jefferson Steamboat Company, a year-round passenger and vehicular service between Bridgeport and Port Jefferson in Long Island, NY. Expected future developments include barge feeder service and high-speed ferry service between Bridgeport, Stamford, and New York.

Long Island, New York

The ports located on Long Island, New York are not as busy as the Port of NY/NJ, although they are frequented by tank barges, tankers, and passenger vessels. There is a regular ferry service from Port Jefferson, NY to Bridgeport, CT, which crosses Long Island Sound. Cold Spring Harbor on Long Island is a historical maritime port.

New York – New Jersey

The port of New York and New Jersey, a natural deep-water harbor that covers 1,500 square miles (sq mi) (3,885 sq km) approximately 9 mi (14.5 km) from the Atlantic Ocean, is the gateway to the densest and wealthiest consumer market in the world. Each year, more than 25 million tons of general cargo move through the port, which has more than 1,100 waterfront facilities, most of which are privately owned and operated. The remaining facilities are owned or operated by the railroads serving the port itself, the Port Authority of New York and New Jersey, and city, state, and the Federal government (USCP 2, 2005). Four major terminals handle cargo and containerships. A passenger ship terminal, the New York Cruise Terminal, is operated by P&O Ports North America for the City of New York. This terminal provides five berths that can accommodate some of the largest cruise ships. The cruise lines calling there include Carnival, Celebrity, Costa, Crystal Cruises, Cunard, Holland America, Norwegian, P&O Cruises, Princess, Radisson Seven Seas, Royal Caribbean, Seabourne, and Silversea (Port Authority of NY/NJ, 2005).

A billion dollars worth of port improvement initiatives is preparing the New York port area to accommodate the growing demand for ocean shipping. Dredging efforts have been coordinated with the USACE, state, and city offices.

[18] New Haven Port Authority: http://www.cityofnewhaven.com/govt/Port_Authority

Philadelphia, Pennsylvania

The Port of Philadelphia is at the intersection of the Delaware and Schuylkill Rivers. For more than 300 years Philadelphia has been an important port city and a major center for international commerce. Philadelphia and its international seaport maintain a preeminent position in several areas of trade, such as the importing of perishable cargoes from South America and high quality paper products from Scandinavia (Philadelphia Port Authority, 2005). The port has two major terminals with more than 45 deep-water piers and wharves and is also a Strategic Military Port (Philadelphia Regional Port Authority, 2005). The port authority has plans to initiate a Delaware River Channeling Deepening Project. Vessel arrivals for the Port of Wilmington, Delaware are included with Philadelphia for the socioeconomic analysis.

Baltimore, Maryland

The port of Baltimore, which supports both commercial shipping and passenger vessels, is located at the head of navigable waters of the Patapsco River, approximately 12 mi (19.3 km) northwest of the Chesapeake Bay. Baltimore's location provides immediate access to the 6.8 million people in the Washington/Baltimore region, the nation's fourth-largest and one of the wealthiest consumer markets in the US.[19] Additionally, the port's inland location makes it the closest Atlantic port to major Midwestern population and manufacturing centers, putting it within a day's reach of one-third of all US households. Baltimore is one of the US top container terminals with high-tech, computerized facilities that greatly increase the port's efficiency and cost-effectiveness. The port has six public terminals and seven private ones, with more than 200 piers and wharves owned by both the Maryland Port Administration and private companies (USCP 3, 2005).

Hampton Roads, Virginia

The port area of Hampton Roads is located in southeastern Virginia, at the southwest corner of Chesapeake Bay, 18 mi (29 km) from the open sea. It encompasses 25 sq mi (64.75 sq km) of accessible waterways. In terms of general cargo, Hampton Roads is the second largest port on the East Coast, after the Port of New York- New Jersey (HRMA, 2005). It includes the ports of Norfolk and Newport News, and has more than 200 piers and wharves (USCP 3, 2005). A new terminal is scheduled to open in 2007 on the Elizabeth River in Portsmouth that would allow the port to handle an additional 500,000 containers per year (HRMA, 2005). The City of Norfolk has plans to build a new terminal to support the growing cruise industry.

In addition to being a major commercial port, Hampton Roads is home to the US Atlantic Fleet and the largest naval base in the world, in Norfolk. Approximately 58 Navy vessels are homeported in Norfolk. The Hampton Roads area is also home to one of the highest concentrations of Coast Guard personnel in the country. The South Atlantic Region of the US Department of Transportation's Maritime Administration (MARAD) in Norfolk is responsible for all MARAD operations on the East Coast (HRMA, 2005).

Morehead City, North Carolina

The port of Morehead City is located 4 mi (6.4 km) from the ocean on the Newport River and Bogue Sound. It is one of the deepest ports on the East Coast. The port has 5,500 feet of continuous wharf two berths and handles break-bulk and bulk cargo. Morehead City is a major

[19] Maryland Department of Transportation. URL: http://www.mdot.state.md.us

port for phosphate products. Container traffic was facilitated by the opening of two inland terminals in the 1980s. More expansions are being planned.[20]

Wilmington, North Carolina

The Port of Wilmington is located on the east bank of the Cape Fear River. It has facilities to handle containerized, bulk, and break-bulk cargo (NC Ports, 2005). It is close to the center of the Southeast US market, the fastest growing region in the country.

Georgetown, South Carolina

The Port of Georgetown is South Carolina State Ports Authority's dedicated break-bulk and bulk cargo facility. Top commodities are steel, salt, cement, aggregates, and forest products.

Charleston, South Carolina

Charleston is the largest city and port in South Carolina. The port of Charleston consists of five terminals dedicated to commercial cargo and containers (South Carolina State Ports Authority, 2005). It also has a cruise terminal with about 49 arrivals in 2005. Norwegian Cruise Line, Carnival, Clipper, Royal Caribbean, and several other smaller cruise companies call at this port. MARAD also utilizes several piers at the former Navy Yard.

Savannah, Georgia

The port of Savannah is Georgia's chief port. It has two deep-water terminals with numerous wharves owned by the Georgia Ports Authority and private entities (Georgia Port Authority, 2005). The Georgia Port Authority has been planning for the expansion of Savannah Harbor since 1999. This project would deepen the channel to a maximum depth of 48 ft (14.6 m). An EIS assessing the impacts of the proposed dredging project is currently being prepared (GA Port Authority, 2005). The Elba Island LNG terminal, owned and operated by Southern LNG, is located on the Savannah River.

Brunswick, Georgia

The Port of Brunswick is located on the Brunswick and East rivers. There are three terminal facilities owned by the Georgia Ports Authority. These terminals handle break-bulk, bulk and ro-ro vessels. There is a harbor deepening project planned for the Port of Brunswick that plans to increase the channel depth from 30 ft (9.8 m) to 36 ft (11 m).

Fernandina Beach, Florida

Fernandina Beach is the center of activity of Amelia Island. The port specializes in break-bulk forest products and container liner services to the Caribbean and South America.

Jacksonville, Florida

The Jacksonville Port Authority (JAXPORT) is a full service international trade seaport operating three public terminals and one passenger cruise terminal. Of 27 principal piers and wharves, six are owned by JAXPORT; the others are privately owned and operated (USCP 2, 2005). Celebrity and Carnival cruise lines operate out of this port (Jacksonville Port Authority, 2005).

[20] http://www.ncports.com

Port Canaveral, Florida

Port Canaveral is strategically located on Florida's central Atlantic Coast and has the necessary intermodal connections to reach all of Florida and the SEUS. In addition, it is an ideal hub between the SEUS, the Caribbean, and Central America. More than 3 million tons of bulk cargo moves through the port every year. Products include fresh produce, frozen food, juice concentrates, milled lumber, bagged cement, steel, and newsprints.

3.4.1.3 Existing Regulations and Traffic Corridors

The Ports and Waterways Safety Act of 1972 authorized the USCG to implement measures to control and supervise vessel traffic to ensure navigational safety and environmental protection in US ports and waterways. It is under this jurisdiction that the USCG will conduct a PARS. The act also authorizes the USCG to require vessels to carry devices that are compatible for use with the Vessel Traffic Services (VTS) system. The VTS is designed to improve the safety and efficiency of vessel traffic and to protect the environment through a national transportation system that collects, processes, and disseminates information on the marine operating environment and maritime vessel traffic in major US ports and waterways. The VTS system was established under Chapter V (Safety of Navigation) of the International Convention on the Safety of Life at Sea (SOLAS). The convention states that governments may establish a VTS when the volume of traffic or the degree of risk justifies such services (IMO, 2004b). Currently, the only VTS within the geographical scope of the strategy is in New York Harbor.

The USCG also issues periodic notices to mariners regarding information about aids to navigation, hazards to navigation, and other information regarding navigational safety (USCG, 2004). In April 2005, the USCG updated the Broadcast Notice to Mariners regarding the presence of right whales within 30 nm (56 km) of the coast along the US mid-Atlantic. The notice to mariners is broadcast via VHF and single side-band radios and published for distribution. The current message states that right whales are prone to vessel collisions, approaching within 500 yards is prohibited, and provides several sources to obtain information on sightings and advisories. The new message suggests that vessel operators use caution and proceed at safe speeds in areas used by right whales.

USCG designates Regulated Navigation Areas (RNA) to control vessel traffic by specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters. There are several designated RNAs within the geographic scope of the proposed rulemaking. The RNA in the Chesapeake Bay Entrance, around Hampton Roads, Virginia, and adjacent waters, requires that all vessels of 300 GRT or greater reduce speeds to 8 knots in the vicinity of the Naval Station Norfolk, to improve security measures and reduce the potential threat to Naval Station Norfolk security that may be posed by these vessels (67 FR 41337). This temporary final rule was republished in the *Federal Register* on December 2002 (68 FR 2201). This rule placed a 5 knot speed limit in Little Creek, a 6 knot speed limit in the southern branch of the Elizabeth River, and a 10 knot speed limit in Norfolk Harbor Reach. The RNA in the Long Island Sound Marine Inspection and Captain of the Port Zone excludes all vessels from operating within 700 yards of the Millstone Nuclear Power Plant or 100 yards from an anchored USCG vessel, in order to ensure public safety and prevent sabotage or terrorists acts. The rule also includes speed restrictions in the vicinity of Naval Submarine Base New London and Lower Thames River. Vessels 300 GRT or more are restricted to 8 knots and lower speeds. This rule was effective from December 2001 to June 2002.

The Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS) established "safe speeds" for mariners and traffic separation schemes. Rule 10 sets out the navigational rules for vessels operating in or near TSSs. Regulation 8 of SOLAS states that the IMO is the only organization competent to deal with international measures concerning the routing of ships (IMO, 2004a).

In July 2004, the IMO coordinated with Transport Canada and the World Wildlife Federation and moved shipping lanes in the Bay of Fundy away from important right whale feeding grounds. The Canadian proposal to move the shipping lanes was adopted at the IMO annual meeting of the Marine Safety Committee in December of 2002 in London, England (WWF, 2003). This amendment to the TSS added 5 miles to the traveling time for vessels calling at Saint John and 11 miles for vessels calling Bayside and Eastport.

Regulation 19, Chapter V of SOLAS, requires that all vessels of 300 gross tonnage and greater engaged in international voyages, cargo ships of 500 gross tonnage and greater not engaged in international voyages, and passenger ships (irrespective of size) built on or after July 1, 2002, to carry an Automated Identification System (AIS) capable of providing information about the ship to other ships and to coastal authorities automatically (IMO, 2004b). The Regulation also applies to ships built before July 2002, engaged in international voyages, according to the following timetable:

- Passenger ships by 1 July 2003
- Tankers by 1 July 2003
- Ships, other than passenger ships and tankers, of 50,000 gross tonnage and greater by 1 July 2004

Ships other than passenger ships and tankers from 300 up to 50,000 gross tons were required to fit AIS by 31 December 2004. It is conceivable that AIS could be used to alert mariners when whales are sighted.

Port State Control (PSC) is an international protocol developed by the IMO that gives authority to a nation state to inspect foreign ships and verify that the ship and its crew are in compliance with international regulations (IMO, 2005). The US is a signatory to IMO protocols and the USCG is the lead PSC agency in the US. The USCG is also the lead agency in developing guidelines for the International Ship and Port Security (ISPS) compliance inspections.

As a sovereign state, the US has extensive authority to regulate ships entering its ports and to establish port of entry conditions. Therefore, the US has the proper authority to require foreign flag vessels calling at US ports to adhere to the measures of the strategy.

Traffic Corridors

Several types of routing measures are used by the USCG and International Maritime Organization to provide safe access routes to and from ports, including recommended routes, anchorage/no anchorage areas, and TSSs. The purpose of a TSS is to separate opposing streams of traffic by appropriate means and establishing traffic lanes (33 CFR 167). TSSs have been adopted by the IMO in certain areas of the world to aid in navigation safety; all vessels must adhere to operating rules within these routes, although vessels may enter the TSS anywhere along its course. There are several TSSs in the waters along the East Coast.

Northeast

There are two internationally adopted TSSs in the Northeast. A TSS has been established in the approaches to the harbor of Portland, Maine. This TSS consists of directed inbound and outbound traffic lanes with a separation zone and a precautionary area. The second TSS has been established in the approach to Boston, Massachusetts. It originates in the Great South Channel, heads in a northerly direction to a point just off the easterly side of Provincetown, from which it continues in a northwesterly direction, crossing Stellwagen Bank and ending in a Precautionary Area off the entrance to Boston Harbor (NOS, 1993a). The Boston TSS intersects the Great South Channel right whale critical habitat and several of the proposed management areas.

In addition to TSSs, there are other nonofficial, but highly utilized areas or lanes in that area. The majority of the vessels transiting Cape Cod Bay are tugs and barges, which generally operate on the western side of the bay. Some vessels cross the designated critical habitat areas to head north to ports in Boston, New Hampshire, Maine, and Canada, and a small portion calls at Provincetown, Massachusetts (Russell *et al*., 2005). Vessels also transit through Stellwagen Bank via the Cape Cod Canal (NOS, 1993a). Research conducted on the Mandatory Ship Reporting System (MSRS) found that traffic headed for Massachusetts from the east generally uses four “high-use routes” that pass through the Great South Channel critical habitat and Stellwagen Bank and converge near the Boston Approach (Ward-Geiger *et al.*, 2005).

Overall, in spite of the presence of two TSSs, the area experiences a lot of vessel traffic, including within the two critical habitat areas and a national marine sanctuary located there. In particular, there are no officially designated routes for vessels traveling into or out of the Cape Cod Canal.

Mid-Atlantic

Ports in the mid-Atlantic attract a lot of ship traffic. Coastwise (moving up and down the coast) ship traffic travels through the right whale’s migratory corridor and vessels approaching a port cross over the migratory corridor. Some mid-Atlantic ports have domestic or internationally adopted TSSs. There is a TSS for the approaches into Narragansett Bay, Rhode Island, and for the approach to Buzzards Bay, Massachusetts through Rhode Island Sound (USCP 2, 2005). There are also TSSs into the approaches of Delaware Bay and Chesapeake Bay. The Off New York TSS has two eastern approaches—off Nantucket and off Ambrose Light; one southeastern approach, and one southern approach, in addition to precautionary areas (USCP 2, 2005).

Southeast

The major ports in this area are Jacksonville, Fernandina, Brunswick, and Canaveral. There are no internationally adopted traffic schemes in the Southeast region. There is currently an MSRS that operates within the southeastern right whale critical habitat. This system does not specify routing measures, although it provides mariners with information on the location of right whales in the area. Then the mariner can decide whether to change heading to avoid whales. This system also yields data on the location of vessels and their routes.

Analysis of data received from the MSRS identified two “high-use” routes associated with the approach to Jacksonville, one of the most frequented ports, followed by Brunswick, and Fernandina Beach (Ward-Geiger *et al.*, 2005). Both of these routes have southern approaches, one more origination more from the east than the other.

Most of the large ship traffic does not navigate coastwise through the SEUS. Northbound traffic generally stays in the Gulf Stream to take advantage of the current and remains east of the proposed Southeast management area. The southbound traffic is sparse and tends to stay offshore from the coasts of Georgia and Florida. Tug and barge, and recreational traffic tend to use coastwise routes.

3.4.1.4 General Vessel Characteristics

Vessel Types

A wide range of vessel types call at East Coast ports and could be affected by the proposed operational measures. For the purpose of the economic analysis, the following 12 vessel types were considered:

- Bulk Carriers
- Combination Carriers
- Containerships
- Freight Barges
- General Cargo Vessels
- Passenger Vessels
- Refrigerated Cargo Vessels
- Ro-Ro Cargo Vessels
- Tank Barges
- Tank Ship
- Towing Vessels
- Other (includes fishing vessels, industrial vessels, research vessels and school ships)

East Coast Arrivals by Type

Table 3-9 shows how many ships in each category arrived at the 26 port areas in 2003 and 2004, based on the USCG vessel arrival database.[21] In 2003, there were 25,532 vessel arrivals at the ports considered here. In 2004, arrivals increased by 7.3 percent to 27,385 vessel arrivals.

Containerships were the most numerous, with 8,623 arrivals in 2003 (about one-third of all arrivals) and 8,886 arrivals in 2004 (a little under a third of all arrivals). Tank ship was the next most frequent vessel type, with 5,439 arrivals in 2003 and 5,513 in 2004. Other significant vessel types in 2004 include bulk carriers (3,149 arrivals), ro-ro cargo vessels (3,054 arrivals), and general cargo vessels (1,843 arrivals). These top five vessel types accounted for 82 percent of total vessel arrivals in 2004.

[21] Reconciliation of the USCG data is described in detail in the supporting Economic Impact Report, prepared by Nathan Associates, Inc.

Table 3-9
East Coast Vessel Arrivals by Vessel Type, 2003 and 2004

Vessel Type	2003	2004
Bulk carrier	2,743	3,149
Combination carrier	150	106
Containership	8,623	8,886
Freight barge	243	274
General cargo vessel	1,752	1,843
Passenger vessel	1,229	1,666
Refrigerated cargo vessel	621	548
Ro-ro cargo vessel	3,107	3,054
Tank barge	1,127	1,492
Tanker	5,439	5,513
Towing vessel	416	745
Other[1]	82	109
Total	**25,532**	**27,385**

[1] Includes fishing vessels, industrial vessels, research vessels, school ships.
Source: Nathan Associates Inc., 2005

Vessel Weight

In most of these categories, ships come in a range of weights. However, on average, combination carriers are the largest ones, with an average weight of 74,426 dead weight tons (DWT) in 2003 and 58,823 DWT in 2004. Tank ships are next, with an average of 54,476 DWT in 2003 and 56,928 DWT in 2004. The average containership was 40,982 DWT in 2003 and 40,887 DWT in 2004. Dry bulk carriers were the only other vessel type with an average DWT in excess of 30,000 DWT, registering 36,042 DWT in 2003 and 36,730 DWT in 2004.

In addition to length, vessel arrivals are also analyzed by DWT and/or gross registered tons (GRT), which are the customary units in the shipping industry for classifying vessels by size category to estimate vessel operating costs.

East Coast Arrivals by Weight

The size of vessels calling at East Coast ports can vary considerably depending on a number of factors including cargo and vessel type, length of ocean voyage, port and channel draft limitations at the loading or unloading port, customers preferred consignment size, and vessel routing considerations. The majority of the vessels calling on the East Coast are on the lower side of the weight range; 38 percent of the entire East Coast arrivals are comprised of vessels less than 20,000 DWT. Approximately 24 percent of arrivals are of vessels between 20,000 and 40,000 DWT, 25 percent between 40,000 and 60,000 DWT, and 13 percent over 60,000 DWT in 2003 and 2004.

In 2003, the port area of Portland had the highest average vessel DWT (53,810) on the East Coast. The port area of Philadelphia was second with an average of 46,371 DWT. Large tankers bringing principally fuel oil for local power plants account for more than 50 percent of the arrivals to both these port areas. High average vessels DWT were also reported in 2003 for the port areas of Salem, MA (44,738) and Hampton Roads (42,650). The average vessel DWT by port area was similar in 2004 to what it was in 2003. The Economic Impact Report provides a further analysis of average vessel size by DWT quartile for each of the port areas and vessel size by vessel type.

Arrivals by Port Area

The potential for each port area to be affected by the proposed action varies with the amount of shipping activity occurring every year. One measure of this activity is the number and weight of vessels calling at each port. Data Chart 3-1 summarizes arrival data by port region, port area, and DWT for 2003 and 2004.

As noted above, in 2003, there were 25,532 vessel arrivals at the ports considered in this EIS, and 27,385 in 2004. Looking at arrivals into each port region, the most active region in both years was the ports of New York/New Jersey, with 5,426 and 5,550 vessel arrivals in 2003 and 2004, respectively. The Chesapeake Bay port region was next, with 4,486 and 4,875 arrivals in 2003 and 2004, respectively. Other port regions with more than 2,000 vessel arrivals in 2004 include the Southeastern US (4,315 vessel arrivals), the Delaware Bay region (2,661 vessel arrivals), the Block Island Sound region (2,563 vessel arrivals), as well as the single-port areas of Savannah (2,474 vessel arrivals) and Charleston (2,473 vessel arrivals).

In terms of single port areas, New York City had the most vessel arrivals (5,550 arrivals) in 2004, followed by Hampton Roads (2,834 arrivals), Philadelphia (2,661 arrivals), Jacksonville (2,517 arrivals), Savannah (2,474 arrivals), Charleston (2,473 arrivals), Baltimore (2,041 arrivals), and Port Canaveral (1,062 arrivals).

Operating Speed

Table 3-10 shows average speeds by vessel type and DWT category based on data from MSRS reports, USACE estimates of vessel service speeds, and comments from the maritime industry. Further information on these data sources is provided in the Economic Impact Report.

Operating Costs at Sea

In addition to operating speeds, the USACE also prepares estimates of vessel operating costs to be used by planners in studies to determine the potential benefits of harbor improvement projects. Vessel operating costs include annual capital costs as determined by the replacement cost of the vessels and application of capital recovery factors; estimates of fixed annual operating costs such as for crew, lubes and stores, maintenance and repair, insurance and administration; the number of operational days per year; and fuel costs at sea and in port.

Data Chart 3-2 shows hourly vessel operating costs at sea for foreign flag and US flag vessels by type and DWT in 2005, based on data published by the USACE. Operating costs were calculated for both US and foreign flag vessels because of the disparity between similar vessel types in these two categories. For example, operating costs for US flag bulk carriers, combination carriers, and tankers are generally double those of similar foreign flag vessels. Operating costs for US flag containerships, ro-ro vessels, and passenger vessels are about 1.5 times higher than comparable foreign flag vessels.

Data Chart 3-1
Vessel Arrivals by Region, Port Area and DWT, 2003-2004

	2003					2004				
	DWT					DWT				
Port Region and Port Area	0 - 19,999	20,000 - 39,999	40,000 - 59,999	60,000 and Greater	Total	0 - 19,999	20,000 - 39,999	40,000 - 59,999	60,000 and Greater	Total
Northeastern US - Gulf of Maine										
Eastport, ME	23	4	13	-	40	17	-	26	-	43
Searsport, ME	132	43	18	3	196	117	46	31	2	196
Portland, ME	209	111	83	217	620	201	103	104	233	641
Portsmouth, NH	32	91	74	2	199	33	48	91	1	173
Subtotal	396	249	188	222	1,055	368	197	252	236	1,053
Northeastern US - Off Race Point										
Salem, MA	1	1	5	2	9	6	6	-	3	15
Boston, MA	237	109	127	10	483	237	109	127	10	483
Subtotal	238	110	132	12	492	243	115	127	13	498
Northeastern US - Cape Cod Bay										
Cape Cod, MA	9	-	3	10	22	15	1	8	12	36
Subtotal	9	0	3	10	22	15	1	8	12	36
Mid-Atlantic Block Island Sound										
New Bedford, MA	46	33	12	19	110	41	28	8	22	99
Providence, RI	172	74	92	12	350	157	89	72	4	322
New London, CT	96	19	20		135	118	25	36	1	180
New Haven, CT	309	116	117	5	547	520	81	94	6	701
Bridgeport, CT	278	4	15	22	319	349	2	14	27	392
Long Island, NY	624	59	9	88	780	691	77	17	84	869
Subtotal	1,525	305	265	146	2,241	1,876	302	241	144	2,563
Mid-Atlantic Ports of New York/New Jersey										
New York City, NY	1,353	1,311	1,830	932	5,426	1,324	1,548	1,774	904	5,550
Subtotal	1,353	1,311	1,830	932	5,426	1,324	1,548	1,774	904	5,550
Mid-Atlantic Delaware Bay										
Philadelphia, PA	1,117	472	296	594	2,479	1,153	556	327	625	2,661
Subtotal	1,117	472	296	594	2,479	1,153	556	327	625	2,661
Mid-Atlantic Chesapeake Bay										
Baltimore, MD	754	483	415	168	1,820	759	588	443	251	2,041
Hampton Roads, VA	429	763	950	524	2,666	472	855	871	636	2,834
Subtotal	1,183	1,246	1,365	692	4,486	1,231	1,443	1,314	887	4,875
Mid-Atlantic Morehead City and Beaufort, NC										
Morehead City, NC	30	74	15	4	123	37	77	33	4	151
Subtotal	30	74	15	4	123	37	77	33	4	151
Mid-Atlantic Wilmington, NC										
Wilmington, NC	196	168	238	26	628	221	176	240	30	667
Subtotal	196	168	238	26	628	221	176	240	30	667
Mid-Atlantic Georgetown, SC										
Georgetown, SC	19	18	26	-	63	27	28	14	-	69
Subtotal	19	18	26	0	63	27	28	14	0	69
Mid-Atlantic Charleston, SC										
Charleston, SC	371	692	986	228	2,277	406	817	1,045	205	2,473
Subtotal	371	692	986	228	2,277	406	817	1,045	205	2,473
Mid-Atlantic Savannah, GA										
Savannah, GA	507	667	908	316	2,398	496	739	823	416	2,474
Subtotal	507	667	908	316	2,398	496	739	823	416	2,474
Southeastern US										
Brunswick, GA	282	126	46	4	458	271	149	28	4	452
Fernandina, FL	225	4	26	-	255	247	2	35	-	284
Jacksonville, FL	1,376	457	358	49	2,240	1,562	514	389	52	2,517
Port Canaveral, FL	763	70	46	10	889	878	84	85	15	1,062
Subtotal	2,646	657	476	63	3,842	2,958	749	537	71	4,315
All Port Areas	9,590	5,969	6,728	3,245	25,532	10,355	6,748	6,735	3,547	27,385

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

This Page Intentionally Left Blank

Table 3-10
Average Vessel Operating Speeds (Knots) by Vessel Type and Weight (000 DWT)

Vessel Type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100	100 to 120	120 to 150	150 and Over
Bulk carrier	11.6	11.6	12.2	12.5	12.5	12.5	13	13	13.4	13.4	14	14	14.1	14.1	14.1	14.1	14.1	14.1
Combination carrier	11.6	11.6	12.2	12.2	12.5	12.5	13	13	13.4	13.4	14	14	14.1	14.1	14.1	14.1		
Containership	13	15.8	17.4	18.5	19.3	20	20.7	21.2	21.7	22.1	22.7	23.4	24.1	24.6				
Freight barge	12	14.2	15.3	16.1	16.8	17.3	17.7	18.1	18.4	18.8	19.2							
General cargo vessel	12	14.2	15.3	16.1	16.8	17.3	17.7	18.1	18.4	18.8								
Passenger vessel	16	18	20	22	24													
Refrigerated cargo vessel	13	15.8	17.4	18.5	19.3	20	20.7	21.2	21.7	22.1	22.7							
Ro-ro cargo vessel	13	15.8	17.4	18.5	19.3	20	20.7	21.2	21.7	22.1	22.7	23.4	24.1					
Tank barge	13.2	13.7	13.9	14	14.2	14.2	14.3	14.4	14.4	14.5	14.5							
Tanker	13.2	13.7	13.9	14	14.2	14.2	14.3	14.4	14.4	14.5	14.5	14.6	14.7	14.7	14.8	14.8	14.9	15
Towing vessel	13.2	13.7	13.9	14	14.2	14.2	14.3	14.4	14.4	14.5								
Other[1]	12	12	12	12	12.	12	12											

1. Includes fishing vessels, industrial vessels, research vessels, school ships
Source: Nathan Associates Inc., 2005

Data Chart 3-2
Hourly Vessel Operating Costs at Sea for Foreign Flag and US Flag, Vessel Type and DWT Size Range, 2005 ($)

	DWT (000s)																	
Vessel type and flag	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-60	60-70	70-80	80-90	90-100	100-120	120-150	150+
Foreign Flag 2005 Hourly Operating Costs at Sea																		
Bulk Carrier	735	752	770	789	808	827	847	867	888	909	942	988	1,035	1,086	1,138	1,222	1,375	1,585
Combination Carrier (e.g. OBO)	771	790	809	828	848	868	889	910	932	955	989	1,037	1,087	1,140	1,195	1,283	1,444	1,665
Container Ship	739	830	933	1,048	1,176	1,321	1,484	1,667	1,872	2,102	2,502	3,156	3,981	5,021	6,333	8,971	-	-
Freight Barge	456	558	683	837	1,024	1,254	1,535	1,879	2,301	2,817	-	-	-	-	-	-	-	-
General Dry Cargo Ship	456	558	683	837	1,024	1,254	1,535	1,879	2,301	2,817	-	-	-	-	-	-	-	-
Passenger Ship a/	3,322	4,706	6,666	10,008	12,623	-	-	-	-	-	-	-	-	-	-		-	-
Refrigerated Cargo Ship	1,664	1,869	2,099	2,357	2,647	2,973	3,339	3,750	4,211	4,730	5,629	-	-	-	-	-	-	-
Ro-Ro Cargo Ship	813	914	1,026	1,152	1,294	1,453	1,632	1,833	2,059	2,312	2,752	3,471	4,379	-	-	-	-	-
Tank Barge	909	926	944	961	979	997	1,016	1,034	1,054	1,073	1,103	-	-	-	-	-	-	-
Tank Ship	909	926	944	961	979	997	1,016	1,034	1,054	1,073	1,103	1,145	1,188	1,232	1,278	1,351	1,481	1,654
Towing Vessel	909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other b/	456	558	683	837	1,024	1,254	1,535	-	-	-	-	-	-	-	-		-	-
US Flag 2005 Hourly Operating Costs at Sea																		
Bulk Carrier	1,272	1,307	1,344	1,381	1,420	1,460	1,500	1,542	1,585	1,630	1,698	1,795	1,896	2,004	2,117	2,300	2,639	3,114
Combination Carrier (e.g. OBO)	1,335	1,373	1,411	1,450	1,491	1,532	1,575	1,619	1,665	1,711	1,783	1,884	1,991	2,104	2,223	2,415	2,771	3,269
Container Ship	1,412	1,528	1,653	1,788	1,934	2,092	2,264	2,449	2,649	2,866	3,225	3,774	4,417	5,170	6,050	7,660	-	-
Freight Barge	903	1,077	1,286	1,535	1,832	2,187	2,610	3,115	3,718	4,438	5,786	-	-	-	-	-	-	-
General Dry Cargo Ship	903	1,077	1,286	1,535	1,832	2,187	2,610	3,115	3,718	4,438	5,786	-	-	-	-	-	-	-
Passenger Ship a/	6,110	7,736	9,795	12,899	15,096	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigerated Cargo Ship	3,177	3,437	3,718	4,022	4,352	4,708	5,093	5,510	5,960	6,448	7,256	-	-	-	-	-	-	-
Ro-Ro Cargo Ship	1,553	1,680	1,818	1,967	2,127	2,302	2,490	2,694	2,914	3,152	3,547	4,152	4,859					
Tank Barge	1,736	1,769	1,802	1,836	1,870	1,906	1,942	1,978	2,016	2,054	2,112	-	-	-	-	-	-	-
Tank Ship	1,736	1,769	1,802	1,836	1,870	1,906	1,942	1,978	2,016	2,054	2,112	2,192	2,276	2,363	2,453	2,594	2,848	3,186
Towing Vessel	1,736	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other b/	903	1,077	1,286	1,535	1,832	2,187	2,610	-	-	-	-	-	-	-	-	-	-	-

Source: Prepared by Nathan Associates Inc. as decribed in text from data provided in U.S. Army Corps of Engineers, Economic Guidance Memorandum 05-01, Deep Draft Vessel Operating Costs and adjusted for bunker fuel prices as of October 19, 2005.

It should be noted that comments from the shipping industry raised concerns that the USACE vessel operating costs for 2004 understated current conditions, especially due to the increased cost of bunker fuels. The USACE operating cost estimates provide the assumed fuel consumption per day at sea for the primary propulsion and auxiliary propulsion for each vessel type and DWT size. The primary propulsion is assumed to use heavy viscosity oil while the auxiliary propulsion is assumed to use marine diesel oil. For the purposes of this study, USACE vessel operating costs were updated to reflect current bunker fuel prices per ton as reported by Lloyd's List Bunker 60 for Houston as of October 19, 2005.[22] The price for heavy viscosity oil was $301 per metric ton and marine diesel oil was $696 per metric ton, representing increases of approximately 125 percent over average bunker fuel prices for 2004. While consumption of fuel varies by vessel type and DWT size, the overall increase in vessel operating costs in 2005 due to bunker fuels is about 35 to 40 percent for foreign flag general cargo vessels and tankers, 45 percent for foreign dry bulk vessels, and 50 to 60 percent for foreign containerships. As the USCG vessel arrival database did not provide adequate information to distinguish single-hull and double-hull tankers, operating costs for double hull tankers were used in the analysis (generally the additional vessel operating cost per hour for double-hull tankers varies from 1 percent greater for the smaller tankers to 7 percent greater for the largest tankers).

3.4.2 Commercial Shipping Industry

The volume and value of goods carried by vessels calling at East Coast ports are major indicators of the economic significance of maritime activity that may be affected by the proposed alternatives. To evaluate this activity, foreign trade statistics published by the US Census Bureau at a Custom District and port level have been analyzed for 2003 and 2004.

Census Bureau data on US imports of merchandise is compiled primarily from automated data submitted through the US Customs' Automated Commercial System.[23] Data are compiled also from import entry summary forms, warehouse withdrawal forms, and Foreign Trade Zone documents that must by law be filed with the US Customs Service. Information on US exports of merchandise is compiled from copies of Shipper's Export Declarations (SEDs) and data from qualified exporters, forwarders, or carriers. Copies of SEDs must be filed with Customs officials at the port of export.

For this study, the following data were used:

- **Customs Import Value.** The value of imports appraised by the US Customs Services in accordance with the legal requirements of the Tariff Act of 1930, as amended. This value is generally defined as the price actually paid or payable for merchandise when sold for exportation to the US excluding US import duties, freight, insurance and other charges incurred in bringing the merchandise to the US.
- **Import Charges.** The aggregate cost of all freight, insurance, and other charges (excluding US import duties) incurred in bringing the merchandise from alongside the

[22] Houston is a major distribution area for fuel and is generally regarded as an important price point for the US.
[23] The description and definition of information from the US Census Bureau Foreign Trade Statistics is based on the Guide to Foreign Trade Statistics: Description of the Foreign Trade Statistical Program available on the US Census Bureau website.

carrier at the port of exportation to placing it alongside the carrier at the first port of entry in the US.

- **F.A.S. Export Value.** The free alongside-ship value of exports at the US seaport based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier at the US port of exportation. The value, as defined, excludes the cost of loading the merchandise aboard the exporting carrier as well as freight, insurance, and any other charges or transportation costs beyond the port of exportation.
- **Shipping Weight.** The gross weight in metric tons including weight of moisture content, wrappings, crates, boxes, and containers.
- **District of Exportation.** The customs district in which the merchandise is loaded on the vessel that takes the merchandise out of the country.
- **Import District of Unloading.** The district where merchandise is unloaded from the importing vessel.

Data Chart 3-3 presents East Coast maritime trade data (value and weight of imports and exports) by port region and area for 2004.[24]

In 2003, the custom import value of merchandise arriving to the ports of the East Coast was $207.9 billion; nearly triple the $70 billion value of exports.[25] The port area of New York City was the largest in terms of the value of imports ($78.6 billion) and exports ($21.8 billion). It accounted for 38 percent of the value of US East Coast imports and 31 percent of the exports.

The port areas of Charleston, Philadelphia, Hampton Roads, and Baltimore constituted the next tier of port areas, with import values ranging from $20.4 billion to $26.1 billion. For exports, the port area of Charleston recorded exports of $13.5 billion in 2003; next came Hampton Roads and Savannah with exports of $12.2 billion and $7.6 billion, respectively.

In 2004, the value of East Coast imports increased by 17.6 percent to $244.4 billion and the value of exports increased by 15.2 percent to $80.7 billion. The value of total trade increased by 17 percent to $325.1 billion.

The total weight of East Coast imports was 247 million tons in 2003; the corresponding number for exports was 51.7 million tons. The port area of Philadelphia was the largest in terms of import shipping weight, with 71.2 million tons in 2003, followed by New York City, with 68.9 million tons. These two areas account for 57 percent of the total East Coast import shipments by weight. For exports, Hampton Roads was first, with 17.2 million tons, followed by New York City, with 9.6 million tons, and Savannah with 8.1 million tons. The relative rankings by port area for 2004 are similar in terms of export tonnages. Shipping weight is also presented in Data Chart 3-3.

[24] Maritime trade refers to the method of transportation by which the merchandise arrived in or departed from the US.
[25] Please note that for purposes of this study, ports south of Port Canaveral, FL are excluded from the data presented.

Data Chart 3-3
US East Coast Maritime Trade by Port Region and Port Area, 2004

Port Region and Port Area	Imports: Custom import value ($ millions)	Imports: Shipping Weight (m.t. 000s)	Exports: F.A.S. export value ($ millions)	Exports: Shipping Weight (m.t. 000s)	Total Trade: Merchandise Value ($ millions)	Total Trade: Shipping Weight (m.t. 000s)
Gulf of Maine						
Eastport, ME	0.0	0.0	115.7	260.9	115.7	260.9
Searsport, ME	394.4	1,554.0	1.6	0.8	396.0	1,554.8
Portland, ME	1,126.0	3,331.7	339.2	177.6	1,465.2	3,509.3
Portsmouth, NH	625.7	3,640.4	105.6	239.7	731.2	3,880.1
Subtotal	2,146.0	8,526.0	562.0	679.1	2,708.0	9,205.2
Racepoint, MA						
Salem, MA	23.5	543.6	10.2	3.1	33.7	546.7
Boston, MA	6,102.0	16,508.9	850.4	986.2	6,952.4	17,495.2
Subtotal	6,125.5	17,052.6	860.6	989.3	6,986.1	18,041.9
Cape Cod, MA						
Cape Cod, MA	0.4	0.0	0.0	0.0	0.4	0.0
Subtotal	0.4	0.0	0.0	0.0	0.4	0.0
Block Island Sound						
New Bedford, MA	128.7	2,114.7	9.4	12.2	138.0	2,126.9
Providence , RI	2,835.4	4,549.4	63.7	256.8	2,899.1	4,806.3
New London, CT	276.6	241.7	1.9	5.9	278.6	247.6
New Haven, CT	976.7	2,426.0	47.1	239.8	1,023.8	2,665.8
Bridgeport, CT	83.5	1,555.2	1.1	0.4	84.5	1,555.6
Subtotal	4,300.8	10,887.1	123.2	515.1	4,424.0	11,402.2
New York						
New York City, NY	90,968.3	70,340.7	23,567.1	10,303.3	114,535.4	80,644.0
Subtotal	90,968.3	70,340.7	23,567.1	10,303.3	114,535.4	80,644.0
Delaware Bay						
Philadelphia, PA	27,164.9	74,650.0	3,334.5	1,887.0	30,499.4	76,537.0
Subtotal	27,164.9	74,650.0	3,334.5	1,887.0	30,499.4	76,537.0
Chesapeake Bay						
Hampton Roads, VA	24,713.9	12,047.4	13,260.7	18,550.2	37,974.6	30,597.7
Baltimore, MD	24,410.9	22,589.5	6,905.5	6,273.8	31,316.5	28,863.3
Subtotal	49,124.8	34,636.9	20,166.3	24,824.0	69,291.1	59,461.0
Morehead City, NC						
Morehead City, NC	307.8	404.8	282.7	67.4	590.5	472.2
Subtotal	307.8	404.8	282.7	67.4	590.5	472.2
Wilmington, NC						
Wilmington, NC	1,516.1	4,206.4	1,109.9	856.4	2,626.1	5,062.8
Subtotal	1,516.1	4,206.4	1,109.9	856.4	2,626.1	5,062.8
Georgetown, SC						
Georgetown, SC	82.2	661.8	17.6	20.7	99.8	682.5
Subtotal	82.2	661.8	17.6	20.7	99.8	682.5
Charleston, SC						
Charleston, SC	31,103.0	12,823.8	15,341.5	5,778.6	46,444.5	18,602.3
Subtotal	31,103.0	12,823.8	15,341.5	5,778.6	46,444.5	18,602.3
Savannah, GA						
Savannah, GA	16,540.5	15,701.7	9,661.9	8,609.1	26,202.4	24,310.8
Subtotal	16,540.5	15,701.7	9,661.9	8,609.1	26,202.4	24,310.8
Southeastern U.S.						
Brunswick, GA	5,349.2	1,249.9	761.3	678.4	6,110.5	1,928.3
Fernandina, FL	92.9	116.7	199.9	239.7	292.7	356.4
Jacksonville, FL	9,165.5	9,490.9	4,541.1	1,168.2	13,706.6	10,659.1
Port Canaveral, FL	406.1	2,835.1	127.1	138.7	533.2	2,973.7
Subtotal	15,013.6	13,692.5	5,629.4	2,225.0	20,643.0	15,917.6
All Port Areas	244,393.8	263,584.2	80,656.8	56,755.1	325,050.6	320,339.3

Source: Prepared by Nathan Associates from U.S Census Bureau Foreign Trade Statistics for 2004 as described in text.

The Census Bureau reports vessel import charges associated with import of merchandise by customs district.[26] Vessel import charges represent the aggregate cost of all freight, insurance, and other charges (excluding US import duties) incurred in bringing the merchandise from alongside the carrier at the port of exportation and placing it alongside the carrier at the first port of entry.

In 2003, vessel import charges at East Coast customs districts totaled $11.1 billion or 5.3 percent of the vessel import value (Data Chart 3-4).[27] In 2004, vessel import charges increased by 18.5 percent to $13.2 billion, representing 5.3 percent of the vessel import value. In 2004, vessel import charges ranged from a high of 11.9 percent of vessel import value for the customs district of Charlotte to a low of 2.8 percent for the customs district of Providence. Factors such as composition and volume of cargo, value of the merchandise per ton, distance of ocean voyage, size and type of vessel used, and port charges affect the relative importance of vessel import charges at a customs district level.

Data Chart 3-4
US East Coast: Vessel Import Charges as a Percent of Vessel Import Value by Customs District of Unloading, 2003 and 2004

	2003			2004		
Custom District of Unlading	Vessel Import Value (Millions of Dollars)	Vessel Import Charges (Millions of Dollars)	Percent of Vessel Import Value	Vessel Import Value (Millions of Dollars)	Vessel Import Charges (Millions of Dollars)	Percent of Vessel Import Value
1 Portland, ME	$1,765	$86	4.9%	$2,146	$103	4.8%
4 Boston, MA	$6,549	$341	5.2%	$7,591	$407	5.4%
5 Providence, RI	$2,665	$68	2.6%	$2,835	$78	2.8%
10 New York City, NY	$78,601	$4,046	5.1%	$90,968	$4,711	5.2%
11 Philadelphia, PA	$21,818	$1,507	6.9%	$27,165	$1,797	6.6%
13 Baltimore, MD	$20,412	$735	3.6%	$24,411	$944	3.9%
14 Norfolk, VA	$20,886	$1,143	5.5%	$24,714	$1,386	5.6%
15 Charlotte, NC	$1,477	$165	11.1%	$1,824	$217	11.9%
16 Charleston, SC	$26,101	$1,231	4.7%	$31,185	$1,483	4.8%
17 Savannah, GA	$18,310	$1,222	6.7%	$21,890	$1,433	6.5%
18 Tampa, FL	$11,357	$566	5.0%	$12,197	$612	5.0%
Total	$209,941	$11,112	5.3%	$246,927	$13,170	5.3%

Source: Prepared by Nathan Associates Inc. from U.S. Census Bureau, Foreign Trade Statistics for 2003 and 2004.

3.4.3 Commercial Fishing Industry

Commercial fishing along the US East Coast is a multimillion dollar industry. In 2004, commercial fish landings at East Coast ports for which fishing constitute a significant share of their activity totaled $706 million (Data Chart 3-5). The potential for impacts varies with the volume of landings and/or dollar value of landings. In 2003 and 2004, New Bedford, Massachusetts, ranked highest in the nation for landings by port ranked by dollars, with $176.2 million (NMFS, 2002) and $206.5 million (NFMS, 2003c), respectively. Other ports that ranked

[26] As vessel import charges are not reported by the US Census Bureau at the port level, these charges were only analyzed at the customs district level. The data presented does not precisely correspond to the vessel import values shown in Data Chart 3-3 by port area as ports included in customs district that are outside the scope of this study have been excluded from this table.
[27] Vessel import value is equivalent to custom import value for merchandise transported by vessels.

high in 2003 include Hampton Roads, Virginia, ($79.6M), Gloucester, Massachusetts ($37.8), and Portland, Maine ($28.7).

The operational measures would apply to vessels with a length of 65 ft (19.8 m) or greater. Analysis of commercial fishing permits issued by NMFS shows that the vast majority of commercial fishing vessels 65 ft (19.8 m) and above have a GRT of less than 150 tons and therefore, are not captured in the USCG vessel arrival database, which necessitated evaluating commercial fishing permits, rather than relying on just the USCG database. Approximately 84 percent of fishing vessels greater than 65 ft (19.8 m) in the Southeast region are less than 150 tons (Data Chart 3-6). In the Northeast region, almost 67 percent of fishing vessels greater than 65 ft (19.8 m) are less than 150 tons. The average speed for commercial fishing vessels is 10 knots or below; therefore the majority of fishing vessels would not be affected by a speed restriction of 10, 12, or 14 knots. Information was not obtained on state-permitted vessels as there is basically no potential for impact on the commercial fishing industry due to low operating speeds.

Data Chart 3-5
US East Coast Commercial Fishery Landings by Port, 2002 – 2004 (millions of dollars)

Port	2002	2003	2004
New Bedford, MA	168.6	176.2	206.5
Hampton Roads, VA	69.5	79.6	100.6
Cape May-Wildwood, NJ	35.3	42.8	68.1
Gloucetser, MA	41.2	37.8	42.7
Point Judith, RI	31.3	32.4	31.5
Portland,ME	40.4	28.7	24.2
Reedville, VA	24.2	24.2	26.1
Point Pleasnat, NJ	19.7	22.8	19.2
Wanchese-Stumpy Point, NC	23.2	21.0	20.6
Atlantic City, NJ	22.4	20.8	17.7
Stonington, ME	21.7	20.5	7.5
Beaufort- Morehead City, NC	19.1	15.0	16.9
Provincetown-Chatham, MA	15.2	13.5	14.1
Charleston -Mt. Pleasant, SC	9.3	13.0	8.5
Montauk, NY	11.1	11.0	13
Boston,MA	8.6	8.9	8.8
Engelhard-Swanquarter, NC	11.1	8.0	7.8
Beaufort, SC	n.a.	7.0	16.9
Cape Canveral, FL	6.2	6.8	9.3
Ocean City, MD	8.1	6.6	n.a.
Hampton Bay-Shinnicock, NY	8.3	6.5	6.6
Georgetown, SC	5.2	6.0	n.a.
Belhaven- Washington, NC	6.2	5.0	3.7
Oriental-Vandemere, NC	8.5	5.0	7.2
Sneads Ferry-Swansboro, NC	6.4	5.0	n.a.
Rockland, ME	4.3	4.1	2.7
Darien-Belville, GA	6.9	6.0	5
Long Beach-Barnegat, NJ	14.6	16.4	20.6
Total	646.6	650.6	705.8

Source: NOAA Fisheries.

Data Chart 3-6
Fishing Permits Issued to Vessels 65 Feet and Greater by Region, 2003

	Southeast Region				Northeast Region	
Vessel gross registered tons	Fishing perrmits	%	Unique vessels	%	Fishing perrmits	%
All vessels	557	100.0%	347	100.0%	856	100.0%
Vessels less than 150 GRT	482	86.5%	290	83.6%	572	66.8%
Vessels 150 GRT and above	75	13.5%	57	16.4%	284	33.2%

Note: For the Northeast Region fishing permit data provided was for unique vessels only.
Source: Prepared by Nathan Associates Inc. from data provided by National Marine Fisheries Service, Sustainable Fisheries Division, Southeast Fisheries Science Center and NOAA Fisheries, Northeast Fisheries Science Center.

3.4.4 Passenger Vessel Industry

In 2003, there were 1,229 passenger vessel arrivals at US East Coast ports and in 2004 there were 1,666 arrivals[28] (Data Chart 3-7). The USCG category of passenger vessels consists principally of cruise ships and ferries that are 150 GRT and greater. Approximately 53 percent of the vessel arrivals are of vessels more than 60,000 GRT.

In 2003, the SEUS region accounted for 46 percent of East Coast passenger vessel arrivals with 562 arrivals; Port Canaveral alone accounting for 547 of these arrivals. New York City had the second most passenger vessel arrivals, with 226 arrivals in 2003. Boston ranked third, with 94 arrivals. Searsport ranked fourth in passenger arrivals with 66, followed by Baltimore and Charleston, which both had 40 arrivals in 2003.

In 2004, the SEUS region had 695 passenger vessel arrivals, 42 percent of the East Coast total. Port Canaveral again accounted for most of those arrivals (579). New York City again had the second highest number of arrivals in 2004 (307). Boston ranked third with 94 arrivals, followed by Jacksonville (89), Searsport (81), and Baltimore (75).

By far the most important port area for passenger vessel arrivals is Port Canaveral, FL, in the SEUS region. In 2004, over 95 percent of the passenger vessel arrivals in Port Canaveral were of vessels greater than 60,000 GRT, an indication of the importance of the cruise industry there. Disney Cruise Line uses Port Canaveral as the home port for its 83,000 GRT Disney Magic and Disney Wonder vessels. Various other cruise companies including Carnival, RCI, Holland America, Norwegian, SunCruz, and Sterling Casino Lines also dock at this port.

The port area of New York/New Jersey is the second most active area for passenger vessels. Over half of the arrivals are greater than 60,000 GRT. Ferry services account for a percentage of these arrivals.

The Off Race Point region comes in third as the Port of Boston is a growing passenger vessel terminal.

[28] Ports south of Port Canaveral, Florida, are excluded from the data presented here as they are outside the geographical scope of the proposed action.

Data Chart 3-7
Passenger Ship Arrivals by Port Region, Port Area and GRT, 2003 – 2004

Port Region and Port Area	2003 Gross Registered Tonnage 0 - 19,999	2003 20,000 - 39,999	2003 40,000 - 59,999	2003 60,000 and Greater	2003 Total	2004 Gross Registered Tonnage 0 - 19,999	2004 20,000 - 39,999	2004 40,000 - 59,999	2004 60,000 and Greater	2004 Total
Northeastern US - Gulf of Maine										
Eastport, ME	-	-	-	-	0	-	-	-	-	0
Searsport, ME	3	14	28	21	66	21	16	27	17	81
Portland, ME	-	2	6	11	19	5	3	10	8	26
Portsmouth, NH	1	-	-	-	1	1	-	-	-	1
Subtotal	4	16	34	32	86	27	19	37	25	108
Northeastern US - Off Race Point										
Salem, MA	-	1	-	-	1	3	-	3	-	6
Boston, MA	8	16	46	24	94	8	16	46	24	94
Subtotal	8	17	46	24	95	11	16	49	24	100
Northeastern US - Cape Cod Bay										
Cape Cod, MA	1	2	5	1	9	3	2	8	-	13
Subtotal	1	2	5	1	9	3	2	8	0	13
Mid-Atlantic Block Island Sound										
New Bedford, MA	-	-	-	-	0	2	-	-	-	2
Providence, RI	6	4	11	14	35	15	4	9	15	43
New London, CT	32	-	-	-	32	54	-	3	-	57
New Haven, CT	5	-	-	-	5	-	-	-	-	0
Bridgeport, CT	4	-	-	-	4	4	-	-	-	4
Long Island, NY	32	-	-	-	32	38	-	-	-	38
Subtotal	79	4	11	14	108	113	4	12	15	144
Mid-Atlantic Ports of New York/New Jersey										
New York City, NY	8	22	82	114	226	28	45	65	169	307
Subtotal	8	22	82	114	226	28	45	65	169	307
Mid-Atlantic Delaware Bay										
Philadelphia, PA	3	5	11	7	26	3	15	15	-	33
Subtotal	3	5	11	7	26	3	15	15	0	33
Mid-Atlantic Chesapeake Bay										
Baltimore, MD	3	7	1	29	40	9	16	3	47	75
Hampton Roads, VA	5	12	2	12	31	13	17	28	6	64
Subtotal	8	19	3	41	71	22	33	31	53	139
Mid-Atlantic Morehead City and Beaufort, NC										
Morehead City, NC	-	-	-	-	0	7	-	-	-	7
Subtotal	0	0	0	0	0	7	0	0	0	7
Mid-Atlantic Wilmington, NC										
Wilmington, NC	-	-	-	-	0	4	2	-	-	6
Subtotal	0	0	0	0	0	4	2	0	0	6
Mid-Atlantic Georgetown, SC										
Georgetown, SC	-	-	-	-	0	1	-	-	-	1
Subtotal	0	0	0	0	0	1	0	0	0	1
Mid-Atlantic Charleston, SC										
Charleston, SC	6	5	10	19	40	17	11	25	11	64
Subtotal	6	5	10	19	40	17	11	25	11	64
Mid-Atlantic Savannah, GA										
Savannah, GA	4	1	-	1	6	45	4	-	-	49
Subtotal	4	1	0	1	6	45	4	0	0	49
Southeastern US										
Brunswick, GA	1	-	-	-	1	8	-	-	-	8
Fernandina, FL	1	1	-	-	2	17	2	-	-	19
Jacksonville, FL	7	-	5	-	12	19	1	56	13	89
Port Canaveral, FL	104	4	2	437	547	18	9	1	551	579
Subtotal	113	5	7	437	562	62	12	57	564	695
All Port Regions	234	96	209	690	1,229	343	163	299	861	1,666

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

3.4.4.1 Cruise Vessels

In 2004, the North American cruise industry[29] contributed more than $30 billion to the US economy, an 18 percent increase from 2003. Cruise passengers residing in the US increased by 11.1 percent from 2003, and the industry increased its total direct spending in the US by 13.8 percent to $14.7 billion. The number of cruise ships increased by 4.3 percent (eight ships) to a total of 192.

The expansion of the cruise industry benefits US ports through the increase in cruise passengers and homeporting. US ports handled 8.1 million cruise embarkations in 2004 (a 14 percent increase from 2003); US residents accounted for 77 percent of the global cruise passengers. In 2000–2004, the Port of Miami was the leader in terms of embarkations with nearly 1.7 million passengers in 2004. Strong growth at Port Everglades moved it from third rank with 0.8 million passengers in 2000 to second rank with 1.3 million passengers in 2004. Port Canaveral also grew from 0.9 million passengers in 2000 to 1.2 million passengers in 2004. Data Chart 3-8 presents information on the number of cruise passenger embarkations at selected East Coast ports in 2000–2003.

Benefits to the general economy from the cruise industry include expenditure on air transportation, food and beverages, ship maintenance and refurbishment, engineering and travel agent commissions. On the East Coast, Florida, New York, and Georgia are the states that benefit most (direct purchases, employment, and income) from the cruise industry (BREA, 2005).

Data Chart 3-8
Embarkations of the North American Cruise Industry for Selected US East Coast Ports, 2000-2004 (passengers in 000s)

Port	2000	2001	2002	2003	2004
Miami	1,682	1,700	1,804	1,965	1,682
Port Everglades	798	1,046	1,202	1,213	1,324
Port Canaveral	941	870	1,028	1,089	1,220
New York	309	238	326	438	547
Norfolk	8.	27	39	48	107
Baltimore	n.a.	n.a.	57	57	105
Boston	n.a.	n.a.	69	69	100
Philadelphia	48	60	1.5	24	29

Source: Business Research & Economic Advisors, The Contribution of the North American Cruise Industry to the US economy in 2004, prepared for the International Council of Cruise Lines, August 2005. Norfolk data from City of Norfolk.

3.4.4.2 Ferry Boats

As mentioned earlier, the USCG vessel arrival data does not include information on vessels less than 150 GRT. As the majority of passenger and car ferries fall below this threshold, USCG data cannot reliably be used to analyze ferry traffic. Instead, information on ferry vessels and ferry routes was obtained from the National Ferry Database published online by the US Department of Transportation (USDOT), Bureau of Transportation Statistics. The National Ferry Database is a

[29] The North American cruise industry is defined as those cruise lines that primarily market their cruises in North America.

comprehensive inventory of existing ferry operations in the US and its possessions. The data were collected as part of a survey conducted by the Federal Highway Administration from March 1, 2000, to September 30, 2000.

The 224 ferry operators surveyed provided services on 487 nonstop ferry route segments comprising 352 ferry routes and serving 578 ferry terminal locations with 677 ferry vessels. Based on the National Ferry Database, 261 ferry vessels operating on the East Coast in 2000 were identified Data Chart 3-9. (A complete inventory of ferry vessels operating in each state including the type of service [passenger, RoRo, or Rail], typical speed, vessel length and gross tonnage is presented in Appendix E). New York State had 65 ferry vessels in operation; Massachusetts had 36, North Carolina 35, and Maine 23. More than 64 percent of the ferry vessels (168) had an overall length of 65 feet or greater. With regard to speed, most ferry vessels can be considered either *conventional,* with typical speeds of 8-16 knots, or *high speed,* with typical speeds in excess of 25 knots.

Data Chart 3-9
Ferry Vessels Operating on the US East Coast by State, 2000

State	Number of Ferry Vessels	Ferry Vessels with LOA of 65 feet or greater	
		Number	Average speed (knots)
Maine	23	11	11.5
New Hampshire	2	2	n.a.
Massachussetts	36	37	16.5
Rhode Island	7	1	n.a.
Connecticut	17	14	19.3
New York	65	45	10.6
New Jersey	20	16	n.a.
Pennsylvania	3	1	n.a.
Delaware	10	7	16.4
Maryland	10	2	n.a.
Virginia	13	6	9.2
North Carolina	35	23	10.1
South Carolina	10	0	0.0
Georgia	4	1	10.0
Florida	6	2	6.0
Total	261	168	n.a.

Source: Prepared by Nathan Assoicates Inc from U.S. Department of Transportation, Bureau of Transportation Statistics, National Ferry Database as presented in Appendix C.

The National Ferry Database yielded information on 172 East Coast ferry routes in 2000 (Data Chart 3-10). New York State had the most routes (46). Massachusetts was next with 36 routes, followed by Maine (23 routes), and North Carolina (16 routes). Most of the ferry routes were within rivers, harbors, sounds, or bays; only 10 of the 172 routes extended into the Atlantic Ocean. Only the latter have any potential to be affected by the proposed action. Further information on each of the ferry routes including the metro area served, water body crossed, type of service, number of passengers and vehicles served, and beginning and end of season service is presented in Appendix E (The table refers to Appendix C of the Economic Report, not the DEIS).

Data Chart 3-10
Ferry Routes Operating on the US East Coast by State, 2000

State	Number of Routes	Routes via Atlantic Ocean
Maine	23	5
New Hampshire	1	1
Massachussetts	36	4
Rhode Island	7	0
Connecticut	5	0
New York	46	0
Pennsylvania	1	0
Delaware	4	0
Maryland	7	0
Virginia	12	0
North Carolina	16	0
South Carolina	6	0
Georgia	4	0
Florida	4	0
Total	172	

Source: Prepared by Nathan Assoicates Inc from U.S. Department of Transportation, Bureau of Transportation Statistics, National Ferry Database as presented in Appendix C.

3.4.5 Whale Watching Industry

In 2000, there were 36 whale watching operations permitted and registered in New England alone (Data Chart 3-11).[30] It is estimated that more than 1.2 million passengers participated in whale watching tours in 2000, generating more than $30 million in revenues. Massachusetts accounted for nearly 80 percent of the New England totals for both passengers and revenues. The peak months for whale watching in New England are July and August, although the season spans from late spring to early fall.

Data Chart 3-11
Characteristics of the New England Whale Watching Industry, 2000

State	Number of Operations	Number of Vessels	Annual Ridership	Annual Revenue ($ millions)
Massachusetts	17	30-35	1,000,000	$24.0
New Hampshire	4	6-10	80,000	$1.9
Maine	14	18-24	137,500	$4.4
Rhode Island	1	1	12,500	$0.3
Total	36	55-70	1,230,000	$30.6

Source: Hoyt, Erich Whale Watching 2000: Worldwide Tourism Numbers, Expenditures and Expanding Socioeconomic Benefits, 2000.

[30] Although whale watching operations exist in the mid- and south-Atlantic states, the degree of activity is smaller and cannot be reliably distinguished from tours to view other species such as dolphins.

Whale watching ships operate out of Bar Harbor, Boothbay, Portland, and Kennebunkport in Maine; and Newburyport, Hyannis, Salem, Provincetown, Boston, Plymouth, and Gloucester in Massachusetts. A 4–6 hour trip averages $30–$40. Vessels range in size from zodiacs to larger vessels, up to 80 ft (24.4 m). Some companies have more than one vessel and also operate charter fishing trips or other types of sightseeing tours.

Along the East Coast outside of New England, whale watching is a less important activity: in 2005, out of 49 East Coast companies, one was in New York State, six in New Jersey, and two in Virginia against 21 in Massachusetts, 15 in Maine, three in New Hampshire, and one in Rhode Island.

By definition, whale watching vessels operate within whale habitats. Currently, they must adhere to a 500-yard (457 m) "no approach" regulation for right whales (50 CFR 222.32). NOAA has also developed whale watching guidelines for the northeastern region of the US. The operational guidelines vary depending on the distance of the vessel from the whales. The distances range from 1 to 2 miles away all the way into 100 ft (30.5 m), in which intentional approach is prohibited. The details of these approach guidelines can be found at the following web address: *http://www.nero.noaa.gov/shipstrike/info/guidetxt.htm*.

3.4.6 Charter Vessel Operations

The charter fishing industry along the US East Coast is particularly active in the Carolinas, Virginia, Florida, New Jersey, and Massachusetts. The industry consists of half-day charters of about 6 hours that typically go up to 20 nm (37 km) off shore, full-day charters between 11 and 12 hours that can go out to 40 nm (74 km) offshore, and extended full day charters that can be from 18 to 24 hours and go up to 50 nm (92.6 km) off shore. The vast majority of the charter fishing industry consists of modern and well-equipped fishing boats of less than 65 ft (19.8 m) length overall (LOA); these vessels would not be subject to the strategy.

Some of the target species off the East Coast inshore and offshore waters include cod, Pollock, bluefish, mackerel, fluke, tautog, striped bass, drumfish, croaker, weakfish, sharks, marlin, swordfish, mahi mahi, wahoo, and tuna. Some of these fisheries are seasonal and charter trips are also contingent on the season in temperate states.

A small segment of the industry referred to as headboats often uses vessels of 80 ft (24.4 m) LOA and above that can accommodate 60 to 100 passengers. These vessels go up to 50 nm (92.6 km) offshore and stop and anchor over wreck and rock formations for fishing species such as red snapper, grouper, triggerfish, and amberjack. The charter fee for a headboat is typically $50 to $80 per person. Table 3-11 shows the number of charter and party boat trips in 2003 and 2004 by state.

Table 3-11
Number of Charter Boat Trips, 2003 & 2004

State	Number of Trips	
	2003	2004
Maine	14,246	52,098
New Hampshire	35,376	39,648
Massachusetts	145,303	154,785
Rhode Island	60,371	45,140
Connecticut	63,570	40,468
New York	405,533	399,045
New Jersey	465,975	468,865
Delaware	37,685	56,297
Maryland	186,916	250,795
Virginia	86,243	94,122
North Carolina	173,573	177,380
South Carolina	39,290	39,284
Georgia	12,190	18,526
East Florida	186,678	179,481

Source: NMFS – Marine Recreational Fisheries Statistics Survey
Note: The number of trips for the states in the north- and mid-Atlantic include party and charter boats.

3.4.7 Demographic Profiles

This section briefly describes the demographic environment of the 26 port areas most likely to be affected by the proposed action based on Census 2000 data. The census area chosen for each port area varied with its size and is as follows:

- Eastport: Washington County, ME
- Searsport: Knox, Hancock, and Waldo Counties, ME
- Portland: York, Cumberland, and Sagadahoc, ME
- Portsmouth: Strafford and Rockingham Counties, NH
- Boston: Middlesex, Suffolk, Norfolk, and Plymouth Counties, MA
- Salem: Essex County, MA
- Cape Cod: Barnstable County, MA
- New Bedford: Bristol County, MA
- Providence: Providence, Bristol, Kent, Newport, and Washington Counties, RI
- New London: New London County, CT
- New Haven: New Haven County, CT
- Bridgeport: Fairfield County, CT
- Long Island: Nassau and Suffolk Counties, NY
- New York City: Bronx, Kings, New York, Putnam, Queens, Richmond, Rockland, and Westchester Counties, NY; Bergen, Essex, Hudson, Middlesex, Monmouth,

Morris, Ocean, Passaic, Somerset, Sussex, and Union Counties, NJ; and Pike County, PA

- Philadelphia: Philadelphia, Montgomery, Delaware, Chester, and Buck Counties, PA; New Castle, Burlington, Camden, Gloucester, and Salem Counties, NJ; and Cecil County, MD
- Baltimore: Anne Arundel, Baltimore, Carroll, Harford, Howard, Queen Anne's Counties, and Baltimore City, MD
- Hampton Roads: Matthews, Gloucester, James City, Surry, Isle of Wight, and Suffolk Counties, VA; Williamsburg, Newport News, Poquoson, Hampton, Norfolk, Portsmouth, Virginia Beach, and Chesapeake cities, VA; and Currituck County, NC
- Morehead City: Carteret and Beaufort Counties, NC
- Wilmington: Pender, New Hanover, and Brunswick Counties, NC
- Georgetown: Georgetown County, SC
- Charleston: Berkeley, Dorchester, and Charleston Counties, SC
- Savannah: Effingham, Bryan, and Chatham Counties, GA
- Brunswick: McIntosh, Glynn, and Brantley Counties, GA
- Fernandina: Nassau County, FL
- Jacksonville: Duval, St. Johns, Clay, and Baker Counties, FL
- Port Canaveral: Brevard County, FL

General demographic characteristics are presented in Data Chart 3-12. Data on income, employment, and poverty status are presented in Data Chart 3-13.

In 2000, the 26 port areas under consideration taken together were home to almost 40 million people, or 14.2 percent of the total US population. Racial distribution differed somewhat from that of the national population, with higher percentages of African-Americans and, to a smaller degree, people of Asian descent (17 and 5 percent respectively, as opposed to 12.3 and 3.6 for the US as a whole).

There were, however, wide variations from port to port both in total population and racial makeup, from Eastport, Maine, with about 34,000 residents, 93 percent of whom were white to the New York City area with 15.6 million residents, only 58 percent of them white. Nine out of the 26 ports considered are proportionately smaller white populations than the US as a whole, all of them south of and including New York City.

The 26 ports had proportionately a slightly smaller Hispanic population than the US as a whole (11.5 against 12.5 percent), but here also, there were wide differences, from less than one percent (0.9) Hispanics in Eastport, Maine, to more than 21 percent in New York City.

Data Chart 3-12
US East Coast Port Areas: Demographic Characteristics, 2000

Port	Area	Population 2000	Racial Distribution (Percentage): White Alone	Black or African American Alone	Asian Alone	Other[(a)]	Percentage of Population that is Hispanic or Latino[(b)]
Eastport	ME	33,941	93.4	0.3	0.5	5.8	0.9
Searsport	ME	127,689	97.8	0.2	0.3	1.7	0.6
Portland	ME	487,568	96.6	0.7	0.9	1.7	0.9
Portsmouth	NH	389,592	96.7	0.6	1.1	1.6	1.2
Boston	MA	3,278,333	81.8	7.3	5.5	6.2	6.0
Salem	MA	723,419	86.4	2.5	2.4	8.8	11.0
Cape Cod	MA	222,230	94.3	1.5	0.6	3.5	1.3
New Bedford	MA	534,678	91.0	2.0	1.4	5.6	3.6
Providence	RI	1,048,319	85.0	4.3	2.3	8.4	8.6
New London	CT	259,088	86.9	5.1	1.9	6.2	5.2
New Haven	CT	824,008	79.3	11.2	2.4	7.1	5.0
Bridgeport	CT	882,567	79.2	10.0	3.2	7.6	11.8
Long Island	NY	2,753,913	82.0	8.4	3.5	6.1	10.3
New York	NY	15,569,089	58.0	19.7	8.1	14.2	21.1
Philadelphia	PA	5,687,147	72.6	19.7	3.3	4.5	5.0
Baltimore	MD	2,552,994	67.4	27.2	2.7	2.7	2.0
Hampton Roads	VA	1,576,370	62.4	30.9	2.7	4.0	3.1
Morehead City – Beaufort	NC	104,341	80.7	16.7	0.4	2.3	2.1
Wilmington	NC	274,532	79.5	17.0	0.6	2.8	2.5
Georgetown	SC	55,797	59.6	38.7	0.3	1.4	1.5
Charleston	SC	549,033	65.2	30.5	1.4	2.9	2.4
Savannah	GA	293,000	61.1	34.9	1.6	2.4	2.0
Brunswick	GA	93,044	73.4	23.7	0.7	2.2	2.4
Fernandina	FL	57,663	90.1	7.4	0.7	1.8	1.8
Jacksonville	FL	1,065,087	71.9	22.2	2.3	3.6	3.9
Port Canaveral	FL	476,230	86.7	8.1	1.5	3.7	4.6
Total All Areas		**39,919,672**	**69.5**	**17**	**5**	**8.5**	**11.5**
United States		**281,421,906**	**75.1**	**12.3**	**3.6**	**9**	**12.5**

(a) Includes American Indian and Alaska Native alone, Native Hawaiian and Other Pacific Islander alone, some other race alone and two or more races. Source: US Census Data, Census 2000, data set SF-3. (b) A self-designated classification for people whose origins are from Spain, the Spanish-speaking countries of Central or South America, the Caribbean, or those identifying themselves generally as Spanish, Spanish-American, etc. Origin can be viewed as ancestry, nationality, or country of birth of the person or person's parents or ancestors prior to their arrival.

Data Chart 3-13
US East Coast Ports: Socioeconomic Characteristics, 2000

Port Area	Labor Force Participation Rate[(a)]	Unemployment Rate[(b)]	Median Household Income (% of US MHI) [(c)]	Per Capita Income (% of US PCI) [(d)]	Number of People Occupied in Rail, Water and Other Transportation Occupations[(e)]	Percentage of People Below Poverty Line
Eastport, ME	57.0	8.5	25,869 (61.6)	14,119 (65.4)	23	19.0
Searsport, ME	63.9	4.8	35,606 (84.8)	19,189 (88.9)	308	11.3
Portland, ME	68.7	3.5	43,736 (104.1)	22,648 (104.9)	1,031	8.0
Portsmouth, NH	72.5	3.1	54,291 (129.3)	24,877 (115.2)	653	5.8
Boston, MA	67.3	4.2	55,882 (133.1)	28,755 (133.2)	4,289	8.8
Salem, MA	65.5	4.6	51,576 (122.8)	26,358 (122.1)	991	8.9
Cape Cod, MA	58.9	5.1	45,933 (109.4)	25,318 (117.3)	508	6.9
New Bedford, MA	65.8	5.8	43,496 (103.6)	20,978 (97.2)	806	10.0
Providence, RI	64.6	5.6	42,370 (100.9)	21,688 (100.5)	1,346	11.9
New London, CT	67.8	3.9	50,646 (120.6)	24,678 (114.3)	516	6.4
New Haven, CT	65.5	5.9	48,834 (116.3)	24,439 (113.2)	1,015	9.5
Bridgeport, CT	66.0	4.8	65,249 (155.4)	38,350 (177.7)	611	6.9
Long Island, NY	64.3	3.8	68,579 (163.3)	29,278 (135.6)	4,433	5.6
New York, NY	60.8	7.4	48,417 (115.3)	25,693 (119.0)	24,848	15.1
Philadelphia, PA	64.2	6.1	49,077 (116.9)	23,972 (111.0)	7,755	10.8
Baltimore, MD	66.4	4.9	50,572 (120.4)	24,398 (113.0)	3,261	9.8
Hampton Roads, VA	67.9	5.0	43,086 (102.6)	20,313 (94.1)	3,342	10.6
Morehead City - Beaufort, NC	58.7	5.5	35,284 (84.0)	19,305 (89.4)	444	14.5
Wilmington, NC	63.0	5.4	38,438 (91.5)	21,469 (99.5)	546	13.0
Georgetown, SC	58.2	6.2	35,312 (84.1)	19,805 (91.7)	70	17.1
Charleston, SC	64.5	5.3	39,232 (93.4)	19,772 (91.6)	942	14.0
Savannah, GA	63.6	5.4	39,558 (94.2)	20,752 (96.1)	758	14.5
Brunswick, GA	63.0	5.5	36,539 (87.0)	19,581 (90.7)	137	15.6
Fernandina, FL	63.9	4.7	46,022 (109.6)	22,836 (105.8)	75	9.1
Jacksonville, FL	66.8	4.6	42,825 (102.0)	21,567 (99.9)	2,016	10.8
Port Canaveral, FL	57.4	4.9	40,099 (95.5)	21,484 (99.5)	746	9.5
United States	63.9	3.7	41,994	21,587		12.4

(a) The labor force includes all people classified in the civilian labor force, plus members of the US Armed Forces (people on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard). The Civilian Labor Force consists of people classified as employed or unemployed.

(b) All civilians16 years old and over are classified as unemployed if they (1) were neither “at work" nor “with a job but not at work" during the reference week, and (2) were actively looking for work during the last 4 weeks, and (3) were available to accept a job. Also included as unemployed are civilians who did not work at all during the reference week, were waiting to be called back to a job from which they had been laid off, and were available for work except for temporary illness.

(c) In 1999.

(d) In 1999.

(e) From employed civilian population 16 years and over.

Source: US Census Data, Census 2000.

As demonstrated in Data Chart 3-13 and Figure 3-11, economic conditions varied substantially from port to port. At one end of the spectrum, one port area, Eastport, Maine, showed clear signs of economic weakness for all indicators compared to the US as a whole as well as to the other port areas under consideration. Conversely, indicators in areas like Bridgeport, Connecticut, and Long Island, New York, were much better than in the nation at large. Only three areas had an unemployment rate under the national rate (Portland, Maine; Portsmouth, New Hampshire; Long Island, New York). All other port areas had higher unemployment rates, up to 8.5 percent in Eastport, but generally in the 4 to 6 percent range.

The median household income in 1999 for the port areas of Long Island ($68,579) and Bridgeport, CT ($65,249), was well above that for the nation as a whole and more than 2.5 times the level of median household income reported for Eastport, Maine ($25,869) (Figure 3-12). Of the 26 areas considered, 17 had a median household income higher that that of the US as a whole, and 14 had a higher per capita income (Figure 3-13). In general, incomes were higher in the north than in the south: with the exception of Eastport, ME, and Searsport, ME, the median household income in all port areas from Hampton Roads to the north exceeded $40,000. With the exception of Fernandina, FL, and Jacksonville, FL, all port areas south of Hampton Roads had a median household income under $40,000.

Eight of the 16 port areas had rates of poverty exceeding the national rate, with the highest percentages in Eastport, ME (19.0 percent), Georgetown, SC (17.1 percent), Brunswick, GA, (15.6 percent) and New York City (15.1 percent) (Figure 3-14). The port areas with the lowest percentage of people below the poverty were Long Island (5.6 percent), Portsmouth, NH (5.8 percent), New London, CT (6.4 percent), and Bridgeport, CT (6.9 percent).

3.4.8 EO 12898 – Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires Federal agencies to take appropriate and necessary steps, to the greatest extent practicable and permitted by law, to identify and address disproportionately high and adverse effects of Federal projects on the health or environment of minority and low-income populations.

In order to determine whether a potentially affected Environmental Justice community is present within the study area, Council on Environmental Quality guidance on Environmental Justice (CEQ, 1997) offers the following guidelines:

- The minority population of the affected area exceeds 50 percent.
- The minority population percentage of the affected area is meaningfully greater than the minority population of the general population or other appropriate unit of geographic analysis.
- Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census's current Populations Report, Series P-60.

U.S. East Coast Unemployment Rate, 2000

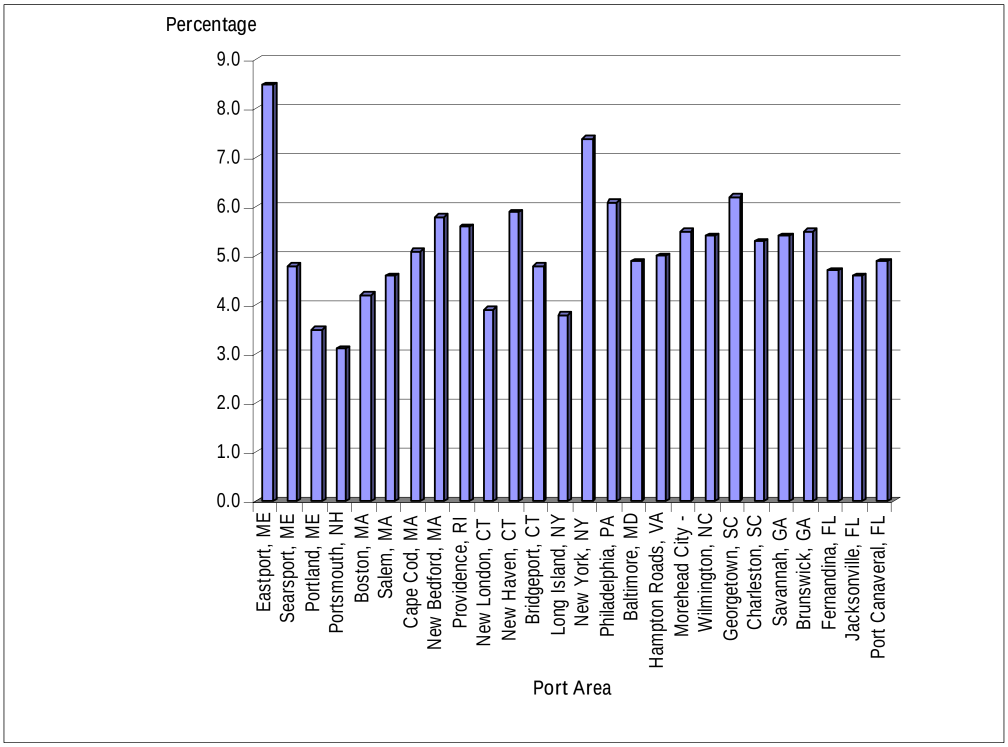


Figure 3-11

This Page Intentionally Left Blank

U.S. East Coast Port Areas: Median Household Income, 1999

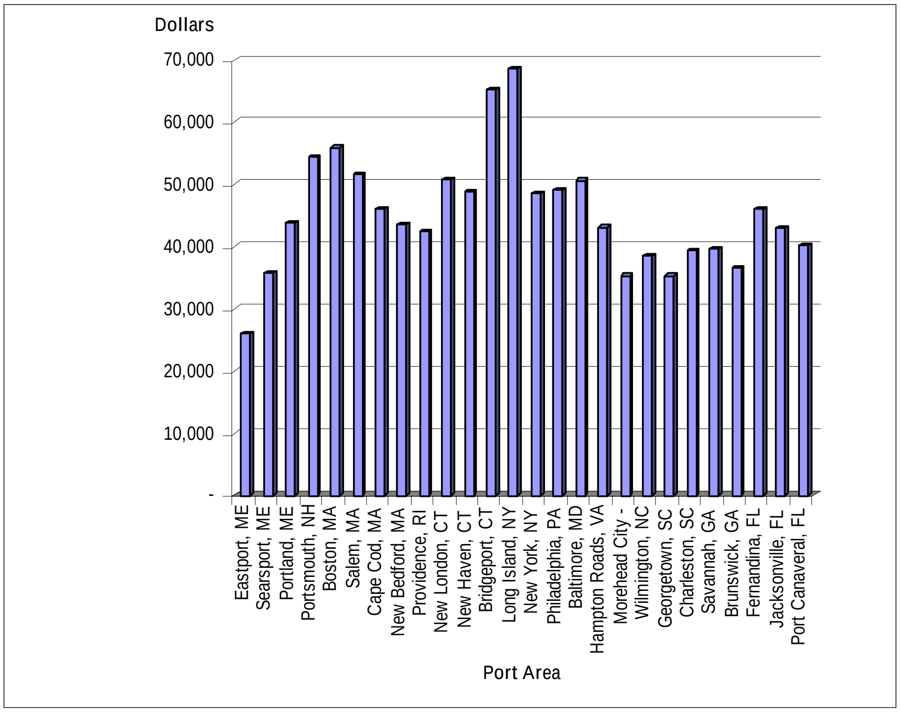


Figure 3-12

U.S. East Coast Port Areas: Per-Capita Income, 1999

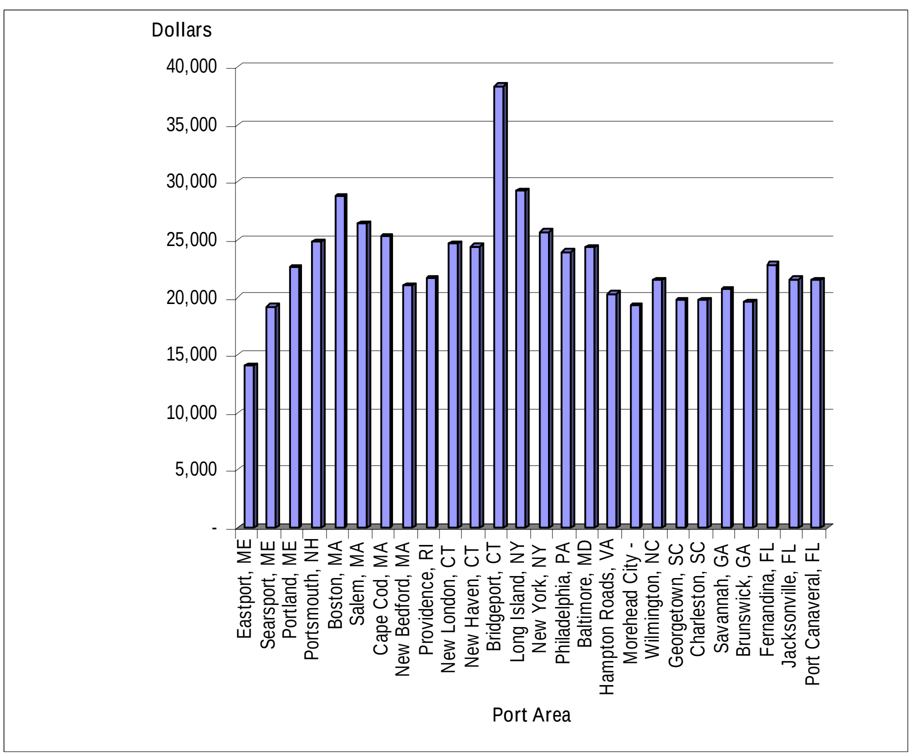


Figure 3-13

This Page Intentionally Left Blank

U.S. East Coast Port Areas: Percentage of People below the Poverty Line, 2000

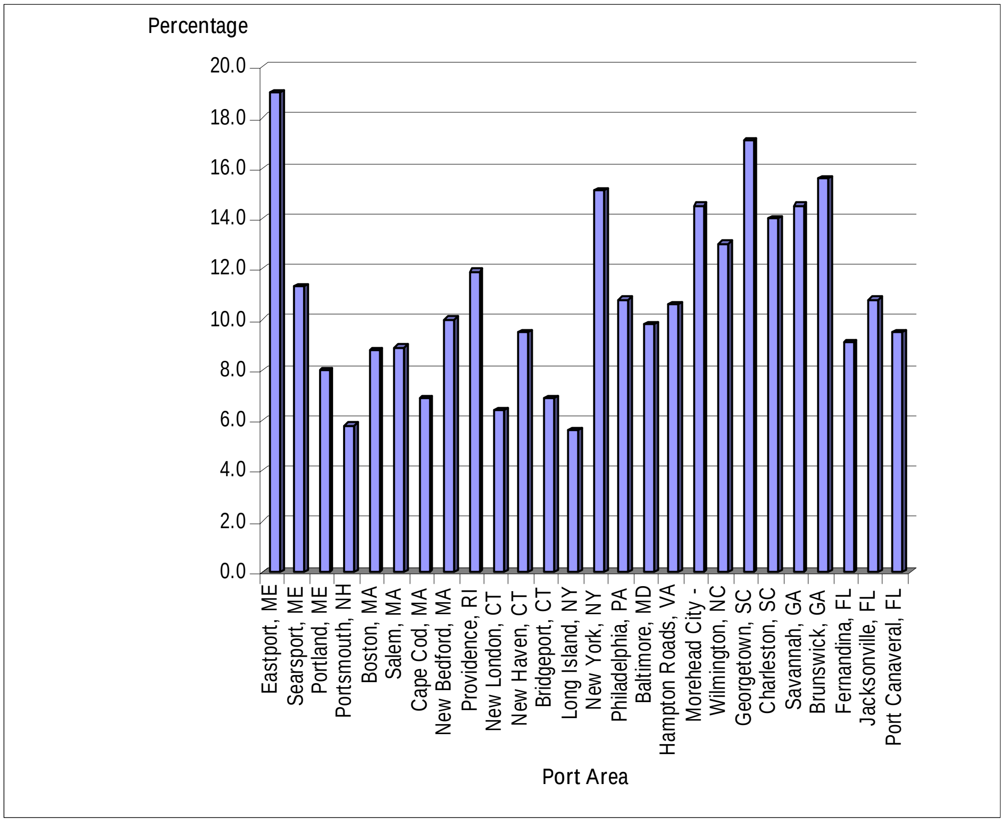


Figure 3-14

This Page Intentionally Left Blank

Table 3-12 lists the minority percentages in each area potentially affected by one or more of the proposed regulations in the strategy. There was one area were the minority population exceeded 50 percent: New York. Minority (nonwhite or white Hispanic) population represented 30.9 percent of the US population in 2000. Six of the port areas had proportionately larger minority population than the US as a whole: New York (50.7 percent), Hampton Roads (38.9 percent), Georgetown (41 percent), Charleston (35.9 percent), Savannah (39.8 percent), and Baltimore (33.7 percent).

Table 3-12
Minority Populations within the Scope of the Strategy

Area	% Nonwhite	% Hispanic	% Minority (nonwhite or white Hispanic)
Eastport, ME	6.52	0.81	7
Searsport, ME	2.10	0.61	2.5
Portland, ME	3.51	0.87	4
Portsmouth, NH	3.35	1.15	4.2
Boston, MA	19.01	6.02	21.6
Salem, MA	13.56	11.04	16.9
Cape Cod, MA	5.77	1.35	6.6
New Bedford, MA	9.02	3.60	10.6
Providence, RI	14.99	8.66	18.2
New London, CT	13.00	5.11	15.4
New Haven, CT	20.60	10.09	25.3
Bridgeport, CT	20.69	11.88	27
Long Island, NY	17.97	10.27	23.6
New York, NY	42.02	21.09	50.7
Philadelphia, PA	27.45	5.03	29.4
Baltimore, MD	32.65	2.01	33.7
Hampton Roads, VA	37.60	3.11	38.9
Morehead City, NC	19.13	2.39	20.4
Wilmington, NC	20.53	2.45	21.6
Georgetown, SC	40.31	1.65	41
Charleston, SC	34.90	2.38	35.9
Savannah, GA	38.76	2.18	39.8
Brunswick, GA	26.70	2.44	28.1
Fernandina, FL	9.98	1.51	11.1
Jacksonville, FL	28.06	3.91	30.3
Port Canaveral, FL	13.19	4.61	16.4
TOTAL ALL AREAS	**30.51**	**11.65**	**35.9**
TOTAL US	**24.86**	**12.55**	**30.9**

Source: US Census Data, Census 2000, Data set SF-1, Table DP1.

Table 3-13 lists the percentages of people living under the poverty level based on Census 2000 data. The average percentage of people living in poverty in the US as a whole was 12.4. While the number for the 26 port areas together was lower, eight areas had higher percentages: Eastport (19 percent), New York City (15.1 percent), Morehead City (14.5 percent), Wilmington (13 percent), Georgetown (14 percent), Charleston (14 percent), Savannah (14.5 percent), and Brunswick (15.6 percent). These areas, therefore, will be considered as Environmental Justice communities for the purposes of this EIS.

Table 3-13
Poverty Levels within the Scope of the Strategy

Area	# Poverty Determined	# in Poverty	% in Poverty
Eastport, ME	32,985	6,272	19.0
Searsport, ME	124,390	13,997	11.3
Portland, ME	476,960	38,369	8.0
Portsmouth, NH	381,112	22,080	5.8
Boston, MA	3,167,516	277,649	8.8
Salem, MA	706,651	63,137	8.9
Cape Cod, MA	218,058	15,021	6.9
New Bedford, MA	521,285	52,236	10.0
Providence, RI	1,010,000	120,548	11.9
New London, CT	247,198	15,780	6.4
New Haven, CT	797,702	75,733	9.5
Bridgeport, CT	865,257	59,689	6.9
Long Island, NY	2,707,916	151,802	5.6
New York, NY	15,276,079	2,299,973	15.1
Philadelphia, PA	5,528,515	598,949	10.8
Baltimore, MD	2,486,691	243,792	9.8
Hampton Roads, VA	1,507,652	160,249	10.6
Morehead City, NC	102,902	14,910	14.5
Wilmington, NC	268,858	34,969	13.0
Georgetown, SC	55,263	9,439	17.1
Charleston, SC	531,170	74,504	14.0
Savannah, GA	284,788	41,216	14.5
Brunswick, GA	91,946	14,376	15.6
Fernandina, FL	56,772	5,192	9.1
Jacksonville, FL	1,042,976	112,924	10.8
Port Canaveral, FL	466,775	44,218	9.5
TOTAL ALL AREAS	**38,957,417**	**4,567,024**	**11.7**
TOTAL US	**273,882,232**	**33,899,812**	**12.4**

Therefore, based on the data above, a total of ten of the 26 port areas considered constitute Environmental Justice communities on account either of race or poverty: Eastport, New York City, Baltimore, Hampton Roads, Morehead City, Wilmington, Georgetown, Charleston, Savannah, and Brunswick.

Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties (any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places). This includes Native American and Native Hawaiian tribal properties and values.

The proposed action would only affect the operations of certain vessels 65 feet (19.8 m) and longer and has no component that could have an impact on known or unknown, on land or under water cultural resources. Under 36 CFR 800.3(a)(1), if the undertaking considered is a type of activity that does not have the potential to cause effects on historic properties, assuming such properties were present, the agency official has no further obligations under Section 106.

This Page Intentionally Left Blank

4 ENVIRONMENTAL IMPACTS

This chapter evaluates the potential direct, indirect, and cumulative impacts of implementing the operational measures of the *North Atlantic Right Whale Ship Strike Reduction Strategy* to reduce ship strikes of North Atlantic right whales on the affected environment described in Chapter 3. This chapter compares the impact of the No Action Alternative with the impacts that would occur with implementation of any of the five action alternatives under consideration by NMFS.

4.1 Biological Impacts on the North Atlantic Right Whale

The proposed action would have major, direct, long-term, positive effects on the western population of the North Atlantic right whale. NMFS has designed the proposed operational measures to reduce the threat of ship strikes as a major cause of right whale mortality and serious injury. NMFS expects that implementation of the proposed action will result in fewer right whale deaths, and therefore, will facilitate population growth and recovery.[1]

Because the population of North Atlantic right whales is small and the population growth rate has declined from an estimated 1.05 in 1980 to 0.92 in 1997[2] (at a 1.00 rate, the population would be stable), a more favorable growth rate could be achieved by preventing even a small number of right whale deaths (Caswell *et al*., 1999). In addition to a decline in the population growth rate, it has also been suggested that the mortality rate has increased between 1980 and 1998 to a level of 4 (±1 percent) (Kraus *et al.*, 2005). If survivorship continues to decline at current rates, the Caswell *et al*. (1999) models predict extinction in less than 200 years. By reducing the number of right whale deaths, the population growth rate would rise. In addition, if it were to rise and remain above 1.00—replacement level—the population would no longer be facing extinction in the long run.

Fujiwara and Caswell (2001) developed a model, which predicted that preventing the death of just one whale a year would have a positive impact on the population. If this “saved” whale were a female, then it would have an even more substantial impact on the population. Preventing the death of two female whales a year would result in an increasing population growth rate. Analysis from this model also shows that the decline in population growth rate is mainly a result of reduced survival probability rates for mother whales. The operational measures proposed for the SEUS region, the sole calving ground for right whale mothers and calves, in particular, would play an essential role in reducing the number of female (and juvenile) deaths, a key component to the recovery of the population.

While the actual number of ship strikes that could be prevented by implementing each alternative cannot be calculated at this time, one can assume that each action alternative has some potential to prevent at least one death or serious injury a year, which would have a positive impact on the population. Preventing nonnatural mortalities will bring right whales closer to the potential

[1] An increase in population growth rate based on ship strike reduction measures assumes that mortalities from entanglement or natural deaths remain the same or decrease as well.

[2] These population growth rate values were computed by a model that utilized estimates of survival probability and reproductive rate (Caswell *et al*., 1999).

biological removal (PBR) levels for the population (Section 1.1.1), and ultimately help the population grow towards its optimum sustainable population (OSP).

All of the action alternatives—Alternatives 2, 3, 4, 5 and 6—would result in a reduction in the number and/or severity of right whale "takes" (Sections 1.6.1 and 1.6.2) under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). This reduction would have substantial to major, direct, positive, long-term effects on the right whale population, depending upon the alternative. This would also result in an indirect positive impact on NOAA's mandate under these statutes to reduce the taking of right whales and to aid in the recovery of an endangered species.

The remainder of this section describes for each alternative the potential biological impacts on the North Atlantic right whale that would result from implementing the No Action Alternative or the action alternatives. The impacts are analyzed by region (the boundaries of the regions are described in Section 1.3):

- Southeastern US (SEUS)
- Mid-Atlantic US (MAUS)
- Northeastern US (NEUS)

Note that in the following discussions of the biological impacts of the proposed operational measures by alternative, the analysis is largely qualitative in nature. At this stage of research, there are too many unknowns to be able to develop an accurate quantitative model to project the number or percentage of ship strikes the alternatives would prevent, and conversely how much this decrease in ship strikes would increase the population growth rate.[3] Among the array of data necessary to develop this model would be real time information on the exact location and number of vessels and the exact location, number, and depth of right whales in the water column, in addition to historic data. Research would also be necessary on whale behavior, including differing reactions to approaching vessels based on various activities such as feeding, mating, sleeping, and on the impact of speed on a whale's ability to avoid an oncoming vessel. NMFS plans to fund research in these areas.

Some of the criteria used to evaluate the effects of the alternatives qualitatively on the right whale population include:

- Previous right whale sighting data.
- Vessel operating speeds.
- Ability of whale to avoid a vessel.
- Vessel size and hydrodynamic effects at various speeds.

[3] As stated earlier, the positive impacts resulting from the operational measures are expected to reduce the likelihood and severity of ship strikes at current shipping levels. However, the number of large vessels in the world's ocean are expected to double over the next two to three decades to keep up with increased volumes of traded cargo (NMFS, 2005d).

4.1.1 Alternative 1 – No Action Alternative

The No Action Alternative would have significant, direct, long-term, negative effects on the North Atlantic right whale population because no precautionary measures beyond those already in place would be taken to reduce the threat of ship strikes. The number of ship strikes in recent years indicates that current measures are not sufficient to protect right whales. Under the No Action Alternative, ship strikes would continue at the same rate, or more likely, increase with the predicted increase in commercial shipping. Applying the predictions from Caswell, Fujiwara, and Brault's modeling (1999), if ship strikes were to continue at current rates or increase, the western population of the North Atlantic right whale would be extinct within 200 years.

4.1.1.1 Northeastern United States (NEUS)

The NEUS contains several key feeding areas, including the designated critical habitat in Cape Cod Bay, where right whales feed, socialize, and mate. Right whale behavior in this region makes them particularly susceptible to ship strikes. When right whales are engaged in feeding, mating, and socializing, they appear to be less aware of oncoming vessels (Mayo et al., 2004; Nowacek *et al*., 2004). Given that relatively high densities of both right whales and ships occur in this area, the likelihood of ship strikes is high. The majority (approximately 24 percent) of recorded ship strikes to large whales internationally occurred in the North Atlantic (US and Canadian waters). While this could be a function of the amount of traffic, it may also be an artifact of higher reporting rates in this region. Without new operational measures to protect the whales in this region, vessel strikes would continue and would threaten the small existing population.

As in the other geographic regions, current conservation measures would continue under the No Action Alternative. Current measures have proven to be insufficient to protect right whales from ships strikes, as is indicated by the number of recorded ship strikes that have occurred over the last few years. Five known right whale deaths from ship strikes occurred between 1999 to 2003 alone (Cole *et al*., 2005), and ship strike mortalities continued with 2 in 2004 (right whale deaths in 2005 are currently being analyzed) (Cole *et al*., 2006). Taking no additional actions would lead to significant, direct, long-term, negative impacts in all areas of the NEUS by hindering the survival and recovery of the western population of the North Atlantic right whale. The No Action Alternative would not effectively contribute to the recovery of the North Atlantic right whale; thus it would not meet the purpose and need of the proposed action.

4.1.1.2 Mid-Atlantic United States (MAUS)

The MAUS includes waters along the coast where whales tend to occur close to shore at certain times of the year. The majority of the whales that occur in this area are migrating from feeding grounds in the north and calving grounds in the south; however, nonmigratory whales have been sighted in this area on occasion. Ships must pass through this habitat to get to port, which places right whales in danger of ship strikes. The general north-south direction of migrating right whales is in conflict with the east-west direction of vessels traveling in and out of ports in this region, which intensifies the need for action in the MAUS, where current right whale protection measures are minimal.

Despite the conservation measures currently in place under the No Action Alternative, continuing to rely on these measures alone would have a potentially significant, direct, long-term, negative impact on the western population of North Atlantic right whales. Without the recommended protective operational measures, ships would continue to use a broad choice of routes at customary sea speeds to enter each port and the chances of striking a right whale would remain high because ship traffic in and out of ports is heavy in the MAUS (Sections 3.4.1.4).

Any vessel strike, especially those that result in serious injury or death, would have a significant, direct, long-term, negative effect on the small, critically endangered right whale population. Because most right whales using coastal MAUS waters are presumably pregnant females, mothers, juveniles, or calves, members of the population that are most important to recovery, failure to implement the recommended operational measures in the MAUS, as in the SEUS, would result in continued ship strikes, and severely hinder the population's capacity to recover.

4.1.1.3 Southeastern United States (SEUS)

The SEUS is the only known calving ground for the western population of North Atlantic right whales. It is a very high-risk area for pregnant females, new mothers, and calves.

The No Action Alternative would have a significant, direct, long-term, negative impact on the right whale population because it would allow the threat of ship strikes to remain at current levels within the critical habitat for calving in the SEUS or increase with the expected increase in ship traffic (NMFS, 2005d). Without protective measures, ship strikes are expected to continue, which could result in continued, negative impacts on pregnant females, new mothers, calves, and juveniles—each one an important contributing members to the recovery of the population.

Young whales are particularly vulnerable to ship strikes. Calves and juveniles are much more susceptible than full-size adults to serious injury or death from ship strikes; one contributing factor may be that they spend more time at the surface than adults do. Of 16 right whale mortalities by ship strike recorded between 1970 and 1999, almost one-third (31 percent or five individuals) were calves and juveniles, and three more were two years old or younger (Knowlton and Kraus, 2001). Over the same period, of 56 documented right whales seriously injured[4] by ship strikes or entanglement, more than one third were calves or juveniles (Knowlton and Kraus, 2001). Smaller whales are also more difficult to sight at sea and, therefore, to avoid. Vessels of all sizes, including smaller vessels, can seriously harm calves and juveniles. In addition, a vessel strike to a new mother leaves a calf alone, which most likely leads to the death of the calf as well. The death of any one member of the population would seriously hinder recovery of the population and, in fact, could contribute directly to the extinction of the western stock of the North Atlantic right whale within the next 100 to 200 years (Section 1.1.1).

4.1.2 Alternative 2 – Dynamic Management Areas

Implementing speed restrictions in Dynamic Management Areas (DMAs) under Alternative 2 would have minor, direct, long-term, positive effects on the right whale population because it would lower the potential for ship strikes of right whales throughout the range of the species. However, because the only operational measure proposed under Alternative 2 is the use of DMAs, this alternative is less likely to reduce ship strikes sufficiently to promote population

[4] The serious injury criteria is described in Knowlton and Kraus, 2001.

recovery than the other action alternatives. Speed restrictions associated with DMAs would be expected to reduce the severity of ship strikes, although unlike Alternatives 4, 5, and 6, this alternative does not reduce the co-occurrence of whales and vessels, except if mariners choose to route around a DMA. Furthermore, whereas the other alternatives capitalize on the known occurrence of whales at certain times of the year with SMAs, implementing DMAs only would result in less certainty that these aggregations would be sighted and protected. The probability of whales being sighted is contingent on the available resources at the time, including being available to fly aerial surveys (which are weather limited), funding, and the timing of the publication of the location of the DMA in the *Federal Register*. Therefore, any limitations in these resources could prevent or slow the sighting of whales that need protection.

When right whales are sighted and a DMA is implemented, ships would be required to adhere to speed restrictions while in the designated area, which may allow the whales and mariner to avoid collision and reduce the severity of a ship strike, or mariners may opt to route around the defined area, thus minimizing the chance for a collision. DMAs provide temporary measures to protect right whales when they are sighted in aggregations of three or more whales, when they are located within a TSS, a shipping lane, or a 30 nm port entrance zone in the MAUS, and do not appear to show evidence of continued coast-wise transit. Research indicates that ship strikes recorded at speeds under 14 knots tend to result in minor to serious injuries; ship strikes that occurred at 14 knots and greater tend to result in serious injury or death (Laist *et al*., 2001; Jensen and Silber, 2003). When right whale sightings trigger a DMA, the restrictions are expected to be in place for 15 days and then lifted if whales are no longer sighted or extended if whales are re-sighted. Therefore, these temporary restrictions would provide short-term protective measures during times and in areas where no other measures (e.g., SMAs) are in place.

4.1.2.1 NEUS

Implementing Alternative 2 would have minor, direct, long-term, positive effects on right whales in the NEUS. However, the effectiveness of DMAs in protecting right whales in the NEUS is limited by an inability to locate them by aerial surveys when rough seas and extreme weather conditions prevail. Routine aerial surveys are flown over this area to locate aggregations of right whales, but the Northeast is more prone to rough sea states than the other regions. Rough sea states may inhibit the ability to see a whale at the surface, and whales below the surface may remain unseen. As a result, DMAs may not be put into effect because whales may not be spotted by an aerial survey during rough sea state conditions. In addition, whales are submerged and undetectable the majority of the time. Finally, aerial surveys are expensive, logistically difficult and cannot assure 100 percent coverage of all areas at all times.

4.1.2.2 MAUS

Implementing DMAs would have minor, direct, long-term, positive effects on right whales in the MAUS. Aerial surveys to identify aggregations of right whales are not conducted as frequently in the MAUS as in the NEUS and SEUS; without the ability to identify right whales that might trigger DMAs, this operational measure would not prove effective as a management measure. Implementing DMAs as the sole operational measure in the MAUS, without increasing survey efforts, would provide a low level of protection to right whales.

4.1.2.3 SEUS

Implementing Alternative 2 would have minor, direct, long-term, positive effects on right whales in the SEUS. Aerial surveys are conducted systematically during the season when right whales utilize the SEUS as a calving ground to identify aggregations of whales. Although implementing DMAs as an independent operational measure would have an overall positive impact on right whales, this alternative may not provide sufficient conservation value to reduce ship strikes and meet the ultimate goal of aiding the recovery of the right whale population because of limitations of the effectiveness of aerial surveys described in the preceding sections.

4.1.3 Alternative 3 – Speed Restrictions in Designated Areas

Implementing the ship speed restrictions considered under Alternative 3 would result in direct, long-term benefits to the right whale population. This EIS analyzes establishing ship speed restrictions of 10, 12, and 14 knots. Generally, lower speed restrictions result in a decreased probability of serious injury or death. A comparison of the impacts on right whales at each of these speed restrictions is provided after the following background information on the relationship between vessel speed and the severity and occurrence of ship strikes.

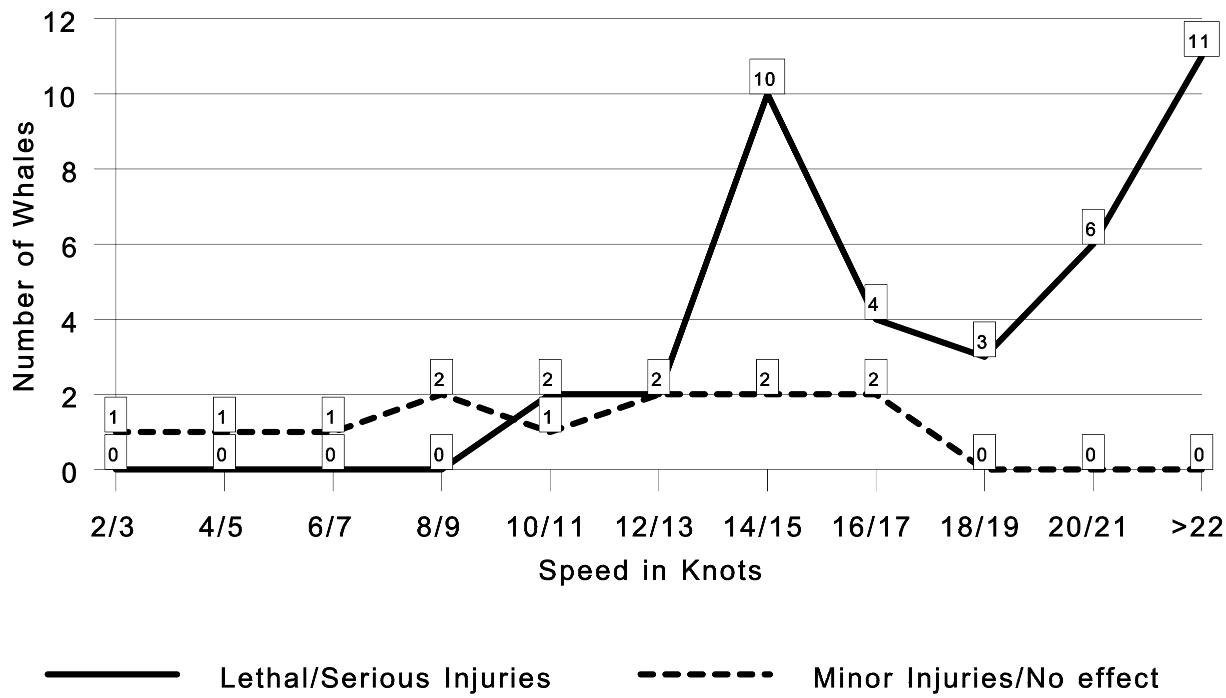
An examination of all known ship strikes indicates vessel speed is a principal factor. Records of right whale ship strikes (Knowlton and Kraus, 2001) and large whale ship strike records (Laist *et al*., 2001; Jensen and Silber, 2003) have been compiled. In assessing records in which vessel speed was known Laist *et al*. (2001) found “a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision.” The authors concluded that most deaths occurred when a vessel was traveling in excess of 13 knots (Figure 4-1).

In perhaps the most complete summary to date, Jensen and Silber (2003) detailed 292 records of known or probable ship strikes of all large whale species from 1975 to 2002. In nearly 20 percent (58 cases) of the records, ship speed at the time of collision was known. Operating speeds of vessels that struck whales ranged from 2–51 knots with an average speed of 18.1 knots. The majority (79 percent) of these strikes occurred at speeds of 13 knots or greater. When the 58 reports are grouped by speed, the greatest number of vessels were traveling in the range of 13–15 knots, followed by a speed range of 16–18 knots, and 22–24 knots, respectively (Jensen and Silber, 2003).

Of the 58 cases, 19 (32.8 percent) resulted in serious injury (as determined by blood in the water, propeller gashes or severed tailstock, and fractured skull, jaw, vertebrae, hemorrhaging, massive bruising, or other injuries noted during necropsy) to the whale and 20 (34.5 percent) resulted in death. Therefore, in total, 39 (67.2 percent) ship strikes in which ship speed was known resulted in serious injury or death. The average vessel speed that resulted in serious injury or death to the whale was 18.6 knots (Jensen and Silber, 2003).

Using a total of 64 records of ship strikes in which vessel speed was known, Pace and Silber (2005) tested speed as a predictor of the probability of a whale death or serious injury. The authors concluded that there was strong evidence that the probability of death or serious injury increased rapidly with increasing speed. Specifically, the predicted probability of serious injury or death increased from 45 percent to 75 percent as vessel speed increased from 10 to 14 knots, and exceeded 90 percent at 17 knots. Interpretation of the logistic regression graph used to obtain these probabilities indicates that there is a 100 percent probability of serious injury or death

Vessel Speed versus Whale Injury Type[1]



Source: Laist *et al*., 2001 & Jensen and Silber, 2003 (Based on 50 Records)

Figure 4-1

---

[1] Lethal Injuries = collision reports describing observation of a dead whale
Serious Injuries = collision reports citing evidence of bleeding wounds
Minor Injuries = collision reports describing a non-bleeding wounds
No Apparent Effect = collision reports noting observations of whales swimming away after a collision with no report of observed wounds

This Page Intentionally Left Blank

around 25 knots and faster. In a related study, Vanderlaan and Taggart (*in review*) analyzed all published historical data on vessels striking large whales. The authors found that the probability of a lethal injury resulting from a strike ranged from 20 percent at 9 knots, 80 percent at 15 knots, and 100 percent at 21 knots or greater.

Similar studies of the occurrence and severity of strikes relative to vessel speed have been reported for other species. Speed zones were adopted in Florida in the early 2000s to reduce manatee injuries resulting from collisions with boats. Laist and Shaw (2006) recently assessed the effectiveness of these speed zones at reducing watercraft-related manatee deaths. Watercraft related manatee deaths declined in the specific areas assessed in the paper, and the authors reported that this decline reflected that well designed speed restrictions could be effective if properly enforced. They further stated "that reduced speed allows time for animals to detect and avoid oncoming boats, and that similar measures may be useful for other marine mammal species vulnerable to collision impacts with vessels (e.g., North Atlantic right whales)" (Laist and Shaw, 2006). A separate study on the impact energy required to break manatee bones suggests that ship strikes can cause bone fractures that may inflict fatal injuries to manatees in a range of 13–15 miles per hour (Clifton, 2005). The boats analyzed in this research were smaller, recreational boats, typically found in Florida waters, in contrast to the large, commercial vessels generally implicated in right whale ship strikes. However, manatee bones are generally not as strong as other mammalian bones (Clifton, 2005), so it would be difficult to apply these results to right whales.

Although there is uncertainty regarding the behavior of whales in the path of approaching ships, documented cases suggest last-second flight responses occurred in whales when the ship was within 100 yards or less of the whale. If a whale attempts to avoid an oncoming vessel at the last minute, a burst of speed coupled with a push from the bow wave could mean that mere seconds might determine whether a whale is struck (Laist *et al*., 2001). A reduction in speed from 18 knots to 12 knots would give whales an additional 2.6 seconds (at a distance of 50 m) to avoid the vessel in this flight response (Laist, 2005-*unpublished data*).

Another factor in the likelihood of a vessel-whale collision related to speed is the hydrodynamic forces in play when a whale tries to avoid the vessel.[5] Knowlton et al. (1998) developed a hydrodynamic model that considered the effect of ship speeds of 10, 15, and 20 knots on a moving whale that was 3 meters forward of the bow. They found that a collision occurred at 20 knots, while the whale was able to avoid collision at the lesser speeds. Hydrodynamic forces from a passing ship would not draw a passive whale into a ship because the pressure wave in front of the ship tends to push objects away from the hull before drawing them back toward the ship. However, if a whale appears (i.e., surfaces from a dive) after this initial flow of water away from the boat, it can be drawn into the ship along the length or close to the propeller. Therefore, if a whale is trying to avoid an approaching ship, reduced ship speed would increase its ability to avoid collision (Knowlton *et al*., 1998).

Reduced speeds can also have a positive impact on mariner safety and reduce the amount of damage a vessel incurs following a collision with a whale. Thirteen records in the ship strike database reported vessel damage because of a vessel collision with a whale. Three of these cases occurred at speeds between 10 to 15 knots and the remaining reports occurred at speeds over 20

[5] Hydrodynamic refers to the dynamics of fluid in motion and for the purpose of this EIS, the forces imposed on a whale by a passing ship are referred to as sway, surge, and yaw.

knots. Physical damage to vessels results in repair costs and economic loss due to lost profits from dry-docking the vessel and not utilizing it for business operations. Several cases also involved human injury from the force of the strike. Therefore, reduced speeds would potentially lessen the extent of damage to the vessel and risks to human health and safety during a collision.

Impact of a 10 Knot Speed Limit

Research on vessel-whale collisions indicates that of the three speeds considered (10, 12, and 14 knots), adopting a speed limit of 10 knots would be the most beneficial to the recovery of the right whale population. Historically, only a small percentage of ship strikes occurred at 10 knots, and those that did usually resulted in injury rather than death (Laist *et al*., 2001). However, while a 10-knot speed restriction would be effective at reducing the risk of ship strikes, it would not eliminate the risk; there is still a 45 percent predicted probability of serious injury or mortality at 10 knots (Pace and Silber, 2005).

Impact of a 12 knot Speed Limit

A speed limit of 12 knots would also benefit right whales. Only a small percentage (11 percent) of ship strikes that result in serious injury or mortality occurred at speeds between 10 to 14 knots (Laist *et al*., 2001). Through interpretation of the logistic regression graph that shows the relationship between serious injury and vessel speed, there is approximately a 60 percent prediction of serious injury or mortality at 12 knots (Pace and Silber, 2005).

Impact of a 14 knot Speed Limit

Adopting a speed limit of 14 knots would be less beneficial to right whales than adopting speed limits of 10 or 12 knots because ship strikes that occurred at 14 knots or higher generally resulted in death or serious injury. The majority (89 percent) of collisions occurred at speeds of 14 knots or faster (Laist *et al*., 2001). Further, there is a 75 percent predicted probability of serious injury or mortality at 14 knots (Pace and Silber, 2005).

In summary, speed restrictions are proposed as a stand-alone measure under Alternative 3 because they are expected to reduce both the severity and occurrence of ship strikes in certain locations where whales are known to occur. Based on the discussions above, this alternative affords a moderate level of protection to right whales.

4.1.3.1 NEUS

Alternative 3 proposes year-round speed restrictions in specific areas in the NEUS, which would have a direct, long-term, positive impact on the right whale population (for the reasons previously described). The geographical area where these speed restrictions would apply includes all waters in the area used by Seasonal Area Management (SAM) zones and critical habitat as designated in the Atlantic Large Whale Take Reduction Plan (ALWTRP) (Section 2.2.3).

Speed restrictions are especially important in the NEUS because this region includes right whale feeding habitat, and whales that are actively feeding may be less responsive to approaching ships (Laist *et al*., 2001). They also may be skim feeding at the surface, which may reduce their awareness with regard to approaching ships and therefore increase their vulnerability to vessel collisions.

Speed restrictions in the NEUS under Alternative 3 differ from those under Alternative 6 because they are year round instead of seasonal. However, Alternative 3 does not include establishing DMAs, and therefore lacks a mechanism to protect whales sighted outside of the SAM zones. Alternative 3 also does not include recommended routes[6], as with alternatives 4, 5, and 6, so this Alternative does not spatially separate vessel traffic from whales and their habitat. Therefore, as a stand-alone measure, the speed restrictions proposed in Alternative 3 would reduce the severity and occurrence of ships strikes but does not account for two key measures (DMAs and routing measures) that provide additional protection.

4.1.3.2 MAUS

Alternative 3, which proposes speed restrictions from October 1 through April 30 off the US mid-Atlantic coast, would have direct, long-term, positive impacts on the recovery of the right whale population by reducing the number and severity of ship strikes (Section 4.1.3). This area would include all waters extending out 25 nm (46 km) from the US coastline from Providence/New London (Block Island Sound) south to Savannah, Georgia. Many ports in the mid-Atlantic generate a high volume of vessel traffic. This region is also a high use are for migrating right whales, so the whales transit this region twice a year.

The speed restrictions in Alternative 3 include the entire coastline out to 25 nm (46 km), whereas Alternative 6 only proposes speed restrictions in 30-nm-wide SMAs around several important port areas. Although Alternative 3 covers a larger area than Alternative 6, the additional coverage may not result in a much greater reduction in vessel strikes because large commercial vessels are concentrated in the vicinity of port areas more than surrounding waters. In addition, data indicate that right whales often occur within 30 nm (56 km) of the coast, and Alternative 3 only extends out to 25 nm (46 km). However, Alternative 3 provides an additional month of restrictions during October, as Alternative 6 only has restrictions from November 1 through April 30. This alternative does not include DMAs to provide protection to whales sighted in the months of May to September or in waters from 25 to 200 nm. Therefore, as a stand-alone measure in the MAUS, ship speed restrictions alone may not provide sufficient protection to reduce the occurrence of ship strikes and aid the recovery of the right whale population.

4.1.3.3 SEUS

Alternative 3, which proposes speed restrictions from December 1 through March 31 off the SEUS, would have a direct, long-term, positive impact on the recovery of the right whale population by reducing the number and severity of ship strikes in right whale calving habitat. This area would include all waters within the Southeast mandatory ship reporting system (MSRS) WHALESSOUTH reporting area (described in Section 2.2.3) and the southeastern US right whale critical habitat (Figure 1-3). Reducing ship strikes in this region is particularly important because it is a calving area, and there are several busy ports in Georgia and Florida.

Alternative 3 includes speed restrictions in the MSRS WHALESSOUTH reporting area and the southeastern right whale critical habitat (Figure 1-1), whereas Alternative 6 only proposes speed restrictions within Southeast SMA (which extends just south of the MSRS area), but not in the

---

[6] A recommended route is defined by the IMO as a route of undefined width, for the convenience of ships in transit, which is often marked by centreline buoys. The USCG adopted this term, which identifies the type of routing measure used in the alternatives. Recommended routes are essentially shipping lanes; therefore the two terms will be used synonomously throughout the EIS.

critical habitat. However, the speed restrictions proposed under Alternative 3 are only effective for four months whereas those proposed under Alternative 6 are effective for five months. The speed restrictions in Alternative 3 have advantages over Alternative 6 for the reasons previously mentioned; however, this alternative does not attempt to route ships away from high-density areas of right whales through identified shipping lanes. Therefore, Alternative 3 only addresses one mitigation measure—speed—and does not account for the distribution of whales that overlap with vessel traffic. Whales that are sighted outside of the MSRS reporting area or the critical habitat would not be protected under this alternative because DMAs are not included. As a stand-alone measure, Alternative 3 may not provide sufficient protection to significantly reduce the risk of ships strikes to aid the recovery of the right whale population.

4.1.4 Alternative 4 – Recommended Shipping Routes

Alternative 4 would have direct, long-term, positive effects to right whales in the SEUS and NEUS regions, and direct, long-term, adverse effects on right whale in the MAUS region.

4.1.4.1 NEUS

Implementing Alternative 4 would have direct, long-term benefits to the right whale population in the NEUS region because of recommended routes, an area to be avoided (ATBA), and the proposed shift in the Boston TSS. The ATBA in the Great South Channel would route vessels (300 GRT and greater) around another important feeding ground from April 1 to July 31, and vessels under 300 GRT but 65 ft (19.8 m) or more in length would have to reduce speed through the ATBA. Also, the proposed shift in the Boston TSS (Figure 2-14) would place the TSS north of an area of known high whale density. Biologists estimate the shift of the TSS would result in at least a 58 percent reduction in the encounters between ships and right whales, thus leading to a significant reduction in the risk of ship strikes of right whales (SBNMS, *unpublished data)*. Further, narrowing the lanes from two miles to one and a half miles reduces the overlap between right whales and ships. Therefore, shifting the TSS would have a direct positive impact on the right whale population in the NEUS.

Alternative 4 proposes the use of recommended shipping routes for all vessels 65 feet and longer from January 1 to May 15. These shipping lanes would route vessels away from feeding right whale aggregations in the Cape Cod Bay Critical Habitat area, where whales are particularly vulnerable to ship strikes due to their behavior in this area. Cape Cod Bay is an important feeding ground for right whales, and research suggests that although right whales should be able to hear vessels, they may not avoid them when engaged in feeding or socializing behavior (Mayo et al., 2004; Nowacek *et al*., 2004).

In the NEUS, the proposed shipping lanes are generally consistent with current vessel traffic patterns, except for vessel traffic leaving the Cape Cod Canal en route to Provincetown, which generally consists of slower than average vessels, including tugs and barges, and vessels entering Cape Cod Bay and/or the Canal from the Northeast and vice versa.

To compare current conditions with the conditions likely to prevail if the proposed shipping lanes were implemented, researchers in the Northeast developed a risk analysis study based on right whale sightings from 1998 to 2002 and vessel traffic data in Cape Cod Bay from the USACE (Nichols and Kite-Powell, 2005). These data were entered into a model to estimate the number of ship/whale encounters that might occur assuming the whales remained at the surface and neither the ships nor the whales attempted to avoid collision. An encounter was counted as occurring when a known number of vessels passed through defined study areas of estimated right whale density. This model estimated that approximately 1.5 ship/whale encounters would occur in Cape Cod Bay annually. Next, the proposed shipping lanes in Cape Cod Bay were incorporated into the model to assess the effectiveness of the proposed routing measures at reducing the potential for ship strikes. Based on this model, Nichols and Kite-Powell projected that the proposed lanes could reduce the potential for ship/whale encounters by 45 percent, from 1.5 to 0.9 a year. The authors note that the encounter value and reduction cannot be translated directly into actual ship *strikes* because whale diving behavior and avoidance actions by whales and/or mariners were not included in the model due to a lack of data. Therefore, these values are presented for informational purposes and are most likely a conservative estimate of annual ship strikes in Cape Cod Bay, as they assume whales are at the surface and neither the ships nor the whales sought to avoid a collision.

Although implementing Alternative 4 would reduce the risk of ship strikes from ships transiting through areas of high whale densities, it would only account for one factor of several that affect the occurrence and severity of ship strike. This alternative would not require vessels to reduce speed when traveling in shipping lanes; therefore, if a vessel collided with a whale in a shipping lane, the severity of the strike would presumably be greater than if there were speed restrictions associated with the lanes as in Alternative 6. Alternative 4 also does not include the use of DMAs as an operational measure, so it does not account for right whale sightings outside designated seasons and areas. Implementing Alternative 4 as a stand-alone measure may not have the potential to reduce ship strikes enough to result in an increase in the population growth rate.

4.1.4.2 MAUS

There are no shipping lanes proposed in the approaches to mid-Atlantic ports; therefore, conditions under Alternative 4 would be the same as the no action conditions. Therefore, taking no action would have direct, long-term, adverse effects on right whales in the MAUS. With no proactive measures in place, right whales would be vulnerable to collisions with ships.

4.1.4.3 SEUS

Implementing Alternative 4 would have direct, long-term, positive effects on right whales in the SEUS region. The proposed shipping lanes in the SEUS were designed to separate vessel traffic and right whale aggregations, thus reducing vessel collisions. The lanes were identified based on the following data: (1) the approaches to pilot buoys of the three major ports in the SEUS that avoid areas with relatively high right whale occurrence and (2) right whale distribution and congregating areas around the approaches to the ports based on aerial survey data (NMFS, *unpublished data*).

Implementing Alternative 4 in the SEUS region would result in establishing shipping routes for the ports of Jacksonville and Fernandina, Florida, and Brunswick, Georgia. These ports currently have no officially designated shipping lanes; however, there are “high use” approaches to these ports, currently used by the maritime community. Traffic route patterns are derived from reports into the MSRS called in by vessels entering the MSRS reporting area from 1999 to 2001 (Ward-Geiger *et al.*, 2005). The majority of traffic approaching Jacksonville enters from a southeast route, and there is also high traffic volume approaching from the northeast. Traffic patterns in Fernandina and Brunswick also exhibit heavy vessel use from the southeast to due east of the pilot Buoy (Garrison, 2005). By restricting this vessel traffic to specific lanes that avoid right whale high-use areas, the probability of vessel-whale interactions would be significantly reduced in the SEUS calving area.

A series of approach lanes into each of the ports was analyzed for a reduction in risk (of a vessel-whale interaction) based on modeled right whale density and spatial distribution, and current vessel traffic patterns (Garrison, 2005). This risk factor was measured against the “status quo” risk level for each port. One or more of these approaches with the largest reduction of risk will be established as voluntary, recommended route(s). An analysis of the routes is the subject of a Port Access Routes Study (PARS) by the USCG.

The approaches in Jacksonville that reduce the risk of a vessel-whale interaction the most enter the MSRS boundary from the southeast, and are oriented in more of an eastern direction than southern, which reduces the distance traveled through the MSRS (Figure 2-1). Concentrating traffic into these lanes (shown by green lines in Figure 2-1) is expected to reduce the likelihood of interactions by 22 to 27 percent (Garrison, 2005). These lanes are just north of the prevailing traffic patterns into Jacksonville reported to the 2000/2001 MSRS; therefore, there would not be a drastic shift in vessel traffic for vessels approaching from the south and east.

Approaches from the east-southeast into Fernandina would reduce the risk of a vessel-whale interaction (Figure 2-2). Lanes in this general area (shown by green lines) are expected to reduce the risk by 24 to 32 percent relative to the status quo. The lane with the risk reduction factor of 32 percent would provide the most protection to whales. The majority of the traffic into Fernandina during the 2000/2001 season approached from the east or northeast; therefore, the lanes that would provide higher levels of protection to right whales would also result in a significant change in existing traffic patterns.

The approaches into Brunswick with the greatest conservation value approach from due east, and would result in a reduction of risk from 10 to 16 percent (Figure 2-2). A high volume of vessel traffic approached the port from the southeast in 2000/2001, so there would be a slight shift from existing traffic patterns.

Reducing the number of vessels that transit in areas where right whales aggregate in the SEUS is important because this region is a right whale calving and nursing area. Females are a vital segment of the population. In 2004 and 2005 there have been four instances where one ship strike resulted in the death of both the pregnant female and the fetus. The death of a mother with a young calf may result in two deaths as the calf is unlikely to survive on its own. The reproductive potential of the mother for the remainder of her life is also a loss to the population. Laist (2005, *unpublished data*) found that calves and juvenile whales were hit more often than adults, so the SEUS calving ground is a particularly important habitat to protect. Jacksonville has higher vessel traffic volumes than Brunswick or Fernandina; therefore, the proposed shipping lanes for the port of Jacksonville may be the most effective at reducing ship strikes in the area. While Alternative 4 may have an overall positive effect on the right whale population, without speed restrictions and DMAs, it may not provide sufficient protection as a stand-alone measure to effectively reduce the occurrence of ship strikes.

4.1.5 Alternative 5 – Combination of Alternatives

Implementing Alternative 5, which combines all of the measures in Alternatives 1 to 4, would have significant, direct, long-term benefits on the right whale population. This alternative combines all of the following operational measures that are being considered: continuing current measures, recommended shipping routes, shifting the Boston TSS, large-scale speed restrictions, DMAs, and the ATBA. These account for all of the measures identified in the EIS that reduce the risk or occurrence of ship strikes, and considered together, their positive impacts on the right whale population would be substantial. Routing measures would shift traffic away from areas of relatively high whale density; speed restrictions in SMAs and DMAs are expected to reduce the occurrence and perhaps the severity of a ship strike; and DMAs would provide protective measures for unpredicted whale occurrences.

Alternative 5 would provide the highest level of protection to the right whale population as the measures mentioned above cover larger areas for longer periods than the other alternatives. This alternative would significantly reduce the amount and/or severity of ship strikes. If deaths and serious injuries are reduced, a higher probability exists that the population growth rate would increase. An increase in the population growth rate would increase the number of whales in the population, which would bring them closer to recovery and farther from extinction.

4.1.5.1 NEUS

Implementing Alternative 5 in the NEUS would have direct, long-term, positive effects on the status of the population. All known right whale feeding grounds are located within the NEUS, and right whale densities can be relatively high in certain areas. While in the NEUS, right whales engage in feeding, socializing, and mating behaviors that may reduce their awareness of certain threats and increase their susceptibility to ship strike. For example, whales engaged in certain behaviors, such as skim feeding on the surface, may be less responsive to approaching ships (Laist *et al*., 2001). Implementing the combination of the operational measures would decrease the conflicts inherent between vessel traffic and high whale density areas and increase the chance of whale survival or avoidance by reducing ship speeds. Refer to Alternative 2 (Section 4.1.2.1), Alternative 3 (Section 4.1.3.1), and Alternative 4 (Section 4.1.4.1) for a discussion of the conservation value of the individual measures that are combined in Alternative 5. These measures would reduce the occurrence and/or severity of ship strike, which would help the population to recover to a sustainable population size. Both males and females utilize these feeding grounds from winter to fall. Fortunately, for both vessel operators and whales, the peak shipping season does not correspond with the peak feeding season. Based on the vessel arrival data from 2004, only 17 percent of vessel arrivals in the NEUS would have occurred during a time when a SMA was implemented.

DMAs would provide measures to protect right whales if they are sighted outside of the periods and locations of seasonal restrictions. DMAs may have greater conservation benefit to right whales in the NEUS than in the MAUS or SEUS because they are proposed for the entire Gulf of

Maine, which has additional operational measures only in the southern boundary of the region, off the coast of Massachusetts. Therefore, DMAs are the only operational measures in the unregulated waters north of Massachusetts.

4.1.5.2 MAUS

Implementing Alternative 5 would have direct, long-term, positive effects on right whales that occur in waters off the MAUS. Continuing existing protective actions, the use of DMAs, and speed restrictions would reduce the risk of ship strikes and facilitate population recovery. The Alternative 5 measure likely to be the most beneficial to whales migrating through the MAUS would be speed restrictions from October 1 to April 30, extending out to 25 nm (46.3 km). The majority of right whale sightings occur within 30 nm of the coast; therefore, these restrictions would provide protective measures in whale high-use areas. As discussed in Section 4.1.3, fewer ship strikes occur at speeds 14 knots and less, and those that do occur usually result in fewer severe injuries than those that occur at speeds greater than 14 knots. The MAUS had more vessel traffic (49 percent) arriving during proposed restricted periods in 2004 than either the NEUS or SEUS. Almost half the vessels arriving at MAUS ports throughout the year would transit through the MAUS coastal areas when the whales are present.

Implementing DMAs in the MAUS would benefit right whales in times when seasonal speed restrictions along the mid-Atlantic coast (out to 25 nm) were not in place and if right whales were to occur outside of this area. As of the spring 2006 migration, there were no systematic aerial surveys taking place in the entire MAUS. For DMAs to be effective in this region, there would need to be an increase in survey effort. Without the ability to identify right whales that might trigger DMAs, this operational measure might not prove effective as a management measure.

4.1.5.3 SEUS

Implementing Alternative 5 would have major, direct, long-term, positive effects on right whales by providing protections in their only known calving and nursery area. As previously mentioned (Section 4.1.4.3), females and their calves are two vital segments of the population to protect. Saving one female could result in a larger boost to the population than saving a male (mature males are not generally found in the calving grounds).

Alternative 5 proposes seasonal speed restrictions in the Southeast MSRS WHALESOUTH reporting area and in the southeastern US critical habitat. These speed restrictions would reduce the number and severity of ship strikes to females and calves in the SEUS. The proposed shipping lanes into the ports of Brunswick, Fernandina, and Jacksonville were designed to shift vessel traffic away from areas where right whales typically aggregate. Approximately one-third of vessel arrivals in southeastern ports in 2004 occurred during the peak right whale migration time (Nov.15–Apr.15), demonstrating the importance of regulations in this region. Therefore, implementing measures to reduce ship speeds and the confluence of whales and ships would reduce the risk of ship strikes and lead to an increase in the survival rate of females and calves.

Implementing DMAs in the SEUS would have direct, long-term, positive impacts on right whales. DMAs provide temporary measures to protect right whales when they are sighted outside of the times for or locations of seasonal restrictions and shipping lanes. DMAs are of particular importance in the SEUS with respect to protecting whales that occur around the approaches to or in the vicinity of Port Canaveral, which is south of the Southeast MSRS and critical habitat, and does not have seasonal speed restrictions.

4.1.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Implementing Alternative 6, the preferred alternative, would have major, direct, long-term, positive impacts on the North Atlantic right whale population. DMAs are proposed for all areas in Alternative 6, so the effects of this operational measure are discussed in this introduction rather than repeated for each of the three regions. Restrictions would be imposed on mariners when whales are sighted in an area or time period not covered by seasonal restrictions. Requiring vessels to reduce speed while transiting through a DMA or routing around a DMA would reduce the threat of ship strikes for the same reasons discussed in Section 4.1.2.

The benefits of ship speed restrictions are similar for all areas where they are proposed (Section 4.1.3). As mentioned earlier, this EIS analyzes three alternative speed restrictions, 10, 12, and 14 knots. For all alternatives, a 10-knot speed restriction would result in a higher reduction in the severity and occurrence of ship strikes, 12 knots would result in a moderate reduction, and 14 knots would result in the least reduction (Section 4.1.3). Speed restrictions would also reduce the likelihood that a whale would be pulled into the side or stern of the vessel by hydrodynamic forces because such forces are weaker at slower speeds. Whales would have additional time to avoid a vessel collision in a last-second flight response.

4.1.6.1 NEUS

Implementing Alternative 6 would have major, direct, long-term, positive effects on the western population of North Atlantic right whales in the NEUS. This section describes the benefits of Alternative 6 to right whales in each of their critical habitats in the NEUS, as defined in Chapter 2.

Cape Cod Bay

In the Cape Cod Bay area, implementing the recommended shipping routes to and from the Cape Cod Canal, Boston, and Provincetown would minimize the risk of ships striking whales because the newly defined routes would minimize ship traffic in whale high-use areas. In addition, a speed restriction of 10, 12, or 14 knots throughout the Cape Cod Bay SMA would incrementally lessen the severity and occurrence of ship striks. Reduction of ship strikes in the Cape Cod Bay area would contribute substantially to population recovery.

Off Race Point

Implementing Alternative 6 would result in positive effects on the right whale population, particularly feeding right whales, in the Off Race Point area. This area is of particular concern for vessel collisions because the Boston TSS concentrates vessel traffic through it. A speed restriction of 10, 12, or 14 knots would facilitate the sighting of right whales, and whales would have additional time to avoid a vessel in a last-second flight response. If mariners elect to route around the Off Race Point area rather than limit their speed through it, this would further minimize ship strikes. Right whales congregate in the Off Race Point rectangular area for feeding, and it is significantly less likely that a ship would strike a right whale outside that area.

Great South Channel

Implementation of the proposed operational measures for the Great South Channel under Alternative 6 would significantly reduce the threat of ship strikes to feeding and socializing right whales. Large aggregations of right whales are sighted annually in this important feeding habitat, which is also designated critical habitat. Right whales in the Great South Channel management area and critical habitat would experience major positive effects because all vessels 65 feet and greater would adhere to speed restrictions. Data strongly suggest that vessels traveling under 14 knots are less likely to seriously injure or kill whales during a collision than those traveling 14 knots or faster (Laist *et al*., 2001; Pace and Silber, 2005).

Gulf of Maine

It is anticipated that the proposed DMAs would have a positive impact on the North Atlantic right whale population because restrictions would be imposed on mariners when whales are sighted in the area. DMAs provide measures to protect right whales if they are sighted outside of the timeframes of seasonal restrictions or outside the geographical boundaries of management areas, shipping lanes, or critical habitat. This measure is particularly important in the Gulf of Maine because DMAs are the only operational measure in this area. The Gulf of Maine includes all US waters north of other management areas for Cape Cod Bay, Off Race Point, and Great South Channel. Route diversions around the DMA and speed restrictions through the precautionary area would reduce the threat of ship strikes for the reasons previously cited in Section 4.1.2. The protective measures provided by a DMA would reduce the risk of ship strikes in the Gulf of Maine, thereby aiding in the recovery of the population.

4.1.6.2 MAUS

Implementation of Alternative 6 in the MAUS would reduce the likelihood that right whales would be struck or killed by vessels entering and leaving the following ports/areas:

- South and East of Block Island Sound
- New York/New Jersey
- Philadelphia, Pennsylvania, and Wilmington, Delaware
- Baltimore, Maryland
- Hampton Roads, Virginia
- Morehead City, Beaufort, and Wilmington, North Carolina
- Georgetown and Charleston, South Carolina
- Savannah, Georgia

Alternative 6 would have major, direct, long-term, positive effects on the western population of the North Atlantic right whale in the MAUS. The MAUS includes an area near the coast used by whales to travel between the northern and southern aggregation areas. Ships pass through the right whale high-use area to ports in this region, which places migrating right whales in danger of ship strikes. The general north-south direction of migrating right whales is in conflict with the east-west direction of vessels traveling to and from ports.

Operational measures proposed for the MAUS would reduce the threat of ship strikes by establishing speed restrictions (10, 12, or 14 knots) in SMAs off several ports in the region (see Table 2-1). The speed restrictions would be in place from November 1 through April 30 to encompass the period when the whales, both northbound and southbound, would typically migrate through the mid-Atlantic corridor. These restrictions would cover waters in a 30 nm radius from each port area (except for Block Island Sound), which corresponds to the area where almost 95 percent of all whale sightings occur (Knowlton *et al*., 2002). Implementation of speed restrictions would lessen hydrodynamic forces surrounding the vessel that tend to draw whales toward the hull, increase the opportunity for a whale to be sighted, and might allow the ship time to divert its path to avoid it, or reduce the severity if a strike does occur.

Speed restrictions in the MAUS are vital to reducing the probability of ship strikes because this region has the highest amount of vessel traffic among the three regions. Almost 50 percent of the total vessel arrivals on the East Coast occur during the right whale migration season, when speed restrictions would be in place. Therefore, these restrictions would have a direct positive effect on the migrating right whale population.

4.1.6.3 SEUS

Implementation of Alternative 6 would have major, direct, long-term, positive effects on the western population of the North Atlantic right whale because it would reduce the threat of ship strikes in their only known calving and nursery area. Mothers and calves appear to be more prone to ship strikes than adults because they spend more time at the surface and because the calf is not yet an accomplished swimmer. This calving area is highly important for the growth of the population. By reducing ship strikes of right whales in the SEUS, there is an enhanced probability of reducing deaths and the population would grow to a sustainable level because more calves and juveniles would live long enough to reach reproductive maturity. Given the right whale’s low fecundity, implementation of the operational measures in the critical habitat for calving is crucial to the survival of the species.

Under this alternative, new recommended shipping routes near Jacksonville and Fernandina, Florida, and Brunswick, Georgia, would be established to minimize the extent of the critical habitat and migratory corridor which ships traverse. By limiting ship travel to specific shipping lanes into these ports, the probability of ships striking whales would be lowered. The proposed recommended routes have been designed to cross areas with low densities of right whales. Therefore, it is expected that implementation of Alternative 6 would increase the survival rate of right whales by decreasing the concentration of ship traffic in the whales’ critical habitat and migratory corridor, especially critical in this calving area for pregnant females, mothers, juveniles, and calves.

Implementation of speed restrictions throughout the Southeast SMA and the recommended routes within the SMA would also help prevent ship strikes. The SEUS region has the second highest amount of vessel traffic among the three regions—30 percent of total vessel arrivals on the East Coast occur when whales are present in this region during periods when SMAs would be in affect. The maximum speed allowed would be 10, 12, or 14 knots. Data suggest that vessels traveling under 14 knots are less likely to seriously injure or kill whales in a collision than those traveling 14 knots and greater (Laist *et al*., 2001; Pace and Silber, 2005). Also, whales would have additional time to avoid a vessel collision in a last-second flight response (Section 4.1.3).

The speed restrictions in the SEUS would be seasonal (November 15 to April 15) to correspond with the calving season, which is concentrated December through March.

Implementation of this group of operational measures in the SEUS would likely reduce the number of ship strikes and allow more pregnant females, mothers, juveniles, and calves to survive. Their survival would contribute positively to the population's status and likely result in population growth if operational measures in other geographic areas were implemented as well. A reduction in the chance of a ship strike in the SEUS would have a major positive, long-term impact on the recovery of the western stock of North Atlantic right whale.

4.2 Impacts on Other Marine Species

This section discusses the potential impacts of the implementation of the alternatives on living marine resources other than the western stock of the North Atlantic right whale. Seabirds and protected anadromous and marine fish are not addressed in this section as they would not be affected by the proposed operational measures. Seabirds are capable of avoiding oncoming vessels, and there is no evidence of regular vessel strikes to this taxonomic group. Like seabirds, fish are capable of avoiding oncoming vessels, and there is no evidence of a threat of vessel strikes to this type of animal.

4.2.1 Alternative 1 – No Action Alternative

4.2.1.1 Other Marine Mammals

Alternative 1, the No Action Alternative, would continue to have indirect, long-term, negative impacts on other marine mammals as well as on North Atlantic right whales. Ship strikes also pose a threat to other large whales in the western North Atlantic (see Section 3.2.1). Fin, humpback, and sperm whales are the endangered species occurring in or near North Atlantic right whale habitat that are most susceptible to ship strikes among large whales. The No Action Alternative would provide no further protection against ship strikes; therefore, other large whales would continue to be seriously injured or killed by ship strikes.

4.2.1.2 Sea Turtles

Like whales, sea turtles are subject to ship strikes (Section 3.2.2). Alternative 1, the No Action Alternative, would have indirect, long term, negative impacts on sea turtles because the number of vessel strikes of sea turtles along the US East Coast would not be reduced. Ship strikes would be expected to continue at the current rate, causing continued injury and death. Data are unavailable with respect to which of the five species of sea turtles occurring in or near North Atlantic right whale habitat are more susceptible to ship strikes than the other.

4.2.2 Alternative 2 – Dynamic Management Areas

4.2.2.1 Other Marine Mammals

Because DMAs are specifically based on sightings of right whale aggregations, implementation of a DMA would not significantly benefit other marine mammals, unless they occur within the waters of a DMA. As Alternative 2 does not target other marine mammals that occur in right whale habitat, it would only provide minimal spatial protective measures to reduce ship strikes to other marine mammal species.

4.2.2.2 Sea Turtles

Because DMAs are not specifically designed to protect sea turtles, the proposed measures contained in Alternative 2 would not significantly benefit sea turtles, unless they occur within the waters of a DMA. Boats would either route around this area or transit at a specific speed through the area, reducing the potential for a vessel collision with right whales. The chances of sea turtles occurring in these waters when a DMA is implemented are low; therefore, any benefit would be minimal.

4.2.3 Alternative 3 – Speed Restrictions in Designated Areas

4.2.3.1 Other Marine Mammals

Alternative 3 would have minor, indirect, long-term positive effects on other marine mammals. Reduced vessel speeds would provide protection for other species whose habitats overlap with right whales. Humpback, fin, and sperm whales are at risk of ship strikes and share similar habitat; therefore, speed reduction measures could also reduce ship strikes to other species of whales to the extent that they are found in the speed-restricted areas. Speed restrictions are protective because they may result in weaker hydrodynamic forces that pull animals toward vessels. Speed restrictions also increase the probability of sightings by the mariners and give animals and mariners more time to avoid interaction. The Off Race Point SAM zone as designated by the ALWTRP and proposed as a potential area for speed restrictions in Alternative 3 would have a positive effect on humpback, fin, and sei whales, which are sighted more in the Off Race Point area than in Cape Cod Bay. Slowing ships down would result in a lower occurrence of ship strikes and fewer fatal collisions. In 41 records of ship strikes where speed at the time of impact was known, no ship strikes were recorded below 10 knots and only 11 percent of ship strikes resulted in lethal or severe injuries when vessels were moving at 10 to 14 knots (Laist *et al*., 2001).

4.2.3.2 Sea Turtles

Speed restrictions would have minor, indirect, long-term, positive effects on sea turtles if they happen to occur in the designated speed restricted areas and are threatened with being struck by a ship. The factors influencing fewer serious injuries and deaths of right whales at lower speeds may have the same role in aiding turtles (Section 4.1.3). Therefore, the severity and occurrence of vessel collisions with sea turtles would likely be reduced.

4.2.4 Alternative 4 – Recommended Shipping Routes

4.2.4.1 Other Marine Mammals

Implementation of Alternative 4 could have minor, indirect, long-term, positive impacts on other marine mammals to the extent that their habitat overlaps with the occurrence of right whales in or around the lanes. Humpback, fin, sperm, and sei whales could potentially benefit from the implementation of shipping lanes. Recommended shipping routes and the ATBA redistribute ship traffic to avoid right whale aggregation areas. However, because these measures are specifically targeted toward reducing the risk to right whales, benefits would be less likely for other species.

If the proposed shift in the Boston TSS (Figure 2-15) were implemented, there would be indirect, long-term, positive impacts on humpback, fin, and sei whales, which are known to occur in this area based on thousands of observations of these species in the current TSS from whale watching platforms from 1979–2002. The proposed change in the TSS would shift the shipping lane north of an area that has a high density of whale sightings. The shift would result in an 81 percent[7] reduction of ships encountering other large whales. The ecological basis for the difference in whale densities is primarily due to the difference of substrate of this area. The substrate under the current TSS consists of a large percentage of sand, which supports the preferred forage species of these whales. The substrate on the seafloor of the proposed TSS consists of a large percentage of gravel and a lower percentage of sand, therefore reducing the availability of food in the proposed TSS and the occurrence of whales feeding in this area (SBNMS, *unpublished data*; Merrick, 2005). Further, narrowing the lanes reduces the overlap between large whales and ships. Therefore, the proposed changes to the TSS would result in a higher reduction in the probability of ship strikes of humpback, fin, minke, and sei whales than the recommended routes and the ATBA.

4.2.4.2 Sea Turtles

Implementation of the recommended shipping routes, TSS, and ATBA, included in Alternative 4 would have a minor, indirect, long-term, positive effect on sea turtles that also occur in these areas.

4.2.5 Alternative 5 – Combination of Alternatives

4.2.5.1 Other Marine Mammals

Implementation of Alternative 5 would have major, indirect, long-term, positive effects on other marine mammals because it proposes broad spatial and temporal speed restrictions that could potentially reduce the risk of vessel collisions with other marine mammals to the extent that their habitat overlaps with right whale habitat and/or restricted areas. Given that other marine mammals occur in right whale habitat, these measures would have some degree of positive effect on other species. As mentioned in Section 4.2.4.1, the shift in the TSS would have an indirect significant positive effect on other species of large whales that occur in these waters.

4.2.5.2 Sea Turtles

The combined measures described in Alternative 5, have the potential to have indirect, long-term, positive effects on sea turtles. Except for Alternative 1, the remaining Alternatives—2, 3, and 4—would have a modest positive impact on sea turtles, each reducing one factor of the risk of ship strike. Therefore, the combination of the same measures under Alternative 5 would

[7] This number also includes minke whale sightings.

potentially benefit endangered sea turtle species that have similar geographical ranges to right whales.

4.2.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

4.2.6.1 Other Marine Mammals

Alternative 6, the preferred alternative, would have indirect, long-term, positive effects on other marine mammals because it includes the following mitigation measures: speed restrictions, routing measures, and DMAs. Endangered fin and humpback whales would benefit the most from the implementation of the strategy's operational measures because they are the most commonly struck large whale species that occur in the western North Atlantic.

4.2.6.2 Sea Turtles

As with Alternative 5, implementing the operational measures contained in Alternative 6 could potentially have indirect, long-term, positive effects on sea turtles. Alternative 5 would result in a greater reduction in the risk of vessel collisions with sea turtles because speed restrictions are in place in larger areas and for longer time frames than would be provided under Alternative 6. However, Alternative 6 would provide some level of protection to sea turtles that occur within the SMAs and DMAs in this alternative.

4.3 Impacts on the Physical Environment

The following sections describe the impacts of the alternatives on bathymetry and substrate, water quality, air quality, and ocean noise. The assessment of the impacts on ocean noise is based on the assumption that engine noise levels generally decrease at reduced speeds. However, the relationship is not necessarily linear and is specific to vessel class and engine type. Different types of vessels generate varying noise levels at certain speeds. Also, even if the total energy (or sound) emitted is lower due to slower speeds, the vessels are transiting the ocean for a longer period of time, therefore there may be a greater overall input of energy into the ocean. It would be difficult to accurately test this assumption until after the measures are implemented, so until that time the impacts on ocean noise are reasonable expectations within the context of the assumption.

4.3.1 Alternative 1 – No Action Alternative

4.3.1.1 Bathymetry and Substrate

The No Action Alternative would have no impact on ocean bathymetry and substrate. This alternative maintains NOAA's current mitigation measures and does not propose any new regulatory measures. The current measures—aerial surveys, MSRS, outreach and education—have no effect on ocean bathymetry and substrate.

4.3.1.2 Water Quality

Implementing the No Action Alternative would have no impact on existing water quality and currents as described in Section 3.3.2. Alternative 1 does not propose any new regulatory measures that could affect water quality.

4.3.1.3 Air Quality

Implementing Alternative 1 would not alter the air quality parameters described in Section 3.3.3. Emissions from vessels would remain the same, with neither improvement nor degradation. Total vessel emissions are expected to increase over time with the predicted increase in commercial shipping in the future. Under the No Action Alternative, the minor, positive improvements in air quality that would accrue from reductions in ship speed in specified areas (Alternatives 2, 3, 5 and 6) would not occur.

4.3.1.4 Ocean Noise

Alternative 1 would have no impact on ocean noise because none of the nonregulatory ship strike mitigation measures included in this alternative have any effect on ocean noise levels. Further, most future research techniques or technological aides to prevent ship strikes are unlikely to generate significant negative environmental impacts on ocean noise levels. However, if technology developed in the future utilizes active sonar or otherwise creates noise in order to detect or deter right whales, then the requisite NMFS permitting process would be adhered to, which would address any environmental impacts at that time.

4.3.2 Alternative 2 – Dynamic Management Areas

4.3.2.1 Bathymetry and Substrate

None of the measures proposed in Alternative 2 would have an impact on bathymetry and substrate because right whale protection measures all occur at the ocean surface. DMAs are temporary restrictions triggered when a certain concentration of right whales is sighted. Vessels would either route around these areas or transit at reduced speed through the DMA. There are no physical restrictions associated with DMAs, and the restricted area only occurs on the water surface.

4.3.2.2 Water Quality

Implementing the right whale conservation measures in Alternative 2 would have negligible impacts on ocean water quality levels. Implementing a DMA would result in vessels changing course to navigate around the identified protection area or reducing speed through the area. The majority of right whales are found within 30 nm (55.6 km) of the coast (Knowlton *et al*., 2002). Therefore, most DMAs would be implemented within US territorial waters where vessels are prohibited from dumping untreated wastes that could reduce local water quality (as described in Section 3.3.2.3 and summarized in Table 3-5: US territorial seas extend to 12 nm [22 km] and the contiguous zone to 24 nm [44.5 km] from the coastline). Also supporting the likelihood that implementing DMAs would have little to no impact on water quality are that vessels would have been in the same general area with or without the DMA; the small area of DMAs (15 nm [27.8

km]); the temporary nature of these restrictions (15 days); and the minimal change in vessel operations and/or routes.

While creation of a DMA might result in vessels leaving US territorial seas to route around a DMA, the presence of the DMA does not affect the likelihood that the vessel captain would dump wastes into the ocean. Unless traveling along the coast within territorial waters, the vessel navigating around a DMA would be steaming outbound from ports where the captain could have disposed of wastes or inbound from zones where the captain would been able to dump wastes in accordance with US and MARPOL regulations.

There is a slight chance that vessels traveling along the coast within territorial waters might elect to dispose of wastes beyond territorial waters and the contiguous zone (24 nm [44.5 km]) if a DMA extended outside the limits. Beyond 24 nm (44.5 km), ships can discharge blackwater (sewage) and graywater (nonsewage wastewater). Discharging large quantities of untreated sewage in estuarine or shallow coastal waters might cause eutrophication, or an influx of high levels of nutrients that can lead to excessive plant growth, which depletes oxygen in the water. However, a small quantity of discharge offshore in the open ocean would have minimal effects on nutrient levels in the surrounding waters. Changes in water quality due to wastewater discharge would be limited to the immediate area of discharge, and effects would be short-term because the effluent would be diluted and dispersed (NPS, 2003).

There are several types of pollutants from marine engines that are released into the ocean. However, these pollutants would be widely dispersed in the ocean because the vessels are moving sources and water currents would transport and disperse the pollutants, thereby diluting the amount of pollutants in any given area. The effects of discharging oil are variable depending on the type, quantity and location of the spill, and can result in fatal or nonfatal long-term effects on animals and their habitat. Discharging bilge and ballast water that may include residual oil, lubricants, and fuel could potentially have a minor short term effect on water quality; however, discharge of these wastes is regulated (Section 3.3.2.3) (NPS, 2003).

Certain types of solid wastes may be disposed of outside of 12 nm (22.2 km) (Section 3.3.2.3), and should not have an adverse effect on water quality under this alternative, as there is a limited probability that implementing DMAs would result in an increase in the disposal of solid waste.

4.3.2.3 Air Quality

Implementing Alternative 2 would have minor, direct, short-term, positive impacts on air quality at sea. If a DMA is triggered, vessels would either transit around the area or reduce speed through the area. If the vessel reduces speed through the DMA, there would be a temporary reduction in smokestack emissions, or ship plume, emanating from the ships' engines. While slowing a ship's speed linearly increases the time of impact of a marine plume on a receptor and the emissions per mile, the amount of energy required to propel the ship through the water decreases as the cube of the speed (Section 3.3.3.3). Thus, the net effect of speed reductions would be to reduce the air emissions from each vessel affected as well as the total air emissions near the DMA precautionary area.

Another effect of reducing ship speed is that it increases the effective release height of the ship plume. This occurs because air movement around the stack tip is influenced by speed. The Briggs plume rise formula used by the US EPA in its regulatory air quality models indicates that the final height of the emissions is dependent on the inverse wind speed under unstable air dispersion conditions and the inverse cube root of wind speed under stable air mass conditions. That is, the slower the ship moves, the higher the final effective release height of emissions. For ground-/sea-based receptors, this translates into lowered concentrations of smokestack emissions from ships operating at slower speeds.

An on-going pollution prevention program in Los Angeles, California, is demonstrating that slowing vessels down reduces the amount of certain pollutants emitted during vessels operations. The Port of Los Angeles and the No Net Increase Task Force compiled a document that reviews initiatives and technologies to achieve no net increase in emissions from port-related activities. One of these measures is a voluntary speed reduction program (VSRP) that was implemented in 2001. A voluntary speed reduction (12 knots) within 20 nm (37 km) of the port is broadcast to captains calling at the Port of Los Angeles. Compliance in the first year was 48 percent, although this compliance represents any speed reduction from 22 knots (average speed without VSR), not necessarily a reduction to 12 knots. In 2005, approximately 70 percent of shipping lines calling at the ports were participating in the program (Port of Los Angeles, 2005).

With 100 percent compliance, the estimated reduction in NO_x emissions would be 57.6 percent for the main engine, although the auxiliary engine emissions are estimated to increase (6.7 percent). The reduction for PM_{10} would be 57 percent for the main engine, and an increase again for the auxiliary engine by 8.1 percent. Auxiliary engine emissions increase due to increased transit time because of slower speeds. In a press release dated August 17, 2005, the Port of Los Angeles announced that the VSRP decreased daily NO_x emissions by 1.1 tons, or 100 tons during the first quarter of 2005. There are plans to increase the compliance zone from 20 to 40 nm (37 to 74 km) (Port of Los Angeles, 2005).

Vessels routing around a DMA rather than slowing to go through it may add distance to their route but would remain at their customary speeds. This may cause the vessels to remain in the area longer, emitting engine exhausts; however, DMAs are temporary and should not occur more than several times a year in a particular area. Therefore, if vessels route around the DMA, overall, impacts on air quality over the affected parts of the ocean should be short-term and minimal.

4.3.2.4 Ocean Noise

Implementing the measures contained in Alternative 2 would potentially have minor, direct, short-term, positive effects on ocean noise levels. Implementation of a DMA would either temporarily redistribute noise around the precautionary area or reduce the level of noise if vessels transit through the area at a reduced speed. Depending on the type of engine, lower speeds generally result in lower noise emissions. In an EIS prepared by the National Park Service (NPS) on cruise ship quotas and operating requirements in Glacier Bay, Alaska, a study (*Underwater Noise Interim Report*), is cited which found that noise levels were considerably less when vessel speed limits were 10 knots, rather than 20 knots (Naval Surface Warfare Center [NSWC], 2000 *in* NPS, 2003).

4.3.3 Alternative 3 – Speed Restrictions in Designated Areas

4.3.3.1 Bathymetry and Substrate

None of the measures proposed in Alternative 3 would have an impact on bathymetry and substrate since they all take place on the ocean's surface. Slowing vessels down would result in less impact to surface water (slower speeds reduce the wake and bow wave), but this change would not affect the ocean floor.

4.3.3.2 Water Quality

Implementing the speed restrictions proposed in Alternative 3 would have negligible impacts on ocean water quality, as described in Section 4.3.2.2. Except for the seaward boundaries of the ALWTRP Seasonal Area Management [SAM] East zone, the MAUS speed restricted area, and the Southeast restricted waters, most of the speed restrictions in Alternative 3 would be within the US territorial sea and the contiguous zone where discharges of wastes are regulated by international and domestic laws and policies, as described in Section 3.3.2.3. In addition, slowing vessels would not cause vessels to discharge greater volumes of effluent than they would at normal sea speeds. Vessels would be present in speed-restricted areas for slightly longer amounts of time, and this might result in a slight increase in the number of times that wastes could be released in the speed-restricted areas. However, this slight increase is not expected to result in greater concentration of wastes in speed-restricted areas because it is expected that pollutants would disperse fairly rapidly because ships are moving sources and pollutants would be dispersed by normal ocean processes such as currents, temperature gradients, and upwelling.

4.3.3.3 Air Quality

As described for Alternative 2 (Section 4.3.2.3), speed restrictions would have direct, short-term, positive impacts on air quality in the affected areas of the ocean. While speed restrictions would result in vessels transiting the proposed areas for a longer period of time, the overall impact still would lead to reductions in vessel emissions. This was demonstrated in the Glacier Bay EIS air quality analysis, where daily and annual emissions from speed-restricted vessels were measured against existing ambient air quality levels (NPS, 2003).

4.3.3.4 Ocean Noise

Implementing the speed restrictions identified in Alternative 3 would potentially have direct, short- and long-term, positive impacts on the levels of ocean noise by reducing noise levels in the immediate areas when and where restrictions are proposed. As described in Section 4.3.2.4, most engines operate more quietly at slower speeds. Noise levels would be reduced in the NEUS year round, and temporarily in the MAUS from October 1 to April 30, and in the SEUS from December 1 through March 31.

Although reduced speeds would increase the amount of time vessels are transiting in shipping lanes and other speed-restricted areas, the area of ocean affected by underwater noise would be less. For example, a vessel traveling 10 to 14 knots is expected to generate sound over a smaller area than a vessel traveling 20 knots or faster because the louder noise generated at a higher speed radiates farther (NPS, 2003). Reduced speeds would directly benefit right whales (as well as other marine mammals) because quieter conditions would result in a reduction in masking.

Masking (described in Section 3.1.6.2) can interfere with right whales' ability to communicate and may even result in avoiding areas with high levels of ambient noise.

4.3.4 Alternative 4 – Recommended Shipping Routes

4.3.4.1 Bathymetry and Substrate

Implementing Alternative 4 would have no effect on bathymetry and substrate. Shifting the current, widely distributed vessel traffic in Cape Cod Bay and the ports of Brunswick, Fernandina, and Jacksonville to several recommended shipping routes would only affect surface waters and would not alter the seafloor or substrate. Furthermore, the PARS will identify navigational hazards, if any, and mariners use nautical charts that identify any such features. Restricting travel through the ATBA and shifting the Boston TSS would have no effect on the water column, ocean bottom features, or sediments.

4.3.4.2 Water Quality

Implementing Alternative 4 would have negligible impacts on water quality with the exception of the shipping routes outside 12 - 24 nm proposed for the ports of Jacksonville, Fernandina, and Brunswick where minor adverse impacts could potentially occur. While this alternative would not cause any net increase in the discharge of pollutants, the vessels and their discharges would be more concentrated in the proposed shipping routes in the NEUS and SEUS. Overall water quality in the port approach areas would not change but pollutants could be slightly more concentrated in the recommended shipping routes.

With respect to the proposed action, the main concern associated with an increase in water pollution is that it could affect right whale food sources and lead to increased levels of contaminants such as metals/leads and toxic substances collecting in right whale tissues. Increased levels of contaminants can have a direct effect on cetacean physiological systems, including reproduction, immune defense, endocrine system, and possibly neural functions that control social and migratory behavior (NMFS, 2005a); although no study has indicated contaminant levels are sufficiently high to compromise these systems in right whales. Indirect effects could entail the presence of pollutants in right whale prey. However, the recommended shipping routes would be located to avoid areas where right whales congregate, and this would include the areas where their prey is most likely to occur and to attract the whales. Therefore, the slight potential increase in the concentration of pollutants in the recommended shipping routes is not expected to adversely affect right whale food sources or to bioaccumulate in the right whales themselves. Any changes to water quality due to wastewater discharges would be limited to the area of discharge and would be short-term in nature because of the likely rapid dilution and dispersion.

Recommended shipping routes would not increase the risk of vessel-to-vessel collisions or accidental oil spills because the proposed lanes would be wide enough to allow vessels to avoid other vessels and the USCG reviewed the lanes for navigational safety through the PARS.

NEUS

Existing vessel traffic patterns in Cape Cod Bay would be altered[8] as a result of the recommended shipping routes that would officially concentrate vessel traffic inside the lane from January 1 to May 15. However, the proposed lanes are within the territorial sea (12 nm [22 km]) where Federal law regulates the discharge of sewage and other waste into the ocean (Section 3.3.2.3). Therefore, the discharge of untreated wastes in the shipping lanes in the Cape Cod Bay is prohibited, and there would be no adverse effects on water quality in the NEUS region.

Shifting the Boston TSS would have a negligible effect on water quality outside the territorial sea. A 12 degree northern rotation in the Boston TSS would add 3.75 nm (6.9 km) to the trip for vessels traveling to or from points south in the TSS (Figure 4-2) (Wiley, 2005 –*unpublished data*). This segment of the current TSS is completely within the contiguous zone and lies almost entirely within the territorial sea, where there are strict regulations on ocean dumping. The proposed shift would result in a slight increase in the section of the TSS that lies outside the territorial sea in the contiguous zone. While there are fewer restrictions with respect to vessel discharges outside of 12 nm (22 km) in the contiguous zone than within it, only a small section of the TSS would be affected. This alternative is not expected to change the number of vessels that use these lanes and would add only minutes to the trip. Furthermore, this shift would route vessels away from an area where whales are sighted frequently; therefore, any potential increase in pollution would be removed from high-density areas of whales.

SEUS

Implementing Alternative 4 could potentially have minimal, direct, short-term, adverse effects on water quality in the approaches to the ports of Brunswick or Fernandina. There is potential for a temporary increase in the concentration of pollution in portions of the recommended routes seaward of waters with pollution restrictions, (beyond 12-24 nm [22-44 km]) where pollution regulations are less stringent than in waters inshore of these limits. This would result from higher vessel traffic in the lanes between November 15 and April 15, when seasonal restrictions are in place. Although the shipping lanes would concentrate vessel traffic, it is unlikely that mariners would intentionally release waste in the lanes instead of other places and time during their voyage. As with proposed shipping lanes in Cape Cod Bay, the lanes in the SEUS were designed to avoid areas of high right whale density, therefore any potential increase in pollution or decrease in water quality would be outside important right whale aggregation areas.

4.3.4.3 Air Quality

Implementing Alternative 4 would not have a significant impact on air quality. If recommended shipping routes are heavily utilized then local air pollution may be concentrated at sea in these shipping lanes instead of dispersed throughout various routes. However, vessels are moving sources, and any emissions would be dispersed along with the forward motion of the vessel and other factors (Section 3.3.3.3) would influence the transport and dispersion of emissions.

[8] Northbound traffic enroute to Boston, Gulf of Maine or Canada would be shifted west, along with southbound traffic travelling to the Cape Cod Canal, and vessels enroute to or from Provincetown would be routed north-by-northwest then southeast (Russel *et al*., 2005)

Any increase in emission concentrations resulting from nearby ships would last only a few minutes either until the ship moves away or as the plume centerline moves away. The magnitude of the transient emissions is directly dependent on the distance from the ship. For average concentrations from ship emissions to increase, the shipping density would have to increase significantly in a sustained manner to the point where there would be a large aggregation of ships in the immediate area. Because vessels would be traveling in shipping lanes, the rules of navigation would prevent vessels from traveling or passing too close to other ships. Therefore, there should not be a significant change in air quality resulting from shipping lanes. Air quality in the ports would remain the same because the speed restrictions are only required seaward of the COLREGS line. There are more air quality issues in port areas because vessels are no longer moving and there is additional machinery that can pollute the air. The ATBA in the Great South Channel and the Boston TSS would not affect air quality either; these measures would merely redistribute emissions during the operational season (January 1 to April 30).

4.3.4.4 Ocean Noise

Implementing Alternative 4 would potentially have minimal, direct, short-term, adverse effects on ambient ocean noise levels in the proposed shipping lanes, but would have minor, positive, short-term, direct effects on ocean noise levels outside the shipping lanes where the vessels now transit in a more dispersed pattern. While this alternative would not alter the amount of noise, vessels would be concentrated in shipping lanes, which would redistribute the vessel noise into shipping lanes. This has the potential to temporarily increase ambient ocean noise levels within these shipping lanes. Conversely, this alternative would decrease ambient noise levels outside of the shipping lanes, where the whales are present. Therefore, this alternative would benefit right whales, because the majority of right whale sightings occur outside of the shipping lanes, where ambient noise levels would decrease. A decrease in ambient noise would lessen the effects of masking on right whale communication. The ATBA in the Great South Channel and the Boston TSS would not affect levels of ocean noise; these measures would merely temporarily redistribute vessel noise.

4.3.5 Alternative 5 – Combination of Measures

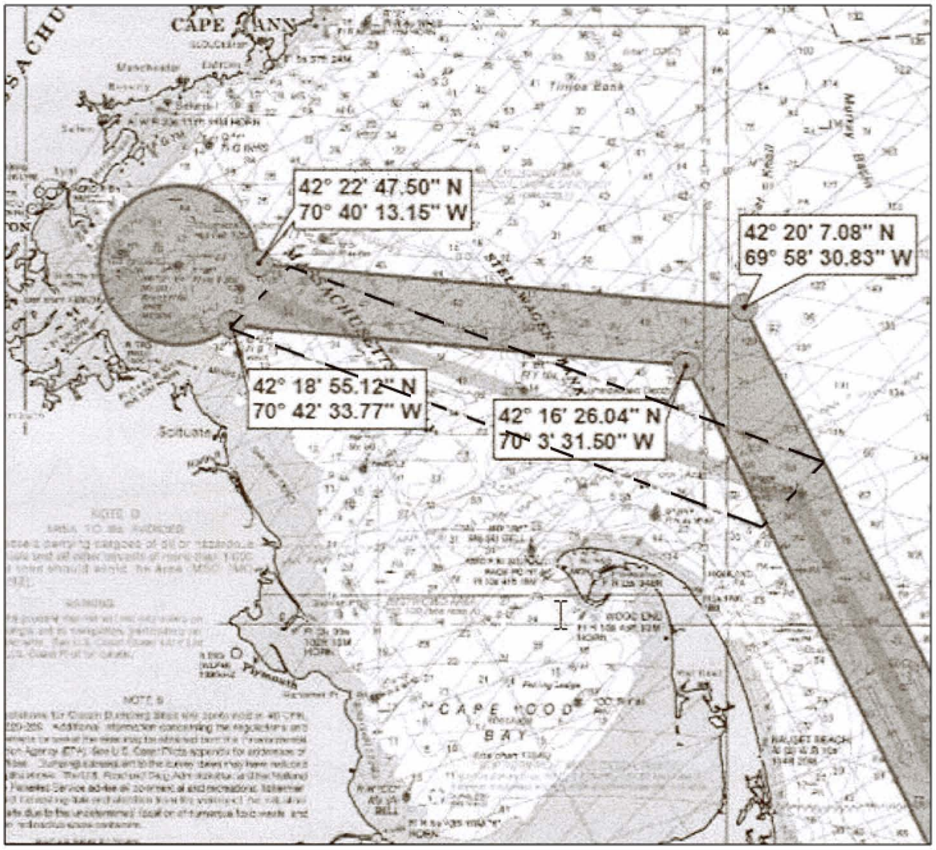
4.3.5.1 Bathymetry and Substrate

Alternative 5, which combines the measures from Alternative 1, 2, 3, and 4, would not have an impact on bathymetry and substrate. The combination of current mitigation measures, DMAs, speed restrictions, and recommended shipping routes would not affect the seafloor because all actions occur at the ocean surface.

4.3.5.2 Water Quality

Alternative 5 would have negligible to minor adverse impacts on water quality. Implementing the combination of alternatives that comprise Alternative 5 would have similar effects on water quality to those described for Alternatives 2, 3, and 4. Water quality impacts would be negligible with the exception of the proposed segments of shipping lanes in Brunswick, Fernandina, and Jacksonville that are seaward of 12 nm (22.2 km) and have the potential to concentrate vessel pollution instead of the pollutants' being distributed throughout various routes. This could have minor, adverse, short-term, direct effects on water quality in portions of the lanes that are located

The Current and Proposed Traffic Separation Scheme
in the Approach to Boston*



**Note: The current TSS is depicted with dashed lines and the proposed TSS is shaded. Coordinates identify endpoints for the proposed TSS.*	**Figure 4-2**

This Page Intentionally Left Blank

outside of waters with pollution regulations during the season when speed restrictions are proposed (see Section 3.3.2.3 for a description of the regulations).

While there may be an increase in the concentration of pollutants in portions of the designated lanes, the number of vessels transiting the area is not changing, therefore there would be no net increase in pollutants—only the distribution of pollutants would change. As previously described, shifting vessel traffic away from important right whale aggregation areas would have a positive impact on right whales by shifting the marine pollutants away from their habitat. Section 4.3.4.2 describes the impacts on plant and animal life from decreased water quality.

Existing regulations, DMAs, and speed restrictions would have a negligible impact on water quality for the reasons described under Alternative 1, 2, and 3. The recommended shipping routes in Cape Cod Bay are within the 12 nm (22 km) territorial sea; therefore, impacts on water quality in this area would be negligible.

4.3.5.3 Air Quality

Implementing Alternative 5 would have minor, direct, long-term, positive effects on air quality. Alternatives 2 and 3 have the potential to actually reduce vessel emissions by slowing vessels, which would improve air quality. Alternative 4 would have neutral effects on air quality because even though emissions would be concentrated in the shipping lanes instead of being dispersed throughout various approaches to the ports, there would be no change in the actual amount of emissions. Therefore, there is a potential for minor positive effects on air quality. Furthermore, since Alternative 5 would result in speed restrictions within the shipping lanes in the SEUS, and research shows that slowing vessels can reduce emissions from certain vessel types, the reduced emissions at slower speeds may counter the increase in concentration of emissions in the lanes (Section 4.3.2.3).

4.3.5.4 Ocean Noise

On balance, implementing Alternative 5 would potentially have minimal, direct, long-term, slightly positive effects on ocean noise levels. Alternative 2 would have no impact or a slight positive impact on noise levels. Alternative 3 would have a positive effect by reducing noise levels, potentially canceling out the minor adverse effect of Alternative 4. Any changes in ocean noise levels resulting from implementing Alternative 5 would be minor.

4.3.6 Alternative 6 (Preferred) –Right Whale Ship Strike Reduction Strategy

4.3.6.1 Bathymetry and Substrate

Alternative 6 contains the operational measures described in NOAA's right whale ship strike reduction strategy. These measures include DMAs, speed restrictions in the Great South Channel, Off Race Point, and Cape Cod Bay management areas, recommended shipping routes in the NEUS and SEUS with uniform speed restriction, and SMAs 30 nm (56 km) around ports in the mid-Atlantic. Implementing Alternative 6 would not affect bathymetry and substrate in the areas affected because all of the operational measures occur at the ocean surface.

4.3.6.2 Water Quality

Implementing Alternative 6 would have negligible effects on water quality, with the exception of the proposed segments of shipping lanes in Brunswick, Fernandina and Jacksonville that are seaward of 12 nm (22 km) and have the potential to concentrate vessel pollution instead of the pollutants' being distributed throughout various routes. This could have minor, direct, short-term, adverse effects on water quality in portions of the lanes that are located outside of waters with pollution regulations during the season when speed restrictions are proposed (see Section 3.3.2.3 for a description of the regulations).

While there may be an increase in the concentration of pollutants in portions of the designated lanes, the number of vessels transiting the area is not changing, therefore there would be no net increase in pollutants—only the distribution of pollutants would change. As previously described, shifting vessel traffic away from important right whale aggregation areas would have a positive impact on right whales by shifting the marine pollutants away from their habitat. Section 4.3.4.2 describes the impacts on plant and animal life from decreased water quality.

Existing regulations, DMAs, and speed restrictions would not have a measurable impact on water quality for the aforementioned reasons in Alternatives 1–3. The recommended shipping routes in Cape Cod Bay are within the 12 nm (22 km) territorial sea; therefore, no impacts on water quality are foreseen in this area.

4.3.6.3 Air Quality

The speed restrictions proposed under Alternative 6 would have minor, direct, long-term, positive impacts on air quality in the vicinity of the proposed SMAs, DMAs, critical habitat, and shipping lanes by slowing vessel speeds, thus reducing vessel air emissions. Research shows that slowing vessels can reduce emissions from certain vessel types and that the reduced emissions at slower speeds might counter the increase in concentration of emissions in the shipping lanes (Section 4.3.2.3).

There may be localized effects on air quality in some locations if vessels divert to alternate ports, depending on what mode of secondary transportation is needed to transfer the cargo to its destination. However, as discussed in Section 4.4.3, only a small percentage of vessels are estimated to divert to other ports. Some of these adverse effects could be mitigated by engine modifications.

4.3.6.4 Ocean Noise

Implementing Alternative 6 would potentially lower noise levels in areas where ship speeds would be reduced resulting in minor, direct, long-term, positive impacts on ocean noise levels in the affected areas. The SMAs proposed in 30-nm (56 km) buffers around ports in the MAUS would have a direct positive effect on ocean noise. Vessels would slow to 10-, 12-, or 14-knot speeds in these buffer zones around the port areas, effectively reducing the amount of noise generated. SMAs would not concentrate ships into lanes so that ship noise would remain widely distributed but lower in volume. Although reduced speeds would increase the amount of time vessels are transiting in SMAs, the magnitude of underwater noise at any one point would be less.

As described in Section 4.3.2.4, DMAs would not have an effect on levels of ocean noise. Vessels 65 feet and greater would reduce speed through the Great South Channel management area and critical habitat, which would reduce levels of ocean noise in these areas.

Alternative 6 would result in ocean noise being redistributed in the areas that have recommended routes for shipping traffic: Cape Cod Bay off Massachusetts, Jacksonville and Fernandina in Florida, and Brunswick, Georgia. Vessel noise would be concentrated in shipping lanes. However, because Alternative 6 proposes speed restrictions in these lanes as well, the overall level of noise would be reduced because slower speeds generate less noise. Alternative 6 would also reduce noise levels in areas outside of the shipping lanes where the vessels previously transited. Furthermore, noise would be substantially reduced in areas outside the shipping lanes, where right whale sightings are more dense.

4.4 Impacts on the Socioeconomic Environment

Section 4.4 describes the potential impacts of the alternatives on the maritime community, including port areas and vessel operations, and is divided into the following sections:

Section 4.4.1 describes the economic impacts on the maritime shipping industry of the US East Coast. The impacts in this section are focused on vessels that have one port of call on the East Coast. Port areas and vessel operations are discussed concurrently because the impacts are shared by both the shipping companies and port facilities.

Section 4.4.2 describes the additional direct economic impacts on the shipping industry due to vessels that make two to three stops along the East Coast in one trip, and vessels involved in coastwise shipping. Only alternatives 3, 5, and 6 would affect these multi-port vessel strings; alternatives 2 and 4 do not result in additional direct impacts on the operations of these vessels.

Section 4.4.3 describes any indirect impacts resulting from the alternatives. Potential indirect impacts include diversion of traffic to other ports, increased intermodal costs due to missed rail and truck connections, and impacts on local economies.

Sections 4.4.4 to 4.4.8 describe the impacts on commercial fishing vessels, passenger vessels, whale watching vessels, charter vessels, and environmental justice communities, respectively.

As stated in Chapters 2 and 3, this DEIS analyzes three alternative speeds: 10, 12, and 14 knots. As 12 knots is in the middle of this range, it is used as the base case scenario for impacts in this Section. Therefore, all economic impacts reflect a 12-knot speed restriction unless otherwise stated. Generally, the total impacts at 10 and 14 knots are also provided in the discussion for each alternative, and then the details of the direct impacts of alternate speeds on the shipping industry by port area and alternative are provided in Section 4.4.1.8. A summary of the direct and indirect impacts on all maritime sectors is provided in Section 4.4.7.7.

4.4.1 Direct Impacts on Port Areas and Vessel Operations

4.4.1.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, the shipping industry would be unaffected beyond measures already in place and would not incur any additional economic impacts. The MSRS would remain in place to inform participating mariners of the presence of whales, and NMFS would continue to provide right whale sighting and avoidance information to NOS, so they can update the US Coast Pilot books annually. Hence, there is no direct economic impact associated with this alternative.

The No Action Alternative would not have any impact on port operations in any of the three regions. The MSRS and local notice to mariners are the only existing operational measures that are port-related; however, they have no economic or other impacts on port operations. Although reporting is mandatory, compliance with speed advisories under the MSRS is voluntary, and the announcements broadcasted via the local notice to mariners are used at the mariner's discretion.

4.4.1.2 Alternative 2 – Dynamic Management Areas

Alternative 2 would have a direct negative economic impact on vessel operations, estimated at $9.8 million in 2003 and $10.8 million in 2004. The triggers for a DMA and the resulting precautionary area are described in Section 2.2.2. DMAs would be implemented at any time of the year depending on whale sightings. Assumptions were made to estimate the number of days per year that DMAs would be effective in each port area based on research conducted on the frequency, timing, and location of whale sightings. The following two paragraphs explain the research on which these assumptions are based.

A report written by Russell *et al*. (2005) estimated the annual expected duration of DMAs in the Northeast region and the Block Island Sound portions of the mid-Atlantic region.[9] However, in calculating the incidence of DMAs, this report assumed that seasonal speed restrictions in designated areas, including SMAs, would be in effect.[10] Hence, the incidences of DMAs contained in the report are only those that would occur outside of proposed SMAs. For the southern Gulf of Maine, the report estimated an average of 2.3 DMAs per year. The economic analysis for this EIS rounded this estimate up to an expected incidence of three DMAs per year (45 effective days) outside of the assumed speed restriction periods. It was also assumed that DMAs would be implemented for 50 percent of the time that speed restrictions are proposed for the Boston shipping lanes near Race Point (April 1–May 15), or an additional 23 days.

One might assume that DMAs would be effective for 100 percent of the proposed speed restriction periods; however, the location specific nature of the DMAs means that some DMAs that would have been implemented during periods with seasonal speed restriction would not fall within normal shipping lanes. Recent research on right whale sightings from 1978 through 2003 shows that many of the sightings after May appear to be more centrally located within the Great

[9] This reference is based on the May 2005 revised report, although there are also references to the original report (Russell *et al*., 2003).

[10] The report assumed the following seasonal speed restricted periods: Great South Channel, April 1-July 31; Cape Cod Bay critical habitat, January 1-April 30; portion of Boston shipping lanes near Race Point, April 1-May 15; offshore approaches to Block Island Sound, September-October and February-April; approaches to the ports of NY/NJ, September-October and February-April.

South Channel critical habitat and would be west of normal shipping lanes (Merrick, 2005). Hence, as can be seen in Table 4-1, the economic impact analysis assumes 68 effective days per year for DMAs in the Northeast region (excluding Cape Cod Bay).

Table 4-1
Effective DMA Days by Port Area

Port Area	Effective DMA Days
NEUS – (except Cape Cod Bay)	68
NEUS – Cape Cod Bay	105
MAUS (except Savannah, GA)	15
SEUS and Savannah, GA	75

Source: Nathan and Associates

For Cape Cod Bay in the NEUS region, the abovementioned report shows an average of 0.8 DMAs per year for Cape Cod Bay outside of the seasonal ATBA period of January 1–April 30. This number has been rounded up to one per year (15 days). Due to the concentration of right whale sightings in Cape Cod Bay, it is assumed that DMAs would have also been implemented for 75 percent of the seasonal ATBA that would affect shipping lanes, or an additional 90 days of effective DMAs. Hence 105 effective DMA days have been assumed for Cape Cod Bay.

For the MAUS region, a report by Knowlton *et al*. (2002) provides information on the spatial and temporal distribution of right whale sightings. Data from 1970 through 2002 were used for this study. With the exception of Savannah, all port areas showed an average of less than one right whale sighting per year. For the economic impact analysis, one DMA period per year (15 days) is assumed for each port in the mid-Atlantic region (except for Savannah). For Savannah, 75 days per year are assumed as specified in the following discussion of the Southeast region.

For the SEUS region, a recent NMFS internal draft report was utilized to identify the incidence of DMAs in shipping lanes. The report uses data on right whale sightings from 1992–2001. The concentration of right whale sightings appears consistent with the proposed seasonal speed restriction period of November 15–April 15. As previously discussed for the NEUS region, not all DMAs implemented in the region will affect the shipping lanes into Southeast ports. For the Southeast region and Savannah, it is assumed that DMAs would be implemented for 50 percent of proposed seasonal speed restriction period or 75 days per year.

Alternative 2 would not have adverse effects on port operations because there are no permanent locations for DMA restrictions, and this particular measure is not aimed specifically at reducing risk in port areas. There is a slight chance that one or more DMAs would be implemented in the vicinity of a port area. In this case, vessels would route around the DMA or transit through it at a slow speed. These restrictions would be in place for approximately 15 days, and would only be continued if whales were still sighted in the area.

Direct Economic Impacts of Alternative 2

In all regions, mariners would be required to either proceed through a DMA at a restricted speed or route around the DMA. The direct impact of a DMA on vessel operations is the increased time required to transit through the DMA at the restricted speed. For a vessel with an average operating speed of 14 knots, it would normally be possible to cover the 39.6 nm (73 km) of a DMA in 170 minutes. With a speed restriction of 12 knots, covering the distance would take 198 minutes, an increase of 28 minutes. At a 10-knot speed restriction, it would take 238 minutes, or nearly four hours to cover the distance. In addition, vessels would need time to slow to the restricted speed prior to entering the DMA and time to speed up after leaving the DMA. A vessel with an average operating speed of 14 knots would take eight additional minutes to slow down to 12 knots and speedup for a total delay of 36 minutes.

For the economic impact analysis, it has been assumed that most vessels would opt to proceed through a DMA with a speed restriction of 12 knots rather than to route around the DMA. At an average speed of 14 knots, a vessel would incur a delay of 170 minutes to route the extra 39.6 nm (73 km) around the two sides of the square that circumscribes a DMA, as compared to the 36-minute delay to go through the DMA at the restricted speed.

Only vessels with an average operating speed in excess of 21 knots would benefit from routing around the DMA instead of proceeding through at a restricted speed of 12 knots. For example, a vessel with an average operating speed of 24 knots would incur a delay of 99 minutes to route around a DMA as compared to a delay of 129 minutes to pass through the DMA.

With a speed restriction of 10 knots, vessels with an average operating speed in excess of 18 knots would benefit from routing around the DMA. Routing around the DMA would take an additional 132 minutes, whereas going through the DMA at 10 knots would take 238 minutes

Because NMFS would draw a square around each circular DMA buffer zone (in order to issue coordinates of the corners to mariners), the position of the DMA relative to the vessel routing alters the effective distance to be traveled. For example, a vessel that would route diagonally through the DMA square would have to traverse 56 nm (104 km) at the restricted speed rather than the 39.6 nm for a vessel crossing the DMA at the mid-points of each side of the square. This phenomenon is perhaps offset by the fact that some vessels' routes will require them to pass only through a portion of a DMA. The economic analysis assumes that vessels would have to traverse an average of 39.6 nm (73 km) for each DMA.

Data Chart 4-1 presents the direct economic impact of DMAs at a 12-knot speed restriction on the shipping industry in 2003. The total direct economic impact is estimated at $9.8 million with the port area of Savannah being the most affected at $2.8 million. Port Canaveral is second at $1.5 million, followed by the port areas of New York/New Jersey at $1.2 million and Jacksonville at $1.1 million. The direct economic impact for these four port areas totals $6.6 million or 66.7 percent of the total for this alternative.

In the NEUS region, the port area of Boston has the greatest direct economic impact, estimated at $0.3 million in 2003. The port area of Portland has an estimated impact of $0.2 million.

Overall, under Alternative 2, containerships account for 50.3 percent of the total direct economic impact with an estimate of $5.0 million. The vessel type with the next largest economic impact is passenger vessels at $2.0 million followed by ro-ro (roll-on-roll-off) cargo ships at $1.1 million. The port area of Port Canaveral accounts for 70 percent of the economic impact incurred by passenger vessels at $1.4 million.

Data Chart 4-1
Alternative 2: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2003 ($000s)

Port Area	Bulk Carriers	Combinat ion Carriers	Containers hips	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	1.0	-	5.7	-	12.5	-	-	-	-	-	-	-	19.2
Searsport, ME	0.6	0.2	-	-	-	148.7	-	0.1	4.5	22.2	-	-	176.4
Portland, ME	6.0	4.3	8.2	0.3	15.4	48.3	-	9.7	1.1	132.5	-	-	225.7
Portsmouth, NH	7.3	0.5	-	-	6.1	1.3	-	-	0.4	30.9	-	-	46.5
Northeastern US - Off Race Point													
Boston, MA	2.9	0.1	97.0	0.1	2.2	125.1	2.9	6.0	-	54.3	-	-	290.7
Salem, MA	1.1	-	-	-	-	1.3	-	-	-	0.3	-	-	2.8
Northeastern US - Cape Cod Bay	-	-	-	-	-	5.2	-	-	-	1.5	-	-	6.7
Mid-Atlantic Block Island Sound													
New Bedford, MA	2.0	-	0.0	-	1.0	-	1.8	-	0.1	0.5	-	-	5.4
Providence, RI	1.8	0.1	0.1	-	1.6	17.2	0.7	9.7	0.1	7.4	-	-	38.7
New London, CT	0.5	-	0.6	-	2.2	9.4	-	-	2.4	0.5	-	-	15.6
New Haven, CT	1.2	0.1	0.3	0.1	4.6	1.5	-	-	10.0	11.0	-	-	28.8
Bridgeport, CT	1.2	-	0.0	0.0	0.0	1.2	2.9	-	7.1	2.1	-	-	14.5
Long Island, NY	-	0.1	-	0.0	-	9.4	-	-	20.9	12.2	-	-	42.6
Mid-Atlantic Ports of New York/New Jersey	9.4	2.1	772.8	0.0	5.9	125.9	8.5	130.7	1.1	101.4	-	-	1,157.8
Mid-Atlantic Delaware Bay	6.3	1.1	82.6	1.0	14.2	11.8	105.4	18.2	0.5	71.0	-	-	312.2
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	9.6	0.4	100.0	-	24.1	20.6	1.2	114.5	0.3	12.3	-	-	282.9
Hampton Roads, VA	10.1	1.7	567.4	0.0	13.7	15.5	0.2	47.8	0.1	13.9	-	-	670.4
Mid-Atlantic Morehead City and Beaufort, NC	0.6	-	3.0	-	3.0	-	0.2	0.3	-	2.3	-	-	9.4
Mid-Atlantic Wilmington, NC	1.8	0.3	27.3	-	18.5	-	0.2	6.2	0.8	14.6	-	-	69.7
Mid-Atlantic Georgetown, SC	0.8	-	0.2	-	4.2	-	-	-	-	-	-	-	5.2
Mid-Atlantic Charleston, SC	3.7	0.0	501.1	-	16.7	18.8	1.2	37.4	0.7	13.4	-	-	593.1
Mid-Atlantic Savannah, GA	21.9	2.3	2,318.3	-	145.1	11.4	42.3	166.7	0.9	98.9	-	-	2,807.7
Southeastern US													
Brunswick, GA	4.7	-	34.6	-	41.9	1.5	14.8	201.4	-	1.2	-	-	300.1
Fernandina, FL	1.4	-	30.5	0.0	43.0	2.9	41.9	2.4	-	0.4	-	-	122.5
Jacksonville, FL	23.4	0.7	389.6	57.9	78.9	24.1	12.1	371.5	2.3	93.7	-	-	1,054.3
Port Canaveral, FL	7.3	0.2	16.3	0.0	34.3	1,418.1	35.1	20.6	0.8	8.9	-	-	1,541.6
Total	126.8	14.2	4,955.7	59.6	489.1	2,019.1	271.3	1,143.1	54.0	707.5	-	-	9,840.3

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-2 presents the direct economic impact of Alternative 2 at 12 knots, estimated for 2004. The total economic impact would be $10.8 million, roughly 10 percent higher than in 2003. This is due to the overall increase in US East Coast vessel arrivals of 7.3 percent in 2004, and particularly, the 12.3 percent growth in vessel arrivals in the SEUS region, which is more affected by DMAs. The rankings by port area and vessel type are the same as described for 2003 above. Figure 4-3 presents graphically the direct economic impact by port area for 2003 and 2004.

At a 10-knot speed restriction, Alternative 2 would result in an economic impact of $17.0 million in 2004. At 14 knots, the economic impact was estimated at $6.5 million in 2004. See Data Chart 4-22 for the economic impact of 10, 12, and 14 knots by port area.

4.4.1.3 Alternative 3 – Speed Restrictions in Designated Areas

Implementing Alternative 3 would have a direct, long-term, adverse economic impact on vessel operations. Based on shipping industry activity in 2003 and 2004 with a 12-knot speed restriction, direct economic impacts would total an estimated $50.5 million for 2003 and $53.9 million in 2004. The geographic areas and time periods in which speed restrictions would be implemented in each region are detailed in the description of Alternative 3 in Section 2.2.3. The effective proposed speed restriction periods for each port area are depicted in Figure 4-4. For all port areas in the NEUS region, the restrictions would be effective year-round (365 days). Speed restrictions would be in place for 212 days per year in the MAUS region, and 121 days per year for port areas in the SEUS region.

As described in Chapter 3, the USCG Vessel Arrival database and ancillary data sets provide information on all vessel arrivals of 150 GRT or greater at US ports. Information in the database regarding the date of vessel arrival was used to determine the number of vessel arrivals in 2003 and 2004 that would have occurred during the proposed seasonal speed restriction periods for each port area.

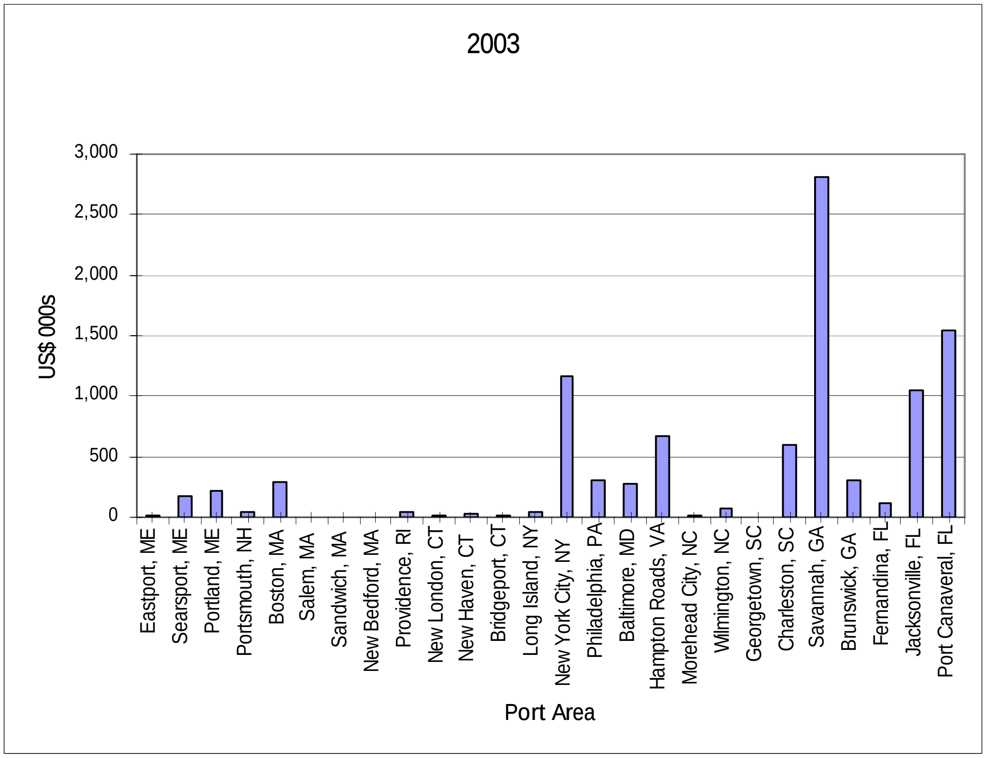
Data Chart 4-3 presents US East Coast arrivals of vessels for 2003 during the periods when speed restrictions are proposed for each port area. In 2003 there were 14,603 vessel arrivals during speed restricted periods, approximately 57 percent of the total of 25,532 arrivals for 2003. While there is some seasonality in US East Coast vessel arrivals, the proposed periods of speed restrictions include both peak periods and nonpeak periods, and hence the percentage of restricted arrivals corresponds closely to the percentage of speed restricted days per year.

The port area of New York/New Jersey had the most vessel arrivals during speed restricted periods with 3,103 arrivals in 2003 followed by the port areas of Hampton Roads (1,529), Philadelphia (1,521 arrivals), Savannah (1,368 arrivals), Charleston (1,343 arrivals) and Baltimore (1,085 arrivals).[11] These six port areas accounted for 68.1 percent of the total US vessel arrivals during speed restricted periods.

In terms of vessel type, containerships recorded the most vessel arrivals during the proposed speed restricted periods with 4,900 arrivals in 2003. Tankers were the next most frequent with 3,458 arrivals followed by bulk carriers with 1,636 arrivals and ro-ro cargo ships with 1,632 arrivals.

[11] The port area of Philadelphia, which includes Wilmington, DE, is included in the data presented for the port region of Mid-Atlantic Delaware Bay in tables in this chapter.

Alternative 2: Direct Economic Impact on the Shipping Industry by Port Area, 2003 and 2004 ($000s)



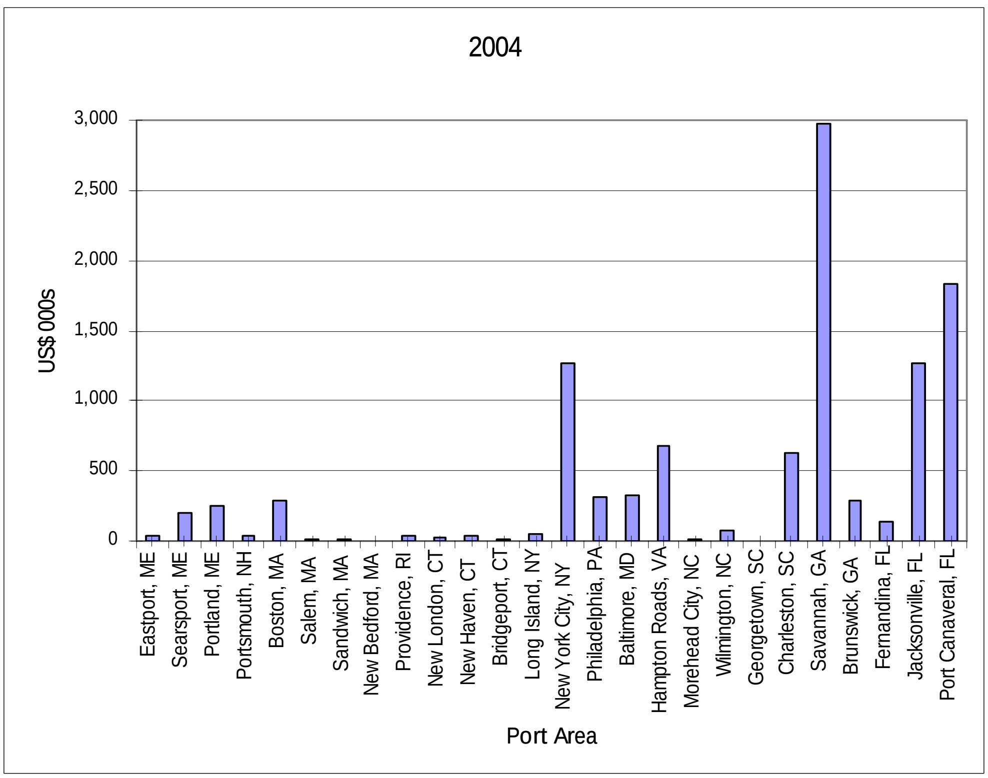


Figure 4-3

This Page Intentionally Left Blank

Alternative 3: Proposed Seasonal Speed Restrictions by Port Area

Source: NOAA.

Figure 4-4

This Page Intentionally Left Blank

Data Chart 4-2
Alternative 2: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2004 ($000s)

Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	1.3	-	5.8	-	27.6	-	-	-	-	-	-	-	34.7
Searsport, ME	0.4	-	4.5	0.2	0.5	168.1	-	0.4	2.2	21.2	-	-	197.7
Portland, ME	6.5	1.2	4.4	0.3	16.6	67.7	-	7.2	5.2	139.8	-	-	249.1
Portsmouth, NH	5.8	0.3	0.1	-	9.8	1.3	-	-	0.2	23.1	-	-	40.7
Northeastern US - Off Race Point													
Boston, MA	2.9	0.1	97.0	0.1	2.2	125.1	2.9	6.0	-	54.3	-	-	290.7
Salem, MA	1.3	-	-	-	-	11.5	-	-	-	-	-	-	12.9
Northeastern US - Cape Cod Bay	-	-	-	-	-	10.5	-	-	0.1	2.4	-	-	12.9
Mid-Atlantic Block Island Sound													
New Bedford, MA	1.9	-	-	-	0.9	0.6	1.3	0.1	-	0.5	-	-	5.2
Providence, RI	1.6	0.1	-	-	1.7	22.6	-	7.9	0.2	5.7	-	-	39.8
New London, CT	0.4	-	2.4	-	6.6	17.5	-	-	2.5	0.6	-	-	30.0
New Haven, CT	1.1	-	1.0	0.0	4.1	-	-	-	18.7	8.4	-	-	33.3
Bridgeport, CT	2.0	-	-	0.0	0.0	1.2	1.1	-	10.0	1.1	-	-	15.4
Long Island, NY	-	-	-	0.0	-	11.2	-	-	24.3	12.5	-	-	47.9
Mid-Atlantic Ports of New York/New Jersey	8.3	1.2	803.9	-	9.6	204.9	9.0	133.5	0.9	98.6	-	-	1,270.1
Mid-Atlantic Delaware Bay	7.9	0.4	79.5	1.5	21.6	15.4	98.3	18.4	0.2	76.4	-	-	319.6
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	12.5	0.3	111.7	-	25.6	37.7	2.2	117.4	0.2	19.2	-	-	326.8
Hampton Roads, VA	14.1	1.3	559.3	0.1	15.8	29.5	4.2	43.7	0.3	15.7	-	-	684.1
Mid-Atlantic Morehead City and Beaufort, NC	1.0	0.0	3.3	-	2.0	2.1	-	-	-	3.1	-	-	11.6
Mid-Atlantic Wilmington, NC	2.3	0.1	25.3	0.2	20.2	1.8	0.2	7.4	0.4	15.2	-	-	73.0
Mid-Atlantic Georgetown, SC	0.7	0.0	0.6	-	3.0	0.3	-	-	-	-	-	-	4.6
Mid-Atlantic Charleston, SC	3.9	0.1	527.5	0.3	21.8	24.3	1.5	35.0	0.6	13.1	-	-	628.0
Mid-Atlantic Savannah, GA	23.7	1.7	2,360.3	0.4	147.3	73.2	59.9	186.0	0.7	116.0	-	-	2,969.3
Southeastern US													
Brunswick, GA	5.7	-	12.4	-	44.9	11.7	13.3	201.1	-	0.3	-	-	289.4
Fernandina, FL	1.6	-	34.4	0.3	48.9	27.9	17.8	2.3	-	-	-	-	133.1
Jacksonville, FL	28.0	1.2	393.4	49.8	94.6	198.4	13.5	385.8	4.5	96.3	-	-	1,265.6
Port Canaveral, FL	12.0	-	18.8	0.1	49.0	1,674.5	29.0	28.0	3.9	15.1	-	-	1,830.5
Total	147.0	8.1	5,045.7	53.3	574.4	2,738.9	254.4	1,180.1	75.2	738.7	-	-	10,815.9

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-3
Alternative 3: US East Coast Restricted Vessel Arrivals by Port Area and Vessel Type, 2003

	Vessel Type												
Port Area	Bulk Carrier	Combination Carrier	Container Ship	Freight Barge	General Dry Cargo Ship	Passenger Ship	Refrigerated Cargo Ship	Ro-Ro Cargo Ship	Tank Barge	Tanker	Towing Vessel	Other a/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	16	-	5	-	19	-	-	-	-	-	-	-	40
Searsport, ME	14	1	-	-	-	66	-	1	23	89	2	-	196
Portland, ME	66	14	9	1	38	19	-	58	6	396	11	2	620
Portsmouth, NH	63	3	-	-	10	1	-	-	2	117	1	2	199
Northeastern US - Off Race Point													
Salem, MA	7	-	-	-	-	1	-	-	-	1	-	-	9
Boston, MA	34	1	77	2	8	94	4	33	-	225	1	4	483
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	9	-	-	-	13	-	-	22
Mid-Atlantic Block Island Sound													
New Bedford, MA	36	-	1	-	16	-	5	-	4	7			69
Providence, RI	49	1		-	13	14	3	45	1	74	1	1	202
New London, CT	12	-	2	-	4	20	-	-	47	5	1	-	91
New Haven, CT	38	-	1	1	17	2	-	-	152	110	10	-	331
Bridgeport, CT	17	-	-	2	2	1	32	-	108	30	-	-	192
Long Island, NY	-	1	-	2	-	19	-	-	318	144	2	1	487
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	209	19	1,381	1	31	53	14	405	25	950	11	4	3,103
Mid-Atlantic Delaware Bay													
Philadelphia, PA	206	7	287	6	131	16	266	85	11	493	12	1	1,521
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	188	6	217	-	107	22	3	401	2	122	5	12	1,085
Hampton Roads, VA	193	14	1,006	1	76	14	1	92	1	122	2	7	1,529
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	15	-	9	-	20	-	1	2	-	22	-	2	71
Mid-Atlantic Wilmington, NC													
Wilmington, NC	66	4	54	-	76	-	1	12	13	142	1	-	369
Mid-Atlantic Georgetown, SC													
Georgetown, SC	26	-	1	-	6	-	-	-	-	-	-	1	34
Mid-Atlantic Charleston, SC													
Charleston, SC	100	-	873	-	58	28	3	136	13	118	12	2	1,343
Mid-Atlantic Savannah, GA													
Savannah, GA	166	7	769	-	137	4	5	94	4	177	3	2	1,368
Southeastern US													
Brunswick, GA	28	-	9	-	11	1	4	84	-	-	-	-	137
Fernandina, FL	3	-	37	1	31	1	12	-	-	-	6	-	91
Jacksonville, FL	51	-	156	59	75	4	2	172	6	93	92	4	714
Port Canaveral, FL	33	-	6	7	26	173	24	12	2	8	6		297
All Port Regions	1,636	78	4,900	83	912	562	380	1,632	738	3,458	179	45	14,603

a/ Other includes fishing vessels, industrial vessels, research vessels, school ships.

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

In 2004, there were 15,444 vessel arrivals at US East Coast ports during the periods when speed restrictions are proposed for each port area, an increase of 5.8 percent over 2003 (Data Chart 4-4). The increase is lower than the 7.3 percent shown for total US East Coast vessel arrivals in Chapter 3 (Section 3.4.1.4) for several reasons. First, the SEUS region which recorded an increase of 12.3 percent in total vessel arrivals in 2004 is the region with the fewest speed restricted days. Second, the port area of New York/New Jersey with the largest number of annual vessel arrivals recorded a growth of less than 0.4 percent in vessel arrivals during proposed speed restricted periods.

Data Chart 4-5 presents the basis for determining the effective distance that speed restrictions would apply for each port area. The location of these areas is described in Section 2.2.3. The following paragraphs discuss the effective distance for the different port areas.

For port areas in the mid-Atlantic region, Alternative 3 specifies that speed restrictions would extend 25 nm (46 km) from the coastline. However, independent researchers and stakeholders have indicated that due to vessel operating practices, the effective distance of the proposed seasonal speed restrictions may be less than distances specified in the operational measures. This is because at most port areas, vessels already slow down to 8–10 knots at the pilot buoy for the pilot to board the vessel. In most instances, the proximity of the pilot buoys to the shore makes it impractical for the vessel to resume normal operating speed. Thus, the effective distance over which the proposed seasonal speed restrictions would apply is lessened by the distance of the pilot buoy from the shore. The location of the pilot buoy relative to the harbor baseline or closing line is shown in Data Chart 4-5. For example, the pilot buoy for the port area of New York/New Jersey is 6.8 nm (12.6 km) from the harbor baseline. Thus, the distance from the edge of the speed restricted area to the pilot buoy is only 18.2 nm (33.7 km).

It should be noted, however, that for the port area of New York/New Jersey and most other US East Coast port areas, vessels do not approach the port directly perpendicular to the coastline. Rather, mariners approaching from the north or south approach the port more on a diagonal routing. For purposes of the economic impact analysis, it is assumed that vessels would travel through the speed restricted areas on a 45 degree routing until they reach the pilot buoy. Thus, for the port area of New York/New Jersey it is assumed that vessel would traverse 25.7 nm (47.6 km) through the speed-restricted area. This concept was applied to all port areas in the mid-Atlantic region.

Data Chart 4-5 indicates an additional effective distance of 54.9 nm (101.7 km) miles for the port area of New York/New Jersey. This is due to the large year-round speed restricted area established in the NEUS region that some vessels will have to traverse either coming to the port area of New York/New Jersey from the north or departing to the north. It is estimated that vessels affected will need to traverse 54.9 nm (101.7 km) of speed-restricted areas in the Northeast. This factor, though, only affects vessel arrivals into the port area of New York/ New Jersey from the north or departures to north. This analysis assumes that it would affect 30 percent of vessel arrivals in the port area of New York/New Jersey.[12]

[12] The determination of 30 percent is based on the following assumptions: 45 percent arrive from the south and depart to the south (0 trips through the northeast speed restricted area); 40 percent arrive from the north and depart to the south (1 trip through the northeast speed restricted area), 10 percent of vessel arrive from the south and depart to the north south (1 trip through the northeast speed restricted area), 5 percent arrive from the north and depart to the north south (2 trips through the northeast speed restricted area). This results in a total factor of 60 percent which

Data Chart 4-4
Alternative 3: US East Coast Restricted Vessel Arrivals by Port Area and Vessel Type, 2004

Port Area	Vessel Type												Total
	Bulk Carrier	Combination Carrier	Container Ship	Freight Barge	Dry Cargo Ship	Passenger Ship	Refrigerated Cargo Ship	Ro-Ro Cargo Ship	Tank Barge	Tanker	Towing Vessel	Other a/	
Northeastern US - Gulf of Maine													
Eastport, ME	22	-	4	-	17	-	-	-	-	-	-	-	43
Searsport, ME	10	-	2	2	3	81	-	1	11	78	8	-	196
Portland, ME	71	4	4	1	28	26	-	37	26	395	47	2	641
Portsmouth, NH	51	3	1	-	16	1	-	-	1	87	9	4	173
Northeastern US - Off Race Point													
Salem, MA	9	-	-	-	-	6	-	-	-	-	-	-	15
Boston, MA	34	1	77	2	8	94	4	33	-	225	1	4	483
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	13	-	-	1	21	1	-	36
Mid-Atlantic Block Island Sound													
New Bedford, MA	31	-	-	-	14	-	4	1	-	6	-	-	56
Providence, RI	45	1	-	-	14	25	-	42	1	68	5	2	203
New London, CT	8	-	5	-	14	17	-	-	39	7	1	-	91
New Haven, CT	21	-	3	-	19	-	-	-	286	94	17	-	440
Bridgeport, CT	35	-	-	1	2	-	17	-	178	28	-	1	262
Long Island, NY	-	-	-	5	-	23	-	-	379	157	-	1	565
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	199	14	1,436	-	49	95	16	404	9	868	20	4	3,114
Mid-Atlantic Delaware Bay													
Philadelphia, PA	200	2	261	13	171	12	242	86	3	547	35	2	1,574
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	223	5	229	-	121	38	4	386	2	160	10	7	1,185
Hampton Roads, VA	254	13	986	3	93	37	5	90	1	133	12	11	1,638
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	23	1	9	-	13	4	-	-	-	32	-	1	83
Mid-Atlantic Wilmington, NC													
Wilmington, NC	67	3	48	-	73	4	-	17	9	152	2	2	377
Mid-Atlantic Georgetown, SC													
Georgetown, SC	26	2	2	-	12	1	-	-	-	-	-	-	43
Mid-Atlantic Charleston, SC													
Charleston, SC	84	1	949	2	66	51	3	128	4	117	19	6	1,430
Mid-Atlantic Savannah, GA													
Savannah, GA	174	8	760	-	124	35	10	107	1	206	5	1	1,431
Southeastern US													
Brunswick, GA	26	-	7	-	14	1	5	93	-	-	-	3	149
Fernandina, FL	11	-	26	2	40	2	4	1	-	-	8	-	94
Jacksonville, FL	54	2	161	62	76	30	2	183	6	90	120	9	795
Port Canaveral, FL	40		6	8	32	180	11	18	2	12	17	1	327
All Port Regions	1,718	60	4,976	101	1,019	776	327	1,627	959	3,483	337	61	15,444

a/ Other includes fishing vessels, industrial vessels, research vessels, school ships.

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

is cut in half to apply to vessel arrivals only. Later in the economic impact analysis the estimated impact on vessel arrivals is doubled to account for the impact on vessel departures.

Data Chart 4-5
Alternative 3: Effective Distance of Speed Restrictions in Designated Areas

Port Area	Location of pilot buoy relative to harbor baseline or closing line	Distance Stated in NOI	Distance to pilot buoy	Diagonal of distance to pilot buoy	Additional effective distance a/	Slow down/speed up time
Northeastern US - Gulf of Maine						
Eastport, ME	n.a.	n.a.	n.a.	n.a.	54.9	Included
Searsport, ME	n.a.	n.a.	n.a.	n.a.	54.9	Included
Portland, ME	n.a.	n.a.	n.a.	n.a.	54.9	Included
Portsmouth, NH	n.a.	n.a.	n.a.	n.a.	54.9	Included
Northeastern US - Off Race Point						
Boston, MA	n.a.	n.a.	n.a.	n.a.	72.4	n.a.
Salem, MA	n.a.	n.a.	n.a.	n.a.	72.4	n.a.
Northeastern US - Cape Cod Bay	5.0	n.a.	n.a.	n.a.	59.2	n.a.
Mid-Atlantic Block Island Sound						
New Bedford, MA	n.a.	25	25	35.4	54.9	Included
Providence, RI	n.a.	25	25	35.4	54.9	Included
New London, CT	n.a.	25	25	35.4	54.9	Included
New Haven, CT	n.a.	25	25	35.4	54.9	Included
Bridgeport, CT	n.a.	25	25	35.4	54.9	Included
Long Island, NY	n.a.	25	25	35.4	54.9	Included
Mid-Atlantic Ports of New York/New Jersey	6.8	25	18.2	25.7	54.9	Included
Mid-Atlantic Delaware Bay	2.5	25	22.5	31.8	54.9	Included
Mid-Atlantic Chesapeake Bay						
Baltimore, MD	2.8	25	22.2	31.3	54.9	Included
Hampton Roads, VA	2.8	25	22.2	31.3	54.9	Included
Mid-Atlantic Morehead City and Beaufort, NC	6.7	25	18.3	25.9	n.a.	n.a.
Mid-Atlantic Wilmington, NC	4.1	25	20.9	29.6	n.a.	n.a.
Mid-Atlantic Georgetown, SC	5.6	25	19.4	27.4	n.a.	n.a.
Mid-Atlantic Charleston, SC	12.5	25	12.5	17.7	6.3	n.a.
Mid-Atlantic Savannah, GA	9.7	25	15.3	21.6	4.9	n.a.
Southeastern US						
Brunswick, GA	6.7	n.a.	n.a.	26.4	3.4	n.a.
Fernandina, FL	10.9	n.a.	n.a.	32.9	5.5	n.a.
Jacksonville, FL	4.2	n.a.	n.a.	30.9	n.a.	n.a.
Port Canaveral, FL	n.a.	n.a.	n.a.	4.5	n.a.	n.a.

a/ Defined and described in text for each port area.
Source: Nathan Associates as descibed in text.

The mid-Atlantic port areas of Philadelphia, Baltimore and Hampton Roads have been assumed to be equally affected by the year-round large speed restricted area established in the NEUS region. Port areas south of Hampton Roads are assumed not to be affected, as vessels normally travel to the east of the NEUS region restricted area.

Port areas in Block Island Sound are assumed to have 40 percent of their vessel arrivals affected by the large speed restricted area in the Northeast region.[13]

As discussed under Alternative 2 (Section 4.4.1.2), another element of the impact on vessel operations is the time for vessels to slow down from sea speed to restricted speed and later to speed back up to sea speed. This would affect vessel arrivals at the port area of New York/New Jersey that would traverse the year-round speed restricted areas in the NEUS region. Extra time has been included in the economic impact analysis for these vessels to slow down to restricted speed and to resume sea speed.

The additional distance shown in Data Chart 4-5 for the mid-Atlantic port areas of Charleston and Savannah was calculated as half of the distance of the pilot buoy to the harbor baseline. Pilots at these ports have indicated that without speed restrictions vessels would regain some speed (not sea speed) prior to the entering the harbor baseline. Applying the speed restriction to more than half of this distance should approximate the extra delay incurred from the pilot buoy to the harbor baseline at these port areas.

For port areas in the NEUS region, the operational measures (Section 2.2.3) did not specify a specific distance over which speed restrictions would be implemented. Rather, broad geographic areas (ALWTRP SAM zones) were delineated. With the exception of Cape Cod Bay, vessels arriving at port areas in the NEUS region from the north would not be affected by proposed speed restriction areas. Primarily, the portion of the restricted area referred to as expanded SAM West zone would affect vessels arriving from the south. It is assumed that vessels arriving from the south and destined for Northeast port areas will attempt to minimize the impact of the speed restrictions by entering the existing Boston TSS at a point east of the southern tip of Cape Cod. From there vessels will route at restricted speeds through the TSS (65 nm [120.4 km]). Vessels destined for Boston may regain some speed (but not sea speed) from the western end of the restricted area to the Boston pilot buoy (15 nm [27.8 km]). Similar to the treatment of Charleston and Savannah, it is assumed that applying speed restrictions to half of this distance should approximate the extra delay incurred by the vessel.

Vessels arriving from the south and destined for Gulf of Maine ports will need to route 54.9 nm (101.7 km) through the SAM West area. These vessels will also be affected by the time to slow down prior to entering and upon leaving the SAM West area.

For Alternative 3, the effective distance of speed restrictions for port areas in the Southeast was determined by identifying typical recommended routes for each port and the distance from the intersection of those routes with the eastern edge of the MSRS WHALESOUTH area to each port's pilot buoy. For the port area of Brunswick, two routes were considered typical, one to the

[13] The determination of 40 percent is based on the following assumptions: 45 percent arrive from the north and depart to the south (1 trip through the northeast speed restricted area); 30 percent arrive from the south and depart to the south (0 trips through the northeast speed restricted area), 15 percent arrive from the north and depart to the north south (1 trips through the northeast speed restricted area) and 10 percent of vessel arrive from the north and depart to the north (2 trips through the northeast speed restricted area). This results in a total factor of 80 percent which is cut in half to apply to vessel arrivals only.

northeast of 21.8 nm (40.4 km) and one to the southeast of 28.4 nm (52.6 km). The southeast route was assumed to account for 70 percent of vessel traffic resulting in a weighted average distance of 26.4 nm (49 km). An additional effective distance of 3.4 nm (6.3 km) was assumed to account for vessels not being able to regain speed over the 6.7 nm (12.4 km) from the pilot buoy to the coastline.

Two recommended routes were used for the port area of Fernandina—a northeast route of 39.5 nm (73.1 km) and a southeast route of 26.3 nm (48.7 km). Traffic was assumed to be equally divided between the two routes for an average distance of 32.9 nm (61 km). An additional effective distance of 5.5 nm (10.2 km) was assumed to account for vessels not being able to regain speed over the 10.9 nm (20.2 km) from the pilot buoy to the coastline.

Three recommended routes were used for the port area of Jacksonville—a northeast route of 39.4 nm (73 km) (10 percent of vessels), an easterly route of 26.3 nm (48.7 km) (30 percent), and a southeast route of 31.7 nm (58.7 km) (60 percent). The weighted average distance is 30.9 nm (57.2 km).

For the port area of Port Canaveral, a single route of 4.5 nm (8.3 km) was used through the right whale critical habitat area.

Using the economic impact model, the minutes of delay that would be incurred in each port area have been identified, taking into account the distribution of vessel arrivals, normal vessel operating speeds, and the effective distance over which the restriction would apply. Data Chart 4-6 presents the average minutes of delay for a speed restriction of 12 knots per vessel arrival for each affected port area and vessel type in 2003.[14] The overall average delay for all vessels in 2003 is 52 minutes per arrival.[15] These delays are also depicted in Figure 4-5.

The longest average delay is experienced at the port area of Hampton Roads with an average delay of 84 minutes per arrival. This is due to the predominance of large and fast containerships at the port area coupled with the relatively few arrivals of smaller and slower vessel types. The port areas of Baltimore (68 minutes) and New York/New Jersey (65 minutes) are the other port areas with average delays in excess of an hour. The port area of Port Canaveral at 6 minutes has the shortest average delay per vessel arrival, as the speed restriction would only be effective for 4.5 nm (8.3 km) from the eastern edge of the right whale critical habitat to the pilot buoy.

Containerships incur the longest average delay with an average of 80 minutes per vessel arrival followed by ro-ro cargo ships (68 minutes), refrigerated cargo vessels (61 minutes), and passenger vessels (46 minutes).

Alternative 3 would not have adverse, direct effects on port operations because all of the speed restrictions in designated areas would be in place over a fixed time period. Therefore, mariners would be able to schedule their arrival time at port ahead of time, based on whether or not restrictions are in place for a particular port region. This would require advanced schedule planning; the rulemaking process would allow sufficient time for schedule revisions prior to implementation in order to avoid delays in arriving at a port.

---

[14] The average delay is based on the total minutes of delays for speed restrictions, slowdown/speedup time for port areas in the Gulf of Maine divided by the number of vessel arrivals by type of vessel for each port area during proposed speed restriction periods. It does not include slow down speedup time for port areas in the mid-Atlantic as those delays would need to be divided into annual vessel arrivals at each port.

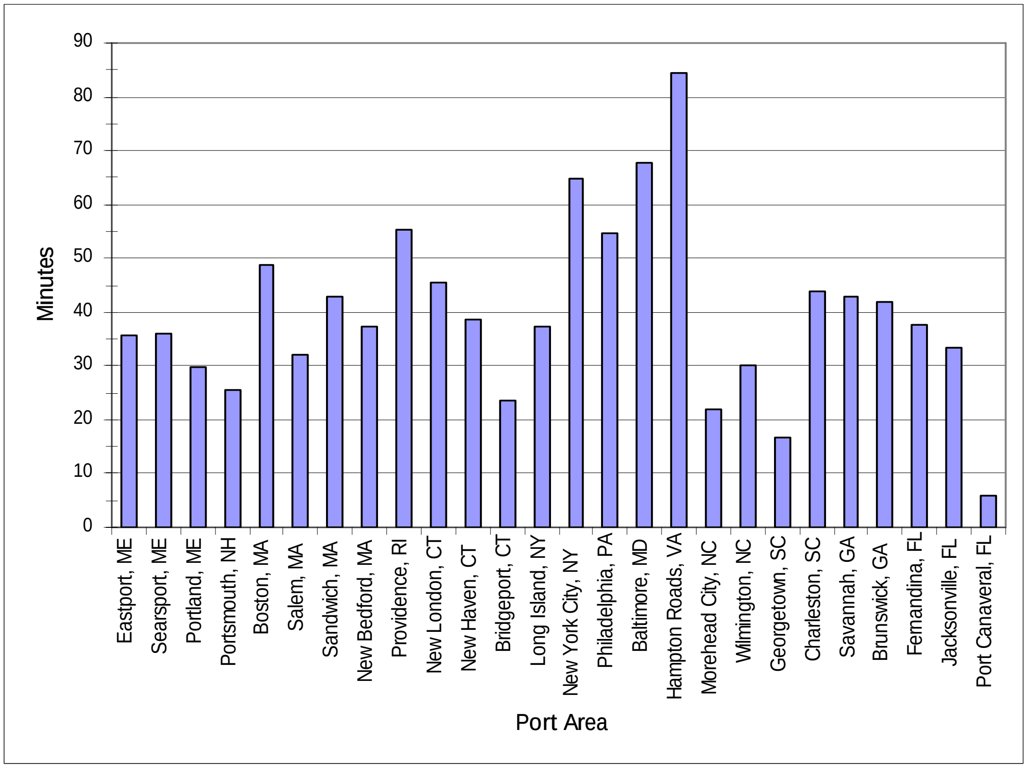
[15] As will be discussed later, vessels are assumed to incur similar delays when leaving each port area.

Data Chart 4-6
Alternative 3: Average Minutes of Delay per Vessel Arrival by Port Area and Type of Vessel, 2003

Port Area	Bulk Carriers	Combinat ion Carriers	Containers hips	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	8.3	-	75.0	-	48.2	-	-	-	-	-	-	-	35.6
Searsport, ME	6.1	26.4	-	-	-	57.8	-	13.6	24.1	28.5	-	-	35.9
Portland, ME	12.0	27.6	73.2	47.5	41.2	60.4	-	20.3	22.8	31.9	-	-	29.9
Portsmouth, NH	15.2	18.3	-	-	48.8	46.3	-	-	25.3	29.5	-	-	25.4
Northeastern US - Off Race Point													
Boston, MA	14.7	18.8	100.1	19.5	36.2	61.1	59.0	29.3	-	36.1	-	-	48.9
Salem, MA	26.1	-	-	-	-	61.1	-	-	-	43.7	-	-	32.0
Northeastern US - Cape Cod Bay	-	-	-	-	-	53.6	-	-	-	35.5	-	-	42.9
Mid-Atlantic Block Island Sound													
New Bedford, MA	28.0	-	21.1	-	50.5	-	69.2	-	29.1	40.6	-	-	37.5
Providence, RI	22.8	42.7	-	-	65.2	91.8	75.7	93.3	27.0	46.0	-	-	55.2
New London, CT	22.3	-	127.9	-	88.7	71.7	-	-	34.1	44.8	-	-	45.5
New Haven, CT	21.1	-	131.3	1.2	79.0	71.7	-	-	36.5	43.4	-	-	38.5
Bridgeport, CT	35.0	-	-	0.9	-	60.4	-	-	28.1	27.6	-	-	23.5
Long Island, NY	-	42.7	-	1.2	-	71.7	-	-	34.3	40.9	-	-	37.4
Mid-Atlantic Ports of New York/New Jersey	17.0	29.6	91.9	32.9	38.3	69.3	75.7	74.2	24.6	34.9	-	-	64.7
Mid-Atlantic Delaware Bay	15.3	36.0	80.9	53.8	51.7	72.5	73.9	76.2	31.5	43.8	-	-	54.5
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	21.8	29.9	101.1	-	59.9	77.0	68.5	85.1	31.1	39.6	-	-	67.8
Hampton Roads, VA	22.4	35.6	104.3	37.2	55.4	79.7	73.8	96.8	32.7	40.2	-	-	84.4
Mid-Atlantic Morehead City and Beaufort, NC	7.3	-	47.9	-	23.4	-	9.5	42.6	-	20.6	-	-	21.9
Mid-Atlantic Wilmington, NC	8.6	17.1	62.5	-	36.5	-	35.7	60.6	20.3	23.0	-	-	30.0
Mid-Atlantic Georgetown, SC	8.6	-	55.0	-	47.4	-	-	-	-	-	-	-	16.6
Mid-Atlantic Charleston, SC	8.5	-	53.3	-	34.1	35.5	31.6	42.9	17.9	20.0	-	-	43.8
Mid-Atlantic Savannah, GA	6.7	12.8	58.1	-	29.1	35.9	62.5	47.3	17.1	21.4	-	-	42.9
Southeastern US													
Brunswick, GA	6.0	-	64.0	-	39.0	37.2	43.4	51.9	-	-	-	-	41.9
Fernandina, FL	23.2	-	45.8	0.8	29.3	47.9	59.2	-	-	-	-	-	37.7
Jacksonville, FL	12.8	-	51.0	33.3	23.1	45.1	42.5	51.3	23.6	25.6	-	-	33.5
Port Canaveral, FL	0.6	-	9.8	0.1	4.6	7.3	5.6	6.6	3.5	3.9	-	-	5.8
Total	15.5	-	79.9	29.5	41.5	46.1	61.4	67.6	32.2	34.5	-	-	52.2

a/ Includes recreational vessels
b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.
Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Alternative 3: Average Minutes of Delay per Vessel Arrival by Port Area and Type of Vessel, 2003



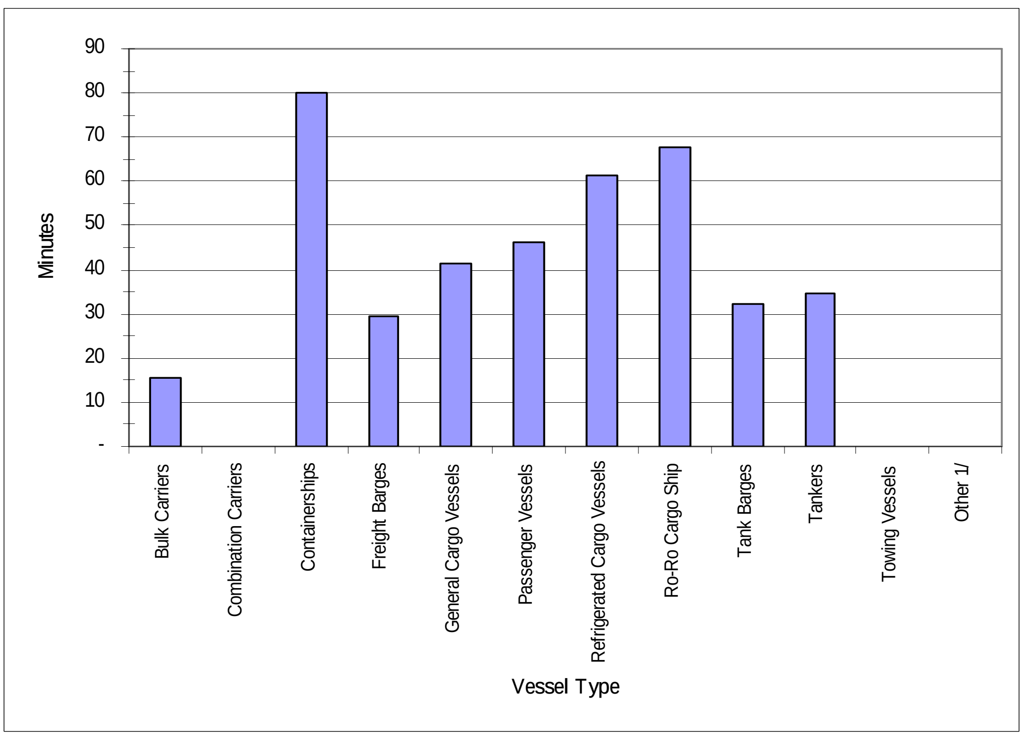


Figure 4-5

This Page Intentionally Left Blank

Direct Economic Impact of Alternative 3

Data Chart 4-7 presents the estimated direct economic impact of 12-knot speed restrictions in designated areas under Alternative 3 on the shipping industry in 2003. The total direct economic impact is estimated at $50.5 million with the largest impact on the port area of New York/New Jersey at $14.5 million. The impact on the port area of Hampton Roads is second at $9.9 million, followed by the port areas of Philadelphia at $5.0 million, Baltimore at $4.3 million, Savannah at $4.0 million, Charleston at $3.9 million, Boston at $1.5 million, and Portland at $1.2 million. The direct economic impact for these eight port areas totals $44.3 million or 87.8 percent of the total for this alternative.

Containerships account for 58.6 percent of the total direct economic impact of Alternative 3 with an estimated $29.6 million. The next largest economic impact by vessel type is ro-ro cargo ships at $5.8 million followed by tankers at $5.2 million and passenger vessels at $4.1 million.

Data Chart 4-8 presents the direct economic impact of a 12-knot speed restriction for Alternative 3 for 2004. The total economic impact is $53.9 million for 2004, roughly 6.8 percent higher than for 2003, which reflects the overall increase in US East Coast vessel arrivals. The rankings for the major vessel types are similar to those for 2003, with passenger vessels moving ahead of tankers due to the stronger growth in passenger vessel arrivals.

Figure 4-6 presents graphically the direct economic impact by port area for 2003 and 2004. The rankings for the leading port areas in 2004 are the same as described for 2003 above.

The direct economic impact of Alternative 3 for 2004 at 10 knots is $86.8 million and $31.2 million at 14 knots. See Data Chart 4-22 for the economic impacts of 10, 12, and 14 knots for Alternative 3 by port area.

4.4.1.4 Alternative 4 – Recommended Shipping Routes

Implementation of Alternative 4 would have direct, long-term, adverse economic impacts on the shipping industry. Based on shipping industry activity in 2003, direct economic impacts would have totaled an estimated $1.0 million. The impact would have increased slightly in 2004 at $1.1 million. The impacts for Alternative 4 would be the same for 10, 12, and 14 knots as there are no speed restrictions proposed. This alternative would have the lowest economic impact of all the proposed alternatives. The recommended routes and other operational measures included in Alternative 4 are described in Section 2.2.4.

A draft report out of the NMFS’ Southeast Fisheries Science Center has evaluated a range of alternative approaches to each port based on how well each would reduce the risk of vessel-whale interactions (Garrison, 2005). NMFS and the USCG PARS have not yet identified the specific approach routes for each port; for the purposes of the economic impact analysis for this DEIS, a Northeast and a Southeast approach to each port have been selected as representative of the final routes that are selected.[16] Accordingly, the economic impact will be assessed based on the following routes in the Garrison paper: route 36 and route

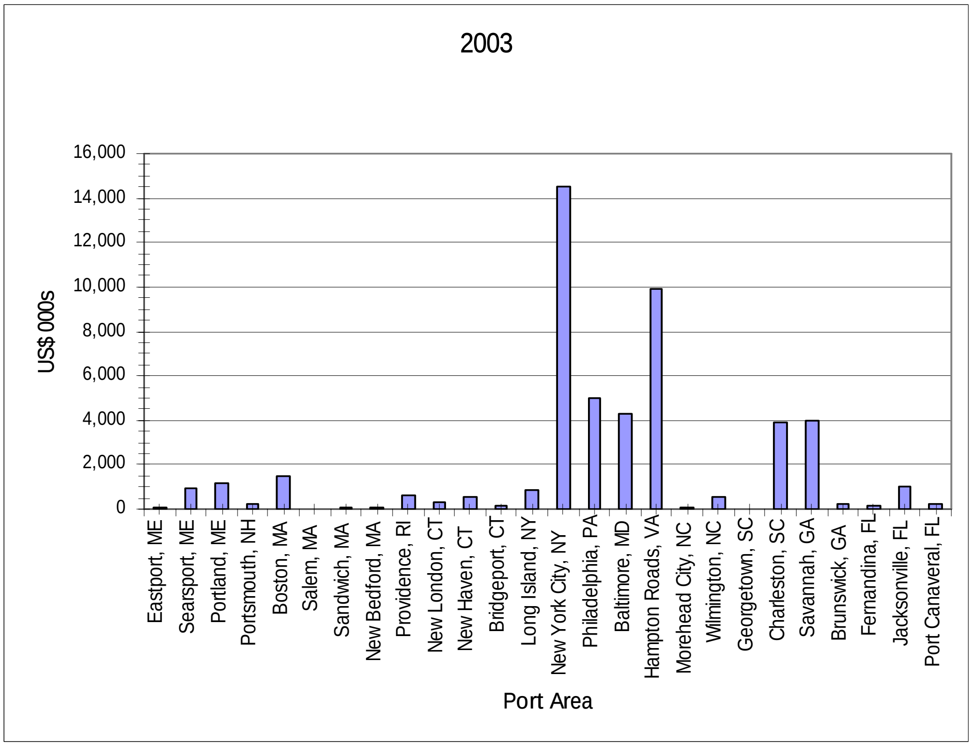
[16] The PARS report was released on May 24, 2006; however, the recommendations in the report are not final until comments are considered, therefore the specific routes will be analyzed in the Final EIS.

Data Chart 4-7
Alternative 3: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2003 ($000s)

Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	5.0	-	29.1	-	63.9	-	-	-	-	-	-	-	98.0
Searsport, ME	3.3	1.2	-	-	-	757.9	-	0.5	22.9	113.2	-	-	898.9
Portland, ME	30.6	21.7	41.9	1.8	78.3	246.2	-	49.4	5.6	675.1	-	-	1,150.6
Portsmouth, NH	37.2	2.3	-	-	31.1	6.8	-	-	2.1	157.5	-	-	237.0
Northeastern US - Off Race Point													
Boston, MA	15.0	0.6	493.5	0.7	11.0	636.2	14.7	30.8	-	276.4	-	-	1,478.8
Salem, MA	5.6	-	-	-	-	6.8	-	-	-	1.7	-	-	14.1
Northeastern US - Cape Cod Bay	-	-	-	-	-	59.5	-	-	-	17.5	-	-	77.1
Mid-Atlantic Block Island Sound													
New Bedford, MA	36.2	-	0.6	-	25.3	-	24.9	-	4.1	10.5	-	-	101.4
Providence, RI	38.1	1.8	-	-	28.6	229.7	17.1	174.2	0.9	137.4	-	-	628.0
New London, CT	9.1	-	18.6	-	25.3	183.1	-	-	57.4	8.9	-	-	302.3
New Haven, CT	27.2	-	10.6	0.0	76.9	18.3	-	-	199.9	189.0	-	-	521.9
Bridgeport, CT	22.5	-	-	0.0	-	7.6	-	-	107.4	31.6	-	-	169.2
Long Island, NY	-	1.8	-	0.0	-	173.9	-	-	391.2	261.1	-	-	828.0
Mid-Atlantic Ports of New York/New Jersey	124.0	23.9	10,349.5	0.7	50.2	707.4	124.6	1,726.4	22.1	1,413.1	-	-	14,541.9
Mid-Atlantic Delaware Bay	106.3	11.4	1,316.6	9.5	238.5	196.2	1,756.1	275.6	12.4	1,062.2	-	-	4,984.7
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	150.8	7.2	1,522.8	-	301.8	293.5	15.9	1,807.2	2.2	204.1	-	-	4,305.5
Hampton Roads, VA	162.7	21.5	8,453.6	0.8	182.4	222.7	5.9	659.1	1.2	212.1	-	-	9,921.9
Mid-Atlantic Morehead City and Beaufort, NC	3.2	-	23.3	-	18.2	-	0.5	3.1	-	15.4	-	-	63.7
Mid-Atlantic Wilmington, NC	16.9	2.3	224.4	-	152.4	-	2.2	45.6	8.4	111.9	-	-	564.0
Mid-Atlantic Georgetown, SC	6.7	-	2.4	-	20.5	-	-	-	-	-	-	-	29.6
Mid-Atlantic Charleston, SC	25.6	-	3,301.3	-	116.0	142.7	6.2	257.9	7.6	83.6	-	-	3,940.8
Mid-Atlantic Savannah, GA	32.0	2.8	3,326.5	-	197.3	17.9	58.7	226.7	2.1	131.4	-	-	3,995.4
Southeastern US													
Brunswick, GA	5.0	-	32.2	-	20.4	4.1	11.9	175.7	-	-	-	-	249.2
Fernandina, FL	2.1	-	50.4	0.0	48.8	5.3	49.7	-	-	-	-	-	156.3
Jacksonville, FL	20.2	-	373.2	48.5	84.0	24.7	5.7	336.5	4.7	84.0	-	-	981.4
Port Canaveral, FL	0.6	-	3.4	0.0	5.2	196.0	8.4	2.9	0.2	1.1	-	-	218.0
Total	885.9	98.5	29,573.9	62.0	1,775.9	4,136.5	2,102.3	5,771.3	852.5	5,198.8	-	-	50,457.7

a/ Includes recreational vessels.
b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.
Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Alternative 3: Direct Economic Impact on the Shipping Industry by Port Area, 2003 and 2004



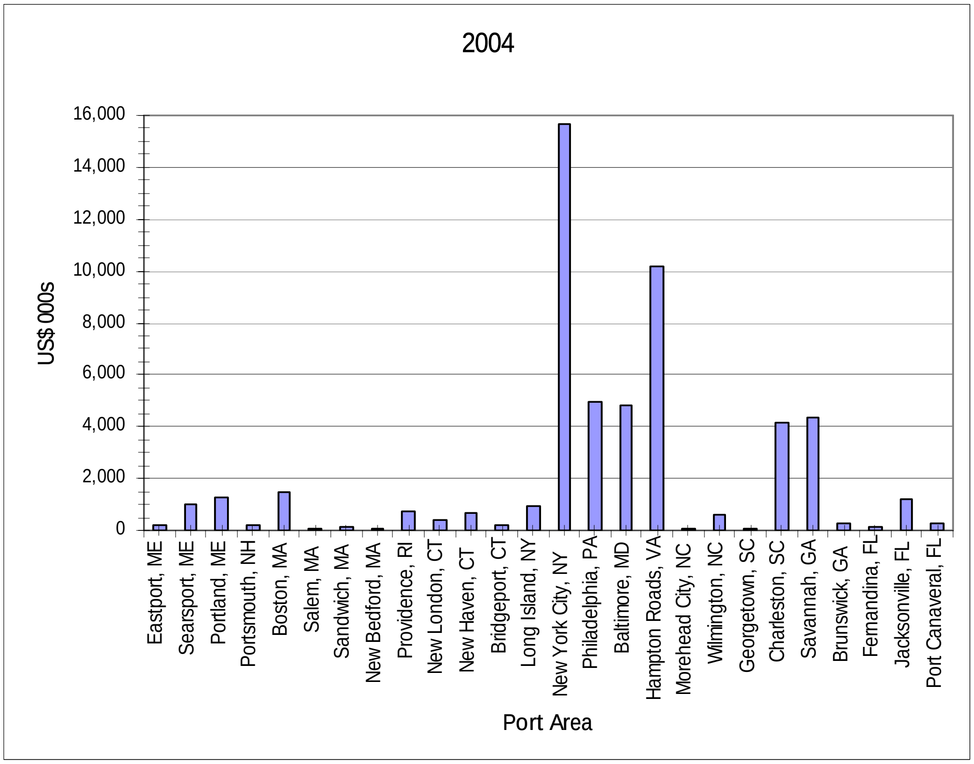


Figure 4-6

This Page Intentionally Left Blank

Data Chart 4-8
Alternative 3: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2004 ($000s)

Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	6.6	-	29.4	-	140.8	-	-	-	-	-	-	-	176.8
Searsport, ME	2.1	-	23.1	1.2	2.6	857.0	-	1.8	11.4	108.2	-	-	1,007.6
Portland, ME	33.3	6.2	22.6	1.8	84.4	345.1	-	36.8	26.7	712.8	-	-	1,269.6
Portsmouth, NH	29.6	1.7	0.4	-	49.8	6.8	-	-	1.1	117.9	-	-	207.3
Northeastern US - Off Race Point													
Boston, MA	15.0	0.6	493.5	0.7	11.0	636.2	14.7	30.8	-	276.4	-	-	1,478.8
Salem, MA	6.8	-	-	-	-	58.7	-	-	-	-	-	-	65.5
Northeastern US - Cape Cod Bay	-	-	-	-	-	120.9	-	-	0.9	27.5	-	-	149.2
Mid-Atlantic Block Island Sound													
New Bedford, MA	31.9	-	-	-	13.3	-	19.9	2.4	-	9.2	-	-	76.8
Providence, RI	27.2	1.9	-	-	39.8	366.9	-	164.8	1.4	128.3	-	-	730.3
New London, CT	6.4	-	46.2	-	98.5	163.7	-	-	50.6	12.2	-	-	377.7
New Haven, CT	16.6	-	20.9	-	60.6	-	-	-	378.8	163.7	-	-	640.6
Bridgeport, CT	32.5	-	-	0.0	-	-	-	-	169.4	23.4	-	-	225.3
Long Island, NY	-	-	-	0.1	-	210.5	-	-	478.5	254.2	-	-	943.4
Mid-Atlantic Ports of New York/New Jersey	101.3	15.3	10,677.8	-	161.3	1,398.2	124.6	1,820.5	8.1	1,329.0	-	-	15,636.1
Mid-Atlantic Delaware Bay	109.6	2.4	1,215.4	22.0	352.1	111.7	1,669.7	278.3	4.0	1,155.9	-	-	4,921.2
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	181.7	6.5	1,627.0	-	388.5	468.0	31.7	1,797.8	2.3	286.6	-	-	4,790.1
Hampton Roads, VA	211.3	16.5	8,235.1	2.9	264.6	480.4	54.2	657.4	1.2	236.6	-	-	10,160.2
Mid-Atlantic Morehead City and Beaufort, NC	7.6	0.3	25.1	-	15.6	14.3	-	-	-	21.9	-	-	84.8
Mid-Atlantic Wilmington, NC	15.0	1.0	198.8	-	164.4	16.4	-	61.7	5.5	121.7	-	-	584.6
Mid-Atlantic Georgetown, SC	5.5	0.3	1.8	-	30.5	3.8	-	-	-	-	-	-	42.0
Mid-Atlantic Charleston, SC	28.6	-	3,459.1	1.7	132.8	204.2	12.1	237.7	2.4	83.0	-	-	4,161.6
Mid-Atlantic Savannah, GA	34.7	3.0	3,410.5	-	228.7	131.6	88.2	268.2	0.8	159.6	-	-	4,325.3
Southeastern US													
Brunswick, GA	4.6	-	20.5	-	33.0	4.1	16.0	204.0	-	-	-	-	282.1
Fernandina, FL	2.2	-	38.7	1.1	51.0	10.6	14.1	8.3	-	-	-	-	126.1
Jacksonville, FL	23.7	1.0	374.3	46.9	86.1	192.9	6.7	369.6	4.7	83.1	-	-	1,189.0
Port Canaveral, FL	1.3	-	3.8	0.0	6.0	222.4	3.7	4.8	0.2	1.7	-	-	244.0
Total	935.1	56.7	29,924.1	78.5	2,415.7	6,024.4	2,055.4	5,945.0	1,148.1	5,312.8	-	-	53,895.7

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

48 for Jacksonville (Figure 2-1), route 28 and route 46 for Fernandina Beach, and route 18 and route 25 for Brunswick (Figure 2-2). These routes appear to combine the lowest ship strike risk values with the likelihood of lower levels of economic impact.

Section 4.4.1.3 identifies the existing pattern of vessel approaches to each port area. Because vessels arriving at these ports generally approach from the south or north, the current approaches to the pilot buoys are approximately 40–65 degrees and 135–160 degrees from a parallel line to the coastline. Under Alternative 4, the preferred Northeast and Southeast access routes to each port are flatter, at approximately 60–80 degrees and 120–145 degrees. Vessels are assumed to have to route parallel to the eastern boundary of the MSRS WHALESSOUTH until the intersection of the recommended route. The difference in the total distance between the current route and the use of the recommended route is then divided by the average operating speed of each time and size of vessel to determine the additional time associated with the use of the recommended shipping route. The economic impact is estimated by multiplying the additional time by the hourly operating cost for each type and size of vessel.

For the port area of Brunswick, the weighted average additional distance from using the recommended access route is 3.2 nm (6 km); for the port area of Fernandina it is 3.7 nm (6.9 km); and for the port area of Jacksonville it is 7.1 nm (13 km).

The 12 degree northerly shift of the Boston TSS would increase vessel routings by 3.75 nm (6.9 km). It is assumed that 60 percent of vessel arrivals in Boston would be affected by the proposed change.[17]

The ATBA for the Great South Channel is not expected to have a measurable impact on vessel operations because most shipping industry vessels currently route to either the west or southeast of the area.

The recommended shipping routes for Cape Cod Bay also would not measurably affect shipping industry vessel operations because the recommended routes are not different from existing north-south shipping routes via the Cape Cod Canal to Boston. The economic impact of the recommended shipping routes for Cape Cod Bay on passenger and other vessels particularly to Provincetown is addressed later in the DEIS.

Alternative 4 would not have adverse effects on port operations because the exact location of the recommended routes, ATBA, and TSS would be reflected in current nautical charts that would be utilized during voyage planning. The specific times that these measures would be operational would also be known ahead of time. Therefore, while these measures may add miles to a vessels' route, the restrictions would be known well ahead of time to allow for incorporation into vessel schedules and transit routes.

[17] The determination of 60 percent is based on the following assumptions: 45 percent arrive from the north and depart to the south (1 trip through the TSS); 30 percent arrive from the south and depart to the south (2 trips through the TSS), 15 percent arrive from the north and depart to the north south (1 trip through the TSS) and 10 percent of vessel arrive from the north and depart to the north (0 trips through the TSS). This results in a total factor of 120 percent which is cut in half to apply to vessel arrivals only.

Direct Economic Impact of Alternative 4

Data Chart 4-9 presents the direct economic impact of Alternative 4 on the shipping industry for 2003. The total direct economic impact is estimated at $1.0 million with the port area of Jacksonville having the largest impact of $0.6 million, followed by the port area of Boston at $0.4 million. The three other port areas affected under this alternative—Brunswick, Fernandina, and Salem each had an economic impact of under $60,000.

Containerships, ro-ro cargo ships, and tankers, and passenger vessels have the highest direct economic impact at approximately $0.2 million each, followed by general cargo vessels and bulk carriers at roughly $0.1 million each.

Data Chart 4-10 presents the direct economic impact of Alternative 4 for 2004. The total economic impact is estimated at $1.1 million in 2004, representing an 11.6 percent increase over 2003. This is due to the overall increase in vessel arrivals in the SEUS region and particularly passenger vessels at Jacksonville. The ranking by port area is the same as described for 2003. In 2004, passenger vessels jump ahead into first place, while containerships fall to third place and tankers drop to fourth place. As mentioned earlier, the economic impacts for Alternative 4 are the same for 10, 12, and 14 knots, as there are no speed restrictions proposed.

4.4.1.5 Alternative 5 – Combination of Alternatives

Implementation of Alternative 5 would have direct, long-term, adverse economic impacts on the shipping industry. Based on shipping industry activity in 2003 and 2004, direct economic impacts would have totaled an estimated $52.4 million in 2003 and $56.1 million in 2004.

Impact on Vessel Operations

Data Chart 4-11 presents the key assumptions used to analyze the impact of Alternative 5 on vessel operations. The table presents the basis for determining the effective distance that speed restrictions would apply for each port area similar to that previously shown in Data Chart 4-5 for Alternative 3. Note that the diagonal distances to the buoy for the port areas of Brunswick, Fernandina, and Jacksonville differ from those of Alternative 3. This is due to the inclusion from Alternative 4 of the recommended shipping routes for these ports that reduces the distance traveled through the speed-restricted WHALESSOUTH reporting area of the MSRS. The speed restrictions were applied to these distances to determine the additional time incurred by vessels.

The other new element for these three Southeast port areas is the additional distance that is traveled parallel to the eastern boundary of the WHALESSOUTH area of the MSRS until the intersection of the recommended shipping routes, which generally have an east-west heading. In other words, vessels may transit farther distances to enter a recommended route. These distances are shown in Data Chart 4-11 as “Extra PARS (which refers to the recommended routes) or TSS Distance (which refers to the Boston TSS).” Speed restrictions do not apply to these distances and the additional time incurred is calculated using the averaging operating speed for each type and size of vessel.

Data Chart 4-9
Alternative 4: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2003 ($000s)

Port Area	Bulk Carriers	Combinat ion Carriers	Containers hips	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Searsport, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Portland, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Portsmouth, NH	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Off Race Point													
Boston, MA	16.9	0.5	49.0	0.6	3.1	146.4	3.5	15.5	-	120.6	-	-	356.1
Salem, MA	3.6	-	-	-	-	1.6	-	-	-	0.6	-	-	5.7
Northeastern US - Cape Cod Bay	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Block Island Sound													
New Bedford, MA	-	-	-	-	-	-	-	-	-	-	-	-	-
Providence, RI	-	-	-	-	-	-	-	-	-	-	-	-	-
New London, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
New Haven, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
Bridgeport, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Island, NY	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Ports of New York/New Jersey	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Delaware Bay	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampton Roads, VA	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Morehead City and Beaufort, NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Wilmington, NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Georgetown, SC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Charleston, SC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Savannah, GA	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeastern US													
Brunswick, GA	6.4	-	4.5	-	5.1	1.3	3.1	34.4	-	-	-	-	54.9
Fernandina, FL	1.5	-	14.8	0.3	14.1	1.5	10.7	-	-	-	-	-	42.9
Jacksonville, FL	47.7	-	147.2	38.8	61.6	13.3	3.4	152.0	5.9	96.8	-	-	566.7
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	76.0	0.5	215.5	39.7	83.9	164.1	20.7	201.9	5.9	218.0	-	-	1,026.3

a/ Includes recreational vessels.
b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.
Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-10
Alternative 4: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2004 ($000s)

Port Area	Bulk Carriers	Combinat ion Carriers	Containers hips	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Searsport, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Portland, ME	-	-	-	-	-	-	-	-	-	-	-	-	-
Portsmouth, NH	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Off Race Point													
Boston, MA	16.9	0.5	49.0	0.6	3.1	146.4	3.5	15.5	-	120.6	-	-	356.1
Salem, MA	4.6	-	-	-	-	10.6	-	-	-	-	-	-	15.2
Northeastern US - Cape Cod Bay	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Block Island Sound													
New Bedford, MA	-	-	-	-	-	-	-	-	-	-	-	-	-
Providence, RI	-	-	-	-	-	-	-	-	-	-	-	-	-
New London, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
New Haven, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
Bridgeport, CT	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Island, NY	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Ports of New York/New Jersey	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Delaware Bay	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampton Roads, VA	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Morehead City and Beaufort, NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Wilmington, NC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Georgetown, SC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Charleston, SC	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Savannah, GA	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeastern US													
Brunswick, GA	5.9	-	3.2	-	7.6	1.3	3.9	38.7	-	-	-	-	60.7
Fernandina, FL	5.2	-	10.4	0.6	16.2	3.1	3.5	0.9	-	-	-	-	40.0
Jacksonville, FL	49.7	2.0	151.6	40.0	62.4	101.4	3.4	162.7	5.9	94.1	-	-	673.3
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	82.3	2.5	214.3	41.1	89.3	262.8	14.4	217.8	5.9	214.8	-	-	1,145.2

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-11
Alternative 5: Effective Distance of Speed Restrictions in Designated Areas, Duration of DMAs and Extra PARS or TSS Distances by Port Area

Port Area	Location of pilot buoy relative to harbor baseline or closing line	Distance stated in NOI	Distance to pilot buoy	Diagonal distance to pilot buoy	Additional effective distance a/	Extra PARS or TSS Distance	PARS or TSS Effective Days	Slow down/speed up time	DMA effective days
Northeastern US - Gulf of Maine									
Eastport, ME	n.a.	n.a.	n.a.	n.a.	54.9	0	0	Included	15
Searsport, ME	n.a.	n.a.	n.a.	n.a.	54.9	0	0	Included	15
Portland, ME	n.a.	n.a.	n.a.	n.a.	54.9	0	0	Included	15
Portsmouth, NH	n.a.	n.a.	n.a.	n.a.	54.9	0	0	Included	15
Northeastern US - Off Race Point									
Boston, MA	n.a.	n.a.	n.a.	n.a.	72.4	3.75	365	n.a.	15
Salem, MA	n.a.	n.a.	n.a.	n.a.	72.4	3.75	365	n.a.	15
Northeastern US - Cape Cod Bay	5.0	n.a.	n.a.	n.a.	59.2	0	120	n.a.	15
Mid-Atlantic Block Island Sound									
New Bedford, MA	n.a.	25	25	35.4	54.9	0	0	Included	0
Providence, RI	n.a.	25	25	35.4	54.9	0	0	Included	0
New London, CT	n.a.	25	25	35.4	54.9	0	0	Included	0
New Haven, CT	n.a.	25	25	35.4	54.9	0	0	Included	0
Bridgeport, CT	n.a.	25	25	35.4	54.9	0	0	Included	0
Long Island, NY	n.a.	25	25	35.4	54.9	0	0	Included	0
Mid-Atlantic Ports of New York/New Jersey	6.8	25	18.2	25.7	54.9	0	0	Included	0
Mid-Atlantic Delaware Bay	2.5	25	22.5	31.8	54.9	0	0	Included	0
Mid-Atlantic Chesapeake Bay									
Baltimore, MD	2.8	25	22.2	31.3	54.9	0	0	Included	0
Hampton Roads, VA	2.8	25	22.2	31.3	54.9	0	0	Included	0
Mid-Atlantic Morehead City and Beaufort, NC	6.7	25	18.3	25.9	n.a.	0	0	n.a.	0
Mid-Atlantic Wilmington, NC	4.1	25	20.9	29.6	n.a.	0	0	n.a.	0
Mid-Atlantic Georgetown, SC	5.6	25	19.4	27.4	n.a.	0	0	n.a.	0
Mid-Atlantic Charleston, SC	12.5	25	12.5	17.7	6.3	0	0	n.a.	0
Mid-Atlantic Savannah, GA	9.7	25	15.3	21.6	4.9	0	0	n.a.	0
Southeastern US									
Brunswick, GA	6.7	n.a.	n.a.	24.1	3.4	5.5	121	n.a.	15
Fernandina, FL	10.9	n.a.	n.a.	26.8	5.5	9.8	121	n.a.	15
Jacksonville, FL	4.2	n.a.	n.a.	28.8	n.a.	9.2	121	n.a.	15
Port Canaveral, FL	n.a.	n.a.	n.a.	4.5	n.a.	0	0	n.a.	15

a/ Defined and described in text for each port area.
Source: Nathan Associates as descibed in text.

The DMA effective days assumed for each port area under Alternative 5 are presented in the last column of Data Chart 4-11. The implementation of one DMA per port area has been assumed for the NEUS region, taking into consideration the sighting of right whales in the Gulf of Maine outside of the speed-restricted SAM west (or Off Race Point) area. In the SEUS region, the implementation of one DMA per port area has also been assumed taking into consideration the sighting of whales outside of the time periods established for speed-restricted designated areas. No DMAs for port areas in the mid-Atlantic region have been assumed outside of the periods established for speed-restricted areas. The slow-down/speed-up time for each port is as specified for Alternative 3. While not shown separately in Data Chart 4-11, each DMA also includes slow-down/speed-up time as described in Alternative 2.

Direct Economic Impacts of Alternative 5

Data Chart 4-12 presents the direct economic impact of the combination of 12-knot speed restrictions in designated areas, DMAs, and the use of recommended routes implemented under Alternative 5 on the shipping industry estimated for 2003. The total direct economic impact is estimated at $52.4 million with the port area of New York/New Jersey having the largest impact of $14.5 million. The port area of Hampton Roads is second at $9.9 million, followed by the port areas of Philadelphia at $5.0 million, Baltimore at $4.3 million, Savannah at $4.0 million, and Charleston at $3.9 million. The direct economic impact for these six port areas totals $41.7 million or 79.5 percent of the total for this alternative.

Containerships account for 57.1 percent of the total direct economic impact of Alternative 5 with an estimate of $29.9 million. The vessel type with the next largest economic impact is ro-ro cargo ships at $6.1 million followed by tankers at $5.5 million and passenger vessels at $4.7 million.

Data Chart 4-13 presents the direct economic impact of Alternative 5 for 2004. The total direct economic impact is $56.1 million for 2004, roughly 7.0 percent higher than 2003, which reflects the overall increase in US East Coast vessel arrivals. The rankings for the major vessel types are similar to 2003 except for passenger vessels moving ahead of tankers and ro-ro cargo ships into second position due to the stronger growth in passenger vessel arrivals.

Figure 4-7 presents graphically the direct economic impact by port area for 2003 and 2004. The rankings for the leading port areas are the same as just described for 2003.

Under Alternative 5, the direct economic impact of a 10-knot speed restriction is $89.7 million, and $32.9 million at 14 knots, both in 2004. See Data Chart 4-22 for the economic impacts of 10, 12, and 14 knots by port area for Alternative 5.

4.4.1.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Implementation of Alternative 6 would have direct, long-term, adverse economic impacts on the shipping industry. Based on shipping industry activity in 2003 and 2004 and considering the impacts of implementing the proposed operational measures with a 12-knot speed restriction, direct economic impacts would have totaled an estimated $28.7 million in 2003 and $30.9 million in 2004. This ranks third in terms of economic impact among the six alternatives considered in this EIS.

Data Chart 4-12
Alternative 5: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2003 ($000s)

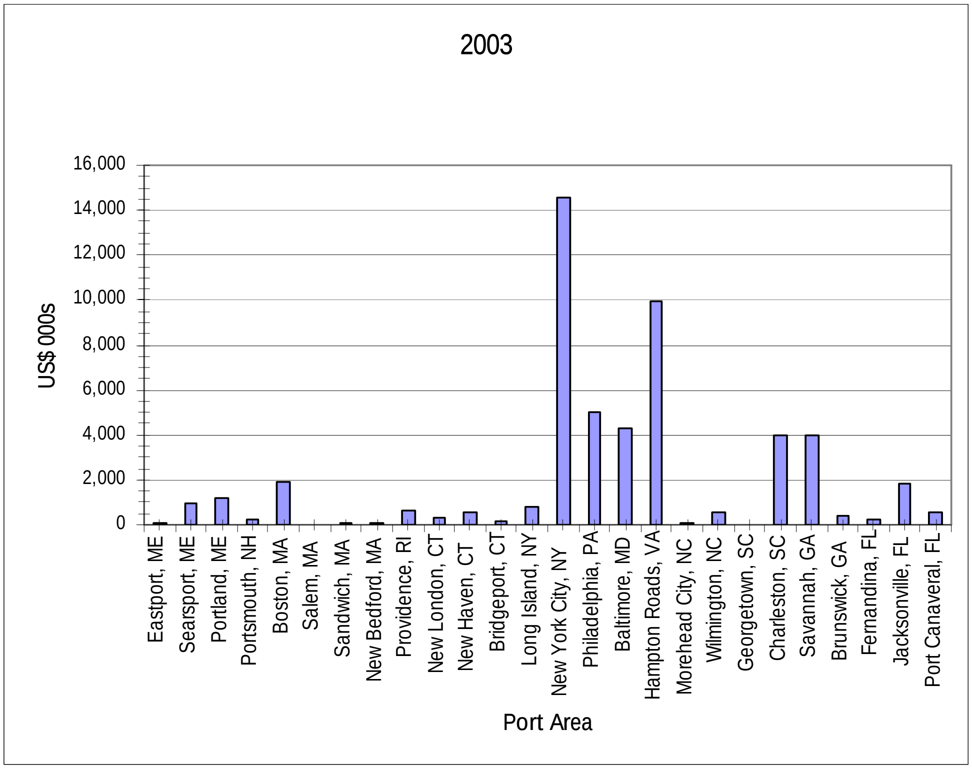
Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	5.3	-	30.3	-	66.7	-	-	-	-	-	-	-	102.2
Searsport, ME	3.4	1.2	-	-	-	790.7	-	0.5	23.9	118.1	-	-	937.8
Portland, ME	31.9	22.7	43.7	1.8	81.6	256.8	-	51.5	5.9	704.3	-	-	1,200.4
Portsmouth, NH	38.8	2.4	-	-	32.5	7.1	-	-	2.2	164.3	-	-	247.3
Northeastern US - Off Race Point													
Boston, MA	32.5	1.1	563.9	1.3	14.5	810.2	18.9	47.5	-	409.0	-	-	1,899.1
Salem, MA	9.4	-	-	-	-	8.6	-	-	-	2.3	-	-	20.4
Northeastern US - Cape Cod Bay	-	-	-	-	-	60.3	-	-	-	17.8	-	-	78.0
Mid-Atlantic Block Island Sound													
New Bedford, MA	36.2	-	0.6	-	25.3	-	24.9	-	4.1	10.5	-	-	101.4
Providence, RI	38.1	1.8	-	-	28.6	229.7	17.1	174.2	0.9	137.4	-	-	628.0
New London, CT	9.1	-	18.6	-	25.3	183.1	-	-	57.4	8.9	-	-	302.3
New Haven, CT	27.2	-	10.6	0.0	76.9	18.3	-	-	199.9	189.0	-	-	521.9
Bridgeport, CT	22.5	-	-	0.0	-	7.6	-	-	107.4	31.6	-	-	169.2
Long Island, NY	-	1.8	-	0.0	-	173.9	-	-	391.2	261.1	-	-	828.0
Mid-Atlantic Ports of New York/New Jersey	124.0	23.9	10,349.5	0.7	50.2	707.4	124.6	1,726.4	22.1	1,413.1	-	-	14,541.9
Mid-Atlantic Delaware Bay	106.3	11.4	1,316.6	9.5	238.5	196.2	1,756.1	275.6	12.4	1,062.2	-	-	4,984.7
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	150.8	7.2	1,522.8	-	301.8	293.5	15.9	1,807.2	2.2	204.1	-	-	4,305.5
Hampton Roads, VA	162.7	21.5	8,453.6	0.8	182.4	222.7	5.9	659.1	1.2	212.1	-	-	9,921.9
Mid-Atlantic Morehead City and Beaufort, NC	3.2	-	23.3	-	18.2	-	0.5	3.1	-	15.4	-	-	63.7
Mid-Atlantic Wilmington, NC	16.9	2.3	224.4	-	152.4	-	2.2	45.6	8.4	111.9	-	-	564.0
Mid-Atlantic Georgetown, SC	6.7	-	2.4	-	20.5	-	-	-	-	-	-	-	29.6
Mid-Atlantic Charleston, SC	25.6	-	3,301.3	-	116.0	142.7	6.2	257.9	7.6	83.6	-	-	3,940.8
Mid-Atlantic Savannah, GA	32.0	2.8	3,326.5	-	197.3	17.9	58.7	226.7	2.1	131.4	-	-	3,995.4
Southeastern US													
Brunswick, GA	16.5	-	44.4	-	36.1	6.4	19.2	261.5	-	0.2	-	-	384.3
Fernandina, FL	6.0	-	87.5	0.8	86.9	9.1	78.6	0.5	-	0.1	-	-	269.5
Jacksonville, FL	85.2	0.1	616.4	107.1	173.8	45.1	12.1	584.9	12.5	222.5	-	-	1,859.8
Port Canaveral, FL	2.1	0.0	6.7	0.0	12.1	479.6	15.4	7.0	0.4	2.9	-	-	526.3
Total	992.4	100.3	29,943.3	122.1	1,937.5	4,666.9	2,156.2	6,129.1	861.8	5,513.9	-	-	52,423.5

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Alternative 5: Direct Economic Impact on the Shipping Industry by Port Area, 2003 and 2004 ($000s)



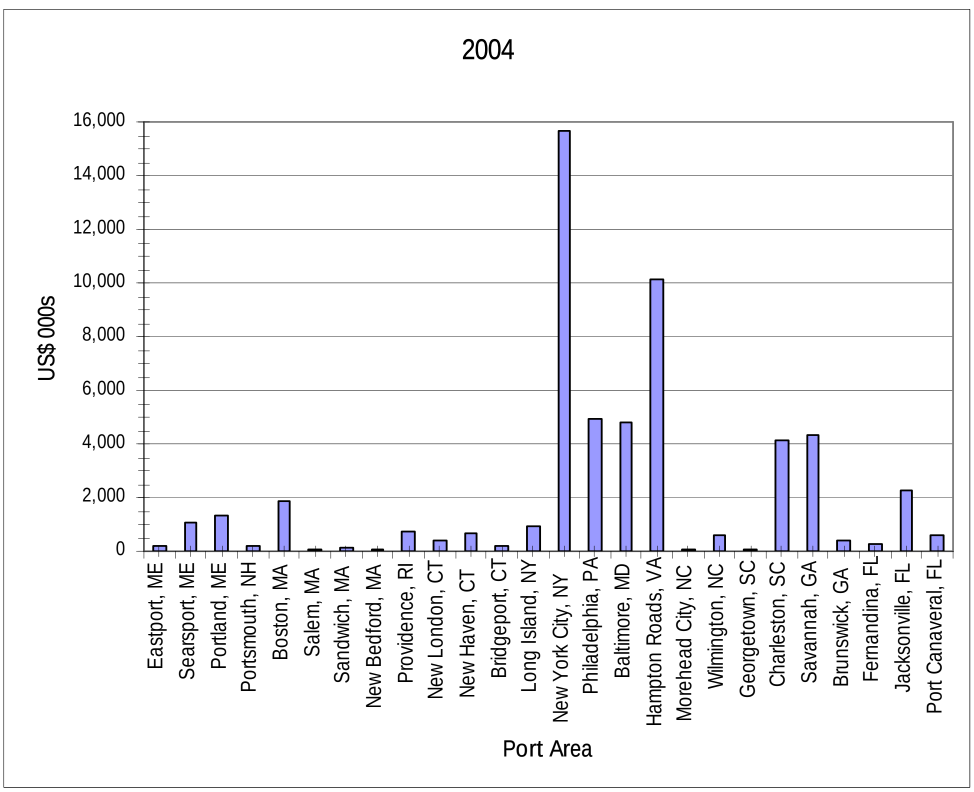


Figure 4-7

This Page Intentionally Left Blank

Data Chart 4-13
Alternative 5: Direct Economic Impact on the Shipping Industry by Port Area and Type of Vessel, 2004 ($000s)

Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	6.9	-	30.7	-	146.9	-	-	-	-	-	-	-	184.5
Searsport, ME	2.2	-	24.1	1.3	2.7	894.1	-	1.9	11.9	112.9	-	-	1,051.2
Portland, ME	34.8	6.5	23.5	1.8	88.0	360.0	-	38.4	27.8	743.6	-	-	1,324.5
Portsmouth, NH	30.8	1.8	0.5	-	52.0	7.1	-	-	1.1	123.0	-	-	216.2
Northeastern US - Off Race Point													
Boston, MA	32.5	1.1	563.9	1.3	14.5	810.2	18.9	47.5	-	409.0	-	-	1,899.1
Salem, MA	11.7	-	-	-	-	71.8	-	-	-	-	-	-	83.5
Northeastern US - Cape Cod Bay	-	-	-	-	-	122.4	-	-	0.9	27.8	-	-	151.1
Mid-Atlantic Block Island Sound													
New Bedford, MA	31.9	-	-	-	13.3	-	19.9	2.4	-	9.2	-	-	76.8
Providence, RI	27.2	1.9	-	-	39.8	366.9	-	164.8	1.4	128.3	-	-	730.3
New London, CT	6.4	-	46.2	-	98.5	163.7	-	-	50.6	12.2	-	-	377.7
New Haven, CT	16.6	-	20.9	-	60.6	-	-	-	378.8	163.7	-	-	640.6
Bridgeport, CT	32.5	-	-	0.0	-	-	-	-	169.4	23.4	-	-	225.3
Long Island, NY	-	-	-	0.1	-	210.5	-	-	478.5	254.2	-	-	943.4
Mid-Atlantic Ports of New York/New Jersey	101.3	15.3	10,677.8	-	161.3	1,398.2	124.6	1,820.5	8.1	1,329.0	-	-	15,636.1
Mid-Atlantic Delaware Bay	109.6	2.4	1,215.4	22.0	352.1	111.7	1,669.7	278.3	4.0	1,155.9	-	-	4,921.2
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	181.7	6.5	1,627.0	-	388.5	468.0	31.7	1,797.8	2.3	286.6	-	-	4,790.1
Hampton Roads, VA	211.3	16.5	8,235.1	2.9	264.6	480.4	54.2	657.4	1.2	236.6	-	-	10,160.2
Mid-Atlantic Morehead City and Beaufort, NC	7.6	0.3	25.1	-	15.6	14.3	-	-	-	21.9	-	-	84.8
Mid-Atlantic Wilmington, NC	15.0	1.0	198.8	-	164.4	16.4	-	61.7	5.5	121.7	-	-	584.6
Mid-Atlantic Georgetown, SC	5.5	0.3	1.8	-	30.5	3.8	-	-	-	-	-	-	42.0
Mid-Atlantic Charleston, SC	28.6	-	3,459.1	1.7	132.8	204.2	12.1	237.7	2.4	83.0	-	-	4,161.6
Mid-Atlantic Savannah, GA	34.7	3.0	3,410.5	-	228.7	131.6	88.2	268.2	0.8	159.6	-	-	4,325.3
Southeastern US													
Brunswick, GA	15.6	-	26.9	-	52.4	8.4	24.1	294.9	-	0.1	-	-	422.4
Fernandina, FL	16.0	-	67.0	2.5	95.7	22.6	24.8	9.8	-	-	-	-	238.5
Jacksonville, FL	92.0	3.8	624.0	105.4	180.0	351.0	13.4	632.5	12.9	218.7	-	-	2,233.8
Port Canaveral, FL	3.7	-	7.5	0.0	15.8	557.3	9.5	10.4	1.0	4.7	-	-	610.1
Total	1,056.1	60.4	30,286.0	139.2	2,599.1	6,774.6	2,090.9	6,324.5	1,158.8	5,625.1	-	-	56,114.6

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Impact on Vessel Operations

Figure 4-8 presents the periods for proposed seasonal speed restrictions by port area. SMAs have not been proposed for specific port areas in the NEUS region, instead the SMAs correspond with right whale habitat. However, the analysis assumes that seasonal speed restrictions for the expanded Off Race Point management area would affect vessel arrivals at the port areas in the Northeast region. Note that this alternative does not include speed restrictions for the port area of Port Canaveral. DMAs will be implemented in all areas outside of the proposed seasonal speed restricted periods.

For all port areas in the NEUS (excluding Cape Cod Bay), the seasonal speed restrictions associated with the Off Race Point management area would be effective 61 days per year. For Cape Cod Bay, the seasonal speed restrictions within the management area and the recommended shipping routes would be effective 135 days. Speed restrictions associated with SMAs would be in place for 181 days per year for port areas in the MAUS region, and 152 days per year for the three affected port areas and in the SEUS region.

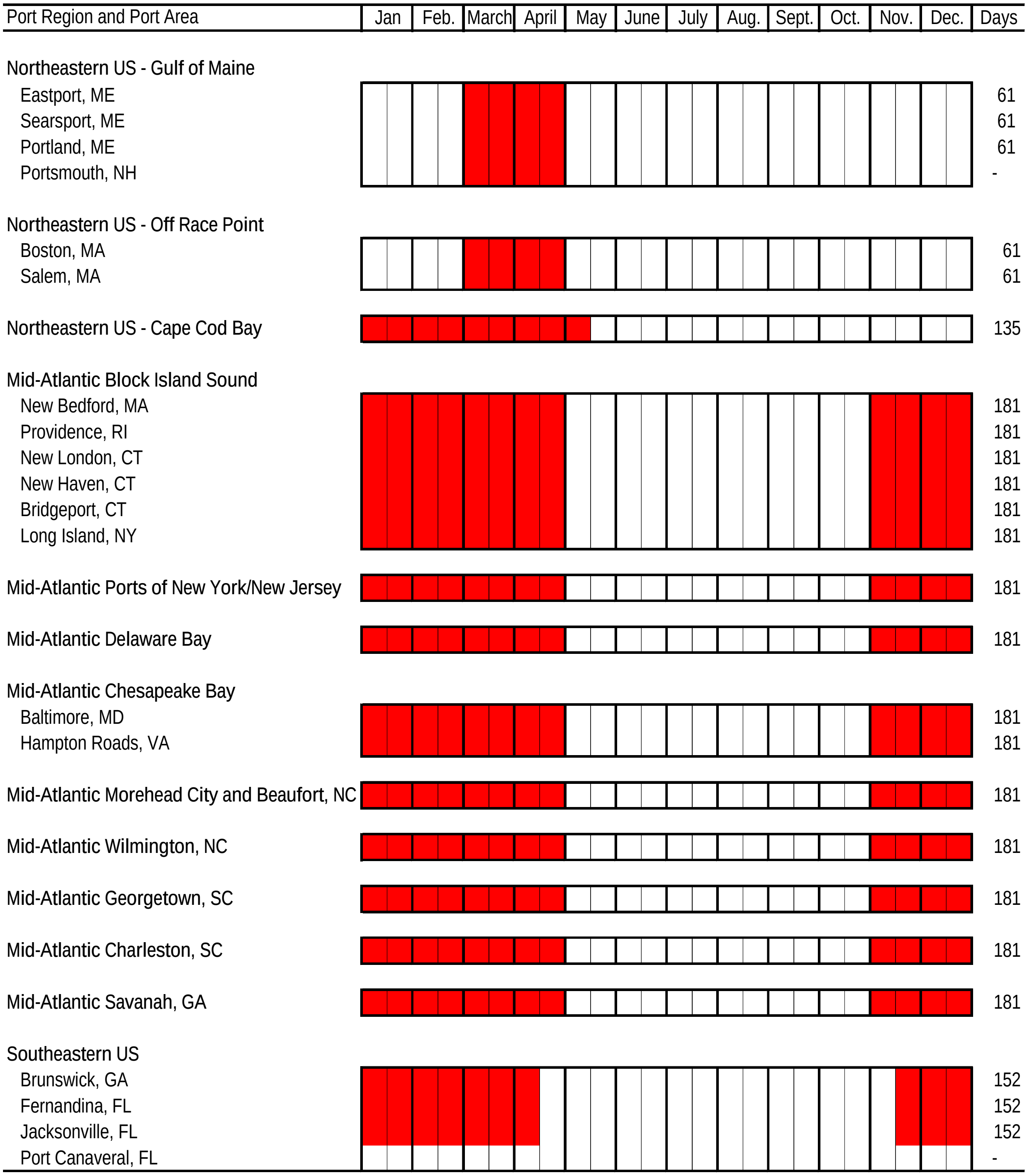
Data Chart 4-14 presents US East Coast arrivals of vessels for 2003 during the periods when speed restrictions are proposed for SMAs established at each port area. In 2003 there were 11,498 vessel arrivals during speed restricted periods, representing approximately 45 percent of the total of 25,532 arrivals for 2003 presented in Chapter 3. Although total arrivals increased in 2004, the percentage of arrivals during speed restricted periods slightly decreased to 43.4 percent. In both years, less than half the vessels calling at US East Coast ports would have been affected by the regulations. While there is some seasonality in US East Coast vessel arrivals, the proposed periods of speed restrictions include both peak periods and nonpeak periods and hence the percentage of restricted arrivals corresponds closely to the percentage of speed restricted days per year.

In terms of port regions, NEUS vessel arrival data indicate that vessel traffic is not at a peak period during the times when whales are present in the NEUS. Only 17 percent of the total vessel arrivals in the Northeast occurred during a restricted period in 2004. (As previously stated this is also influenced by the lower number of restricted days in the NEUS than the other regions; 61 days in the Gulf of Maine and Off Race Point and 135 days in Cape Cod Bay). Therefore, only a small percentage of vessels and port areas in this region would be affected. In the MAUS, just about half (49 percent) of the total vessel arrivals occur during restricted periods (181 days/year), hence this region would be the most affected by the proposed operational measures. The SEUS falls in between the other two regions with one-third of the total vessel arrivals occurring during restricted periods, which also corresponds to the 152 days/year that speed restrictions are in place in the SEUS.

The port area of New York/New Jersey has the most vessel arrivals during speed restricted periods with 2,618 arrivals in 2003 followed by the port areas of Philadelphia (1,315 arrivals), Hampton Roads (1,298 arrivals), Savannah (1,157 arrivals), Charleston (1,140 arrivals), Baltimore (913 arrivals) and Jacksonville (905 arrivals). These seven port areas accounted for 81.3 percent of the total US vessel arrivals during periods with speed restrictions.

In terms of vessel type, containerships recorded the most vessel arrivals during proposed speed restricted periods with 4,165 arrivals in 2003. Tankers were the next most frequent with 2,473 arrivals followed by ro-ro cargo ships with 1,444 arrivals and bulk carriers with 1,243 arrivals.

Alternative 6: Proposed Seasonal Speed Restrictions by Port Area



Source: NOAA.

Figure 4-8

This Page Intentionally Left Blank

Data Chart 4-14
Alternative 6: US East Coast Restricted Vessel Arrivals by Port Area and Vessel Type, 2003

Port Area	Vessel Type: Bulk Carrier	Combination Carrier	Container Ship	Freight Barge	General Dry Cargo Ship	Passenger Ship	Refrigerated Cargo Ship	Ro-Ro Cargo Ship	Tank Barge	Tanker	Towing Vessel	Other a/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	3	-	1	-	3	-	-	-	-	-	-	-	7
Searsport, ME	2	-	-	-	-	-	-	-	-	18	-	-	20
Portland, ME	14	1	1	-	2	-	-	10	1	78	-	-	107
Portsmouth, NH	9	-	-	-	2	-	-	-	1	25	-	-	37
Northeastern US - Off Race Point													
Salem, MA	3	-	-	-	-	-	-	-	-	-	-	-	3
Boston, MA	7	-	20	-	2	-	-	10	-	72	-	1	112
Subtotal	10	0	20	0	2	0	0	10	0	72	0	1	115
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	3	-	-	-	6	-	-	9
Mid-Atlantic Block Island Sound													
New Bedford, MA	29	-	1	-	14	-	3	-	4	6	-	-	57
Providence, RI	41	1	-	-	11	-	3	38	1	62	1	-	158
New London, CT	9	-	2	-	4	17	-	-	41	4	1	-	78
New Haven, CT	31	-	1	1	14	1	-	-	136	96	8	-	288
Bridgeport, CT	13	-	-	-	1	1	29	-	94	25	-	-	163
Long Island, NY	-	1	-	-	-	15	-	-	281	122	2	1	422
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	172	17	1,172	1	28	14	10	347	25	820	9	3	2,618
Mid-Atlantic Delaware Bay													
Philadelphia, PA	179	7	246	5	116	1	246	72	11	420	12	-	1,315
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	153	4	183	-	95	12	3	347	2	101	4	9	913
Hampton Roads, VA	161	11	857	1	66	4	1	79	1	112	1	4	1,298
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	11	-	7	-	17	-	1	1	-	19	-	2	58
Mid-Atlantic Wilmington, NC													
Wilmington, NC	59	4	44	-	63	-	1	11	11	120	1	-	314
Mid-Atlantic Georgetown, SC													
Georgetown, SC	23	-	1	-	5	-	-	-	-	-	-	1	30
Mid-Atlantic Charleston, SC													
Charleston, SC	85	-	735	-	49	21	3	117	13	103	12	2	1,140
Mid-Atlantic Savannah, GA													
Savannah, GA	140	7	655	-	113	3	5	78	4	148	2	2	1,157
Southeastern US													
Brunswick, GA	33	-	11	-	14	1	5	112	-	2	-	-	178
Fernandina, FL	4	-	43	1	42	1	13	-	-	-	7	-	111
Jacksonville, FL	62	1	185	80	102	8	2	222	7	114	117	5	905
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	0
All Port Regions	1,243	54	4,165	89	763	102	325	1,444	633	2,473	177	30	11,498

a/ Other includes fishing vessels, industrial vessels, research vessels, school ships.

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

In 2004, there were 12,189 vessel arrivals at US East Coast ports during the periods when speed restrictions are proposed for each port area (Data Chart 4-15), an increase of 6.0 percent over 2003. The increase is lower than the 7.3 percent shown for total US East Coast vessel arrivals in Chapter 3 for several reasons. First, the SEUS region that recorded an increase of 12.3 percent in total vessel arrivals in 2004 is the region with the fewest speed-restricted days. Second, the port area of New York/New Jersey with the largest number of annual vessel arrivals recorded no increase in vessel arrivals during proposed speed restricted periods.

Data Chart 4-16 presents the key assumptions that are used to analyze the impact of the operational measures in Alternative 6 on vessel operations. The table presents the basis for determining the effective distance that speed restrictions would apply for each port area similar to that previously shown in Data Chart 4-11 for Alternative 5. However, for Alternative 6, port area buffers will have a radius of 30 nm (56 km) and will not be parallel to the coastline as in Alternatives 3 and 5. Hence there is no need to determine the diagonal distance of recommended routes as was calculated for Alternatives 3 and 5.

The effective distance of seasonal speed restrictions and the extra distance resulting from the recommended routes is shown in Data Chart 4-16 for the port areas of Brunswick, Fernandina and Jacksonville are the same as described for Alternative 5. However, the effective period is one month longer.

The additional effective distance shown for port areas in the northeast and for some port areas in the mid-Atlantic is based on the assumption that vessel arrivals at these port areas will have to traverse 54.9 nm (101.7 km) through the large speed restricted area of a combined Off Race Point and Great South Channel management areas that will be implemented from April 1 to April 30. Under Alternatives 3 and 5 this element was effective year-round; under Alternative 6 it is only effective for 30 days and only applies to vessel arrivals that would need to pass through the area.[18]

For the port areas of Providence and New Bedford, an additional effective distance of 13.8 nm (25.6 km) has been assumed from the northern boundary of the Block Island SMA to the pilot buoy for Narragansett Bay as vessels would not be able to regain sea speed after passing through the SMA at a reduced speed. Combined with the 54.9 nm (101.7 km) distance for the Off Race Point and Great South Channel SMAs, this results in a total additional effective distance of 68.7 nm (127.2 km) as shown in Data Chart 4-16.

For the NEUS region, the additional effective distance shown in Data Chart 4-16 is based on an average of the effective distance from March 1 to March 30 (when only the Off Race Point management area is implemented) and the effective distance from April 1 to April 30 (when both Off Race Point and Great South Channel management areas are implemented). For the Gulf of Maine port areas, the effective distance during March is estimated at 36.9 nm (68.3 km) and for April at 60.5 nm (112 km), resulting in an average effective distance of 48.7 nm (90.2 km), as listed in Data Chart 4-16. For the port areas of Boston and Salem, the effective distance for March is estimated at 52.4 nm (97 km) and for April at 72.4 nm (134 km), which yields the average effective distance of 62.4 nm (115.6 km) listed in Data Chart 4-16.

[18] See the discussion under Alternative 3 regarding assumptions as to the percentage of vessel arrivals at mid-Atlantic port areas that would be affected.

Data Chart 4-15
Alternative 6: US East Coast Restricted Vessel Arrivals by Port Area and Vessel Type, 2004

	Vessel Type												
Port Area	Bulk Carrier	Combination Carrier	Container Ship	Freight Barge	General Dry Cargo Ship	Passenger Ship	Refrigerated Cargo Ship	Ro-Ro Cargo Ship	Tank Barge	Tanker	Towing Vessel	Other a/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	5	-	2	-	1	-	-	-	-	-	-	-	8
Searsport, ME	1	-	-	-	-	-	-	-	4	14	-	-	19
Portland, ME	13	-	-	-	2	1	-	11	10	69	5	-	111
Portsmouth, NH	8	1	-	-	3	-	-	-	-	11	1	2	26
Northeastern US - Off Race Point													
Salem, MA	-	-	-	-	-	-	-	-	-	-	-	-	0
Boston, MA	7	-	20	-	2	-	-	10	-	72	-	1	112
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	1	-	-	-	10	-	-	11
Mid-Atlantic Block Island Sound													
New Bedford, MA	26	-	-	-	11	-	4	1	-	5	-	-	47
Providence, RI	33	1	-	-	12	7	-	34	1	57	2	2	149
New London, CT	8	-	4	-	13	10	-	-	36	6	1	-	78
New Haven, CT	14	-	3	-	17	-	-	-	257	83	13	-	387
Bridgeport, CT	34	-	-	1	2	-	13	-	163	21	-	1	235
Long Island, NY	-	-	-	4	-	20	-	-	339	143	-	1	507
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	163	14	1,226	-	43	41	14	345	8	738	20	2	2,614
Mid-Atlantic Delaware Bay													
Philadelphia, PA	163	2	225	13	142	6	223	71	3	470	27	2	1,347
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	190	4	194	-	104	16	3	323	1	140	7	6	988
Hampton Roads, VA	219	13	840	2	81	24	5	76	1	116	11	9	1,397
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	18	1	8	-	13	4	-	-	-	28	-	-	72
Mid-Atlantic Wilmington, NC													
Wilmington, NC	53	3	42	-	66	3	-	14	9	129	1	-	320
Mid-Atlantic Georgetown, SC													
Georgetown, SC	22	1	2	-	11	1	-	-	-	-	-	-	37
Mid-Atlantic Charleston, SC													
Charleston, SC	67	1	798	-	56	42	3	108	4	101	16	5	1,201
Mid-Atlantic Savannah, GA													
Savannah, GA	136	7	648	-	99	33	10	93	1	176	3	1	1,207
Southeastern US													
Brunswick, GA	33	-	7	-	23	4	5	113	-	-	-	3	188
Fernandina, FL	12	-	30	2	50	6	6	1	-	-	11	-	118
Jacksonville, FL	66	2	204	74	91	43	2	231	9	120	154	14	1,010
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	0
All Port Regions	1,291	50	4,253	96	842	262	288	1,431	846	2,509	272	49	12,189

a/ Other includes fishing vessels, industrial vessels, research vessels, school ships.

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004.

Data Chart 4-16
Alternative 6: Effective Distance of Seasonal Speed Restrictions and Duration of DMAs

Port Area	Location of pilot buoy relative to harbor	Distance Stated in NOI	Effective distance to pilot buoy	Diagonal of effective distance	Additional effective distance a/	Extra PARS Distance	PARS Effective Days	Slow down/speed up time	DMA effective days
Northeastern US - Gulf of Maine									
Eastport, ME	n.a.	n.a.	n.a.	n.a.	48.7	0	0	Included	45
Searsport, ME	n.a.	n.a.	n.a.	n.a.	48.7	0	0	Included	45
Portland, ME	n.a.	n.a.	n.a.	n.a.	48.7	0	0	Included	45
Portsmouth, NH	n.a.	n.a.	n.a.	n.a.	48.7	0	0	Included	45
Northeastern US - Off Race Point									
Boston, MA	n.a.	n.a.	n.a.	n.a.	62.4	0	0	n.a.	45
Salem, MA	n.a.	n.a.	n.a.	n.a.	62.4	0	0	n.a.	45
Northeastern US - Cape Cod Bay	5.0	n.a.	n.a.	n.a.	39.9	0	0	n.a.	45
Mid-Atlantic Block Island Sound									
New Bedford, MA	n.a.	30	30	n.a.	68.7	0	0	Included	0
Providence, RI	n.a.	30	30	n.a.	68.7	0	0	Included	0
New London, CT	n.a.	30	30	n.a.	54.9	0	0	Included	0
New Haven, CT	n.a.	30	30	n.a.	54.9	0	0	Included	0
Bridgeport, CT	n.a.	30	30	n.a.	54.9	0	0	Included	0
Long Island, NY	n.a.	30	30	n.a.	54.9	0	0	Included	0
Mid-Atlantic Ports of New York/New Jersey	6.8	30	23.2	n.a.	54.9	0	0	Included	0
Mid-Atlantic Delaware Bay	2.5	30	27.5	n.a.	54.9	0	0	Included	0
Mid-Atlantic Chesapeake Bay									
Baltimore, MD	2.8	30	27.2	n.a.	54.9	0	0	Included	0
Hampton Roads, VA	2.8	30	27.2	n.a.	54.9	0	0	Included	0
Mid-Atlantic Morehead City and Beaufort, NC	6.7	30	23.3	n.a.	n.a.	0	0	n.a.	0
Mid-Atlantic Wilmington, NC	4.1	30	25.9	n.a.	n.a.	0	0	n.a.	0
Mid-Atlantic Georgetown, SC	5.6	30	24.4	n.a.	n.a.	0	0	n.a.	0
Mid-Atlantic Charleston, SC	12.5	30	17.5	n.a.	6.3	0	0	n.a.	0
Mid-Atlantic Savannah, GA	9.7	30	20.3	n.a.	4.9	0	0	n.a.	0
Southeastern US									
Brunswick, GA	6.7	n.a.	n.a.	24.1	3.4	5.5	151	n.a.	15
Fernandina, FL	10.9	n.a.	n.a.	26.8	5.5	9.8	151	n.a.	15
Jacksonville, FL	4.2	n.a.	n.a.	28.8	n.a.	9.2	151	n.a.	15
Port Canaveral, FL	n.a.	n.a.	n.a.	n.a.	n.a.	0	0	n.a.	15

a/ Defined and described in text for each port area.
Source: Nathan Associates as descibed in text.

The DMA effective days assumed for each port area under Alternative 6 are presented in the last column of Data Chart 4-16. The implementation of three DMAs per port area has been assumed for the NEUS Region taking into consideration the sighting of right whales in the Gulf of Maine and for time periods outside of those specified for speed restrictions in the Off Race Point SMA. In the SEUS region, the implementation of one DMA per port area has been assumed taking into consideration the sighting of whales outside of the time periods established for the Southeast SMA. No DMAs for port areas in the MAUS region have been assumed outside of the periods established for SMAs. While not shown separately in Data Chart 4-16, each DMA includes slow-down/speed-up times as described in Alternative 2.

Data Chart 4-17 presents the average minutes of delay for speed restrictions associated with recommended shipping routes in the NEUS and SEUS and SMAs in all three regions. The delays are shown at 12 knots per vessel arrival for each affected port area and vessel type in 2003.[19] The overall average delay for all vessels in 2003 is 43 minutes per arrival.

The longest average delay at 12 knots is experienced at the port areas of Fernandina (68 minutes) and Jacksonville (61 minutes), and Brunswick (57 minutes) due to the combination of speed restrictions and the delays caused by the recommended shipping routes. The port area of Hampton Roads has an average delay of 56 minutes per arrival. This is due to the predominance of large and fast containerships at the port area coupled with the relatively few arrivals of smaller and slower vessel types. Other port areas with above average delays include Baltimore (45 minutes), Providence (45 minutes), and Charleston (43 minutes).

Freight barges incur the longest average delay with an average of 64 minutes per vessel arrival (Figure 4-9). This is due the specialized higher-speed freight barge service from Jacksonville to Puerto Rico. Other vessel types with above average delays are containerships (61 minutes), ro-ro cargo ships (57 minutes), refrigerated cargo vessels (46 minutes), and passenger vessels (46 minutes).

The average minutes of delay for speed restrictions of 10 knots per vessel arrival for each affected port area and vessel type in 2003 is 73 minutes per arrival, a 30-minute increase from 12 knots.

The longest average delay at 10 knots is experienced at the port areas of Fernandina (103 minutes), Jacksonville (96 minutes), and Brunswick (86 minutes) due to the combination of speed restrictions and the delays caused by the recommended routes. The port area of Hampton Roads has an average delay of 87 minutes per arrival. Other port areas with more than 80 minutes of delays include Providence (93 minutes), Boston (82 minutes), New Bedford (81 minutes), and Cape Cod Bay (80 minutes).

Freight barges also incur the longest average delay at 10 knots, with 93 minutes per vessel arrival. Other vessel types with above average delays are containerships (89 minutes), ro-ro cargo ships (87 minutes), passenger vessels (76 minutes) and refrigerated cargo vessels (75 minutes).

[19] The average delay is based on the total minutes of delays for speed restrictions, extra PARS distance and slow-down/speed-up time divided by the number of vessel arrivals by type of vessel for each port area during proposed seasonal speed restriction periods. It does not include delays for DMAs as those delays would need to be divided by vessels affected by DMAs.

Data Chart 4-17
Alternative 6: Average Minutes of Delay for SMA Speed Restrictions at 12 knots per Vessel Arrival by Port Area and Type of Vessel, 2003

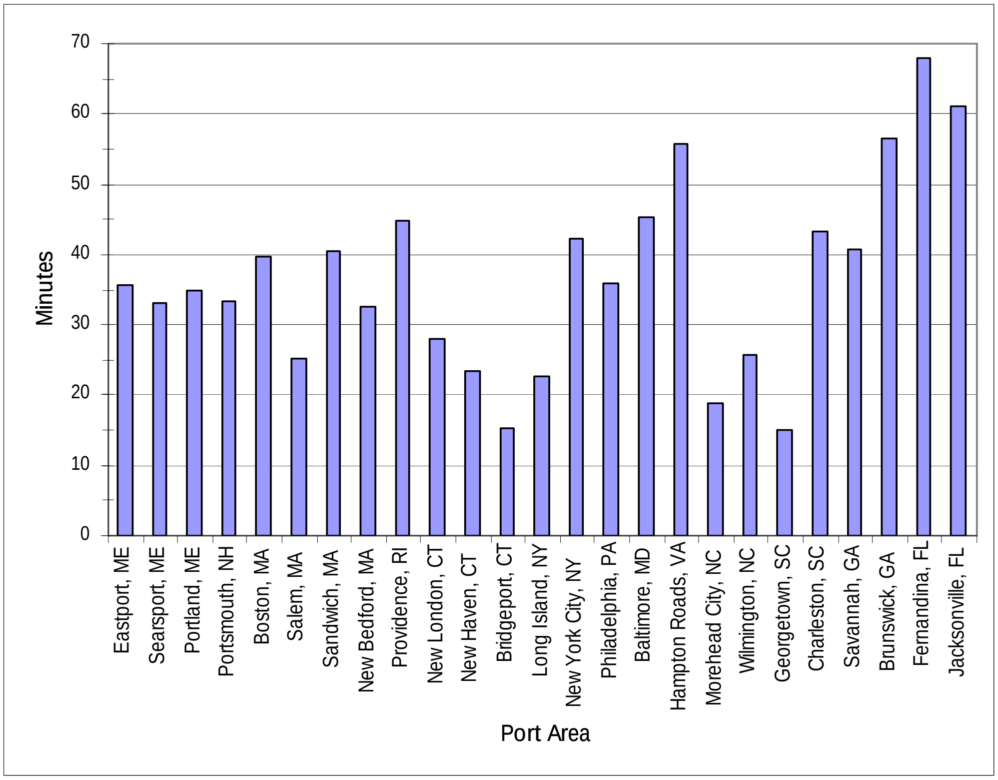
Port Area	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	10.3	-	100.3	-	39.6	-	-	-	-	-	-	-	35.7
Searsport, ME	9.0	-	-	-	-	-	-	-	-	35.8	-	-	33.1
Portland, ME	16.5	33.4	54.2	-	55.3	-	-	27.1	27.7	38.7	-	-	35.0
Portsmouth, NH	19.8	-	-	-	66.2	-	-	-	30.7	35.8	-	-	33.4
Northeastern US - Off Race Point													
Boston, MA	10.6	-	87.2	-	23.4	-	-	20.5	-	33.1	-	-	39.7
Salem, MA	25.2	-	-	-	-	-	-	-	-	-	-	-	25.2
Northeastern US - Cape Cod Bay	-	-	-	-	-	49.9	-	-	-	35.6	-	-	40.4
Mid-Atlantic Block Island Sound													
New Bedford, MA	24.7	-	17.8	-	46.1	-	58.6	-	24.6	34.6	-	-	32.6
Providence, RI	20.1	36.1	-	-	54.3	-	64.0	79.4	22.8	38.6	-	-	44.8
New London, CT	13.7	-	77.4	-	53.7	43.4	-	-	20.5	26.5	-	-	27.9
New Haven, CT	13.1	-	79.5	0.7	49.1	43.4	-	-	22.1	26.4	-	-	23.5
Bridgeport, CT	20.9	-	-	-	-	40.0	-	-	18.4	18.0	-	-	15.3
Long Island, NY	-	25.8	-	-	-	43.4	-	-	20.7	24.6	-	-	22.5
Mid-Atlantic Ports of New York/New Jersey	11.0	19.3	60.3	21.6	25.5	47.3	51.1	48.4	16.2	22.8	-	-	42.3
Mid-Atlantic Delaware Bay	10.4	23.8	53.2	34.6	34.1	53.3	48.7	51.0	20.9	29.0	-	-	36.0
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	14.6	17.9	67.2	-	39.3	52.8	45.3	56.2	20.6	26.1	-	-	45.2
Hampton Roads, VA	14.6	23.6	69.0	24.6	36.7	52.1	48.9	64.1	21.7	26.5	-	-	55.9
Mid-Atlantic Morehead City and Beaufort, NC	6.0	-	40.5	-	20.5	-	8.6	40.8	-	18.5	-	-	18.9
Mid-Atlantic Wilmington, NC	7.8	15.0	54.4	-	31.2	-	31.3	52.7	17.9	20.1	-	-	25.8
Mid-Atlantic Georgetown, SC	8.2	-	48.9	-	42.3	-	-	-	-	-	-	-	15.0
Mid-Atlantic Charleston, SC	8.3	-	52.9	-	33.4	33.9	31.3	42.5	17.8	19.8	-	-	43.3
Mid-Atlantic Savannah, GA	6.2	12.1	55.0	-	27.3	31.4	59.4	44.9	16.2	20.4	-	-	40.7
Southeastern US													
Brunswick, GA	20.5	-	75.0	-	55.4	54.9	59.9	65.5	-	45.2	-	-	56.5
Fernandina, FL	63.2	-	76.0	49.5	67.1	77.1	83.7	-	-	-	-	-	68.1
Jacksonville, FL	53.6	56.2	78.8	67.3	60.8	73.6	73.0	79.0	61.0	62.2	-	-	61.1
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	14.3	20.8	60.9	63.6	39.9	46.1	46.2	57.1	20.9	27.2	-	-	42.7

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Alternative 6: Average Minutes of Delay for SMA Speed Restrictions per Vessel Arrival by Port Area and Type of Vessel, 2003



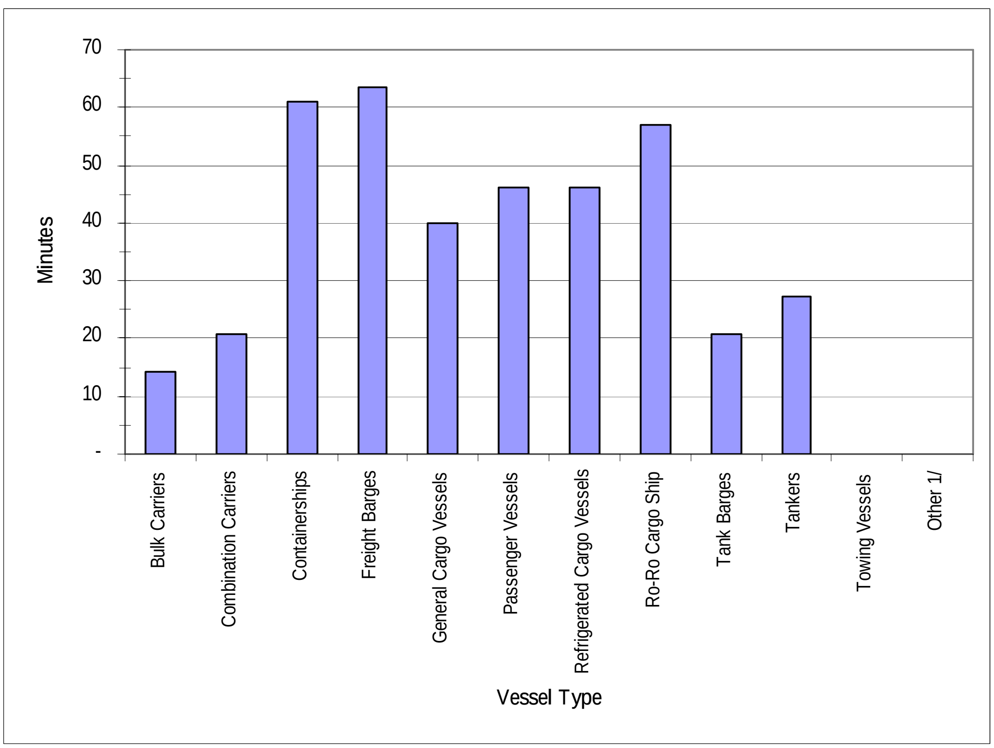


Figure 4-9

Direct Economic Impact of Alternative 6

Data Chart 4-18 presents the direct economic impact of the Alternative 6 combination of speed restrictions in SMAs, DMAs, and recommended routes on the shipping industry in 2003 at 12 knots. The total direct economic impact at 12 knots is estimated at $28.7 million with the port area of New York/New Jersey having the largest impact of $6.8 million. The port area of Hampton Roads is second at $4.9 million, followed by the port areas of Charleston at $3.3 million, Savannah at $3.2 million, Philadelphia at $2.5 million, Jacksonville at $2.3 million, and Baltimore at $2.1 million. The direct economic impact for these seven port areas totals $25.0 million or 87.2 percent of the total for this alternative. No other port area had a direct economic impact over $0.5 million.

Containerships account for 60.4 percent of the total direct economic impact of Alternative 6 with an estimate of $17.3 million. The vessel type with the next largest economic impact is ro-ro cargo ships at $3.8 million followed by tankers at $2.7 million, general cargo vessels at $1.3 million, refrigerated cargo vessels at $1.2 million and passenger vessels at $1.1 million.

Data Chart 4-19 presents the direct economic impact of Alternative 6 in 2004. The total direct economic impact is $30.9 million in 2004, roughly 7.5 percent higher than 2003, which reflects the overall increase in US East Coast vessel arrivals. The rankings for the major vessel types are similar to 2003 with passenger vessels moving ahead of general cargo ships and refrigerated cargo vessels due to the stronger growth in passenger vessel arrivals.

Figure 4-10 presents graphically the direct economic impact by port area for 2003 and 2004. The rankings for the leading port areas are the same as described for 2003 above with the exception of the port area of Savannah moving ahead of the port area of Charleston and the port area of Jacksonville moving ahead of the port area of Baltimore.

The direct economic impact of the combination of speed restrictions and DMAs under Alternative 6 at 10 knots in 2003 is estimated at $45.8 million. As with 12 knots, the port area of New York/New Jersey has the largest impact at $10.5 million. The port area of Hampton Roads is second at $7.2 million, followed by the port areas of Charleston and Savannah at $4.9 million, Philadelphia at $4.3 million, Jacksonville at $3.6 million, and Baltimore at $3.4 million. The direct economic impact for these seven port areas totals $38.8 million or 84.8 percent of the total for this alternative. No other port area had a direct economic impact over $0.9 million.

Containerships account for 54.5 percent of the total direct economic impact of Alternative 6 at 10 knots with an estimate of $24.9 million. The vessel type with the next largest economic impact is ro-ro cargo ships at $5.7 million followed by tankers at $5.7 million, general cargo vessels at $2.1 million, refrigerated cargo vessels at $2.0 million and passenger vessels at $1.8 million.

The total direct economic impact of Alternative 6 at 10 knots in 2004 is $49.4 million in 2004, roughly 8.0 percent higher than 2003 which reflects the overall increase in US East Coast vessel arrivals. The rankings for the major vessel types are similar to 2003 with passenger vessels moving ahead of general cargo ships and refrigerated cargo vessels due to the stronger growth in passenger vessel arrivals.

The rankings for the leading port areas in 2004 are the same as described for 2003 above with the exception of the port area of Savannah moving ahead of the port area of Charleston and the port area of Jacksonville moving ahead of the port area of Baltimore.

The total direct economic impact of Alternative 6 at 14 knots is $18.4 million in 2004.

Data Chart 4-18
Alternative 6: Direct Economic Impact of a 12-knot Speed Restriction on the Shipping Industry by Port Area and Type of Vessel, 2003 ($000s)

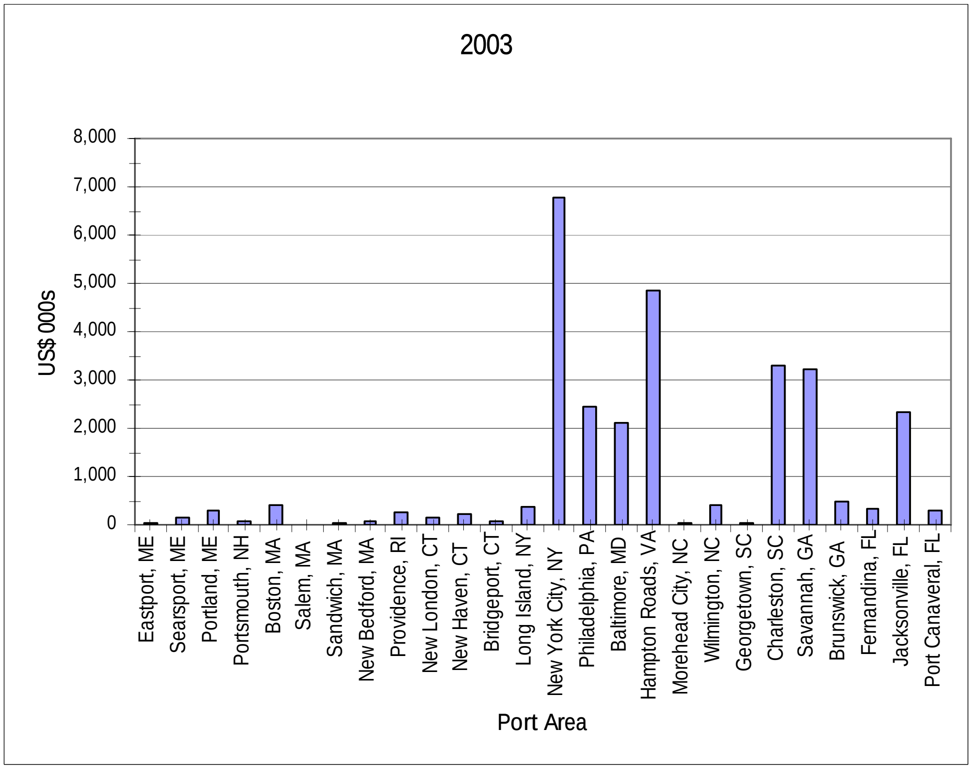
Port Area	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	1.5	-	10.0	-	10.7	-	-	-	-	-	-	-	22.3
Searsport, ME	0.9	0.1	-	-	-	98.4	-	0.1	3.0	36.9	-	-	139.4
Portland, ME	10.8	4.3	6.9	0.2	15.5	32.0	-	14.7	1.6	209.9	-	-	296.0
Portsmouth, NH	10.2	0.3	-	-	9.1	0.9	-	-	1.2	51.2	-	-	72.9
Northeastern US - Off Race Point													
Boston, MA	4.1	0.1	178.0	0.1	2.5	82.8	1.9	10.0	-	117.9	-	-	397.3
Salem, MA	3.1	-	-	-	-	0.9	-	-	-	0.2	-	-	4.2
Northeastern US - Cape Cod Bay	-	-	-	-	-	18.8	-	-	-	8.8	-	-	27.6
Mid-Atlantic Block Island Sound													
New Bedford, MA	22.4	-	0.4	-	17.8	-	10.9	-	3.0	6.6	-	-	61.2
Providence, RI	24.4	1.3	-	-	15.2	-	12.5	109.2	0.7	83.8	-	-	247.2
New London, CT	3.6	-	9.8	-	13.3	81.7	-	-	26.1	3.6	-	-	138.0
New Haven, CT	11.9	-	5.6	0.0	36.9	4.8	-	-	93.9	87.2	-	-	240.4
Bridgeport, CT	8.9	-	-	-	-	4.4	-	-	53.8	15.1	-	-	82.3
Long Island, NY	-	0.9	-	-	-	72.1	-	-	181.2	114.1	-	-	368.3
Mid-Atlantic Ports of New York/New Jersey	56.9	12.0	4,980.7	0.4	27.2	113.2	56.0	823.4	12.5	687.4	-	-	6,769.7
Mid-Atlantic Delaware Bay	54.8	6.6	646.1	4.4	121.3	8.4	939.8	136.9	7.2	526.5	-	-	2,452.0
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	72.4	2.4	756.6	-	152.9	99.3	9.2	901.8	1.3	97.2	-	-	2,093.1
Hampton Roads, VA	78.1	9.7	4,191.8	0.5	93.9	35.0	3.4	324.9	0.7	112.5	-	-	4,850.4
Mid-Atlantic Morehead City and Beaufort, NC	1.9	-	14.5	-	13.4	-	0.5	1.6	-	11.8	-	-	43.7
Mid-Atlantic Wilmington, NC	13.6	2.0	160.2	-	106.3	-	1.9	36.0	6.2	82.8	-	-	409.1
Mid-Atlantic Georgetown, SC	5.6	-	2.2	-	15.6	-	-	-	-	-	-	-	23.4
Mid-Atlantic Charleston, SC	21.1	-	2,790.3	-	91.8	95.3	6.1	219.6	7.5	72.5	-	-	3,304.4
Mid-Atlantic Savannah, GA	25.1	2.7	2,689.8	-	149.4	10.4	55.7	177.5	2.0	104.6	-	-	3,217.2
Southeastern US													
Brunswick, GA	20.6	-	53.9	-	44.6	6.4	23.5	331.4	-	3.3	-	-	483.7
Fernandina, FL	8.1	-	100.7	0.8	117.0	9.1	84.5	0.5	-	0.1	-	-	320.6
Jacksonville, FL	103.2	1.9	727.4	142.5	230.4	80.9	12.1	745.9	14.5	268.8	-	-	2,327.6
Port Canaveral, FL	1.5	0.0	3.3	0.0	6.9	283.6	7.0	4.1	0.2	1.8	-	-	308.3
Total	564.9	44.5	17,328.2	148.9	1,291.6	1,138.3	1,225.2	3,837.6	416.7	2,704.6	-	-	28,700.5

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Alternative 6: Direct Economic Impact on the Shipping Industry by Port Area, 2003 and 2004 ($000s)



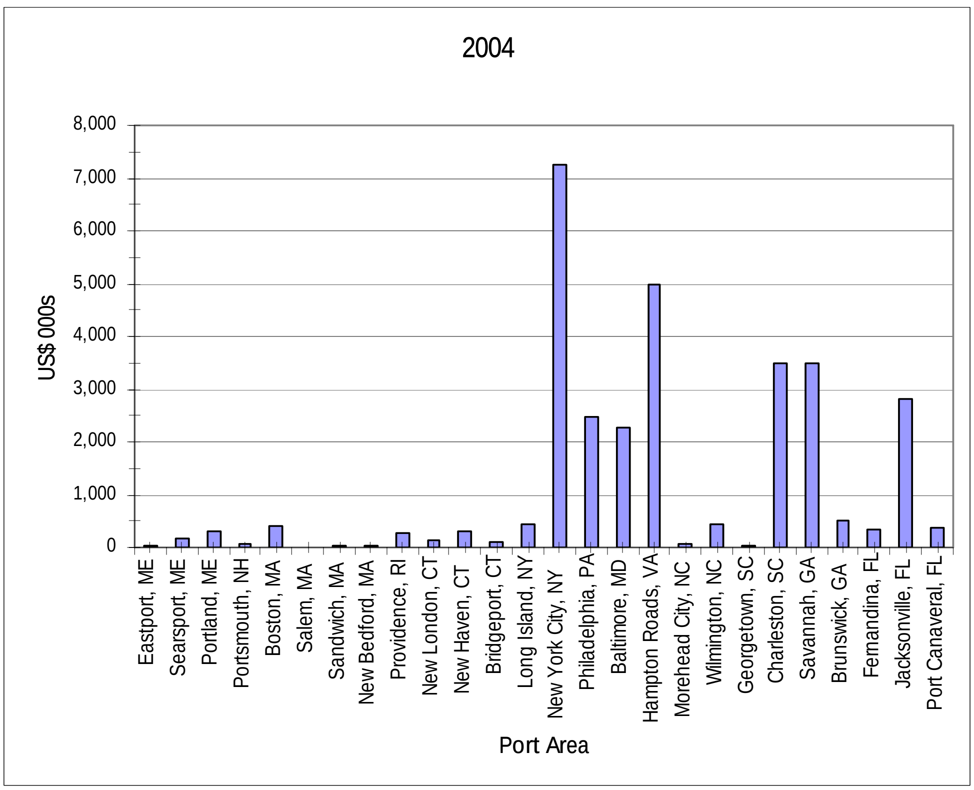


Figure 4-10

Data Chart 4-19
Alternative 6: Direct Economic Impact of a 12-knot Speed Restriction on the Shipping Industry by Port Area and Type of Vessel, 2004 ($000s)

Port Area	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	2.9	-	17.3	-	25.9	-	-	-	-	-	-	-	46.0
Searsport, ME	1.0	-	3.0	0.2	0.3	111.3	-	0.2	5.2	32.1	-	-	153.3
Portland, ME	9.0	0.8	2.9	0.2	13.2	51.0	-	14.8	12.4	203.8	-	-	308.2
Portsmouth, NH	8.7	0.7	0.1	-	14.1	0.9	-	-	0.1	28.4	-	-	53.0
Northeastern US - Off Race Point													
Boston, MA	4.1	0.1	178.0	0.1	2.5	82.8	1.9	10.0	-	117.9	-	-	397.3
Salem, MA	0.9	-	-	-	-	7.6	-	-	-	-	-	-	8.5
Northeastern US - Cape Cod Bay	-	-	-	-	-	14.9	-	-	0.0	14.0	-	-	29.0
Mid-Atlantic Block Island Sound													
New Bedford, MA	18.6	-	-	-	7.9	-	14.6	1.8	-	5.7	-	-	48.6
Providence, RI	13.9	1.4	-	-	26.8	64.9	-	97.6	1.0	78.7	-	-	284.3
New London, CT	3.4	-	20.1	-	50.0	48.0	-	-	24.5	5.6	-	-	151.6
New Haven, CT	6.4	-	11.0	-	27.4	-	-	-	179.4	75.3	-	-	299.4
Bridgeport, CT	16.3	-	-	0.0	-	-	-	-	89.3	10.4	-	-	116.1
Long Island, NY	-	-	-	0.0	-	96.1	-	-	224.8	121.6	-	-	442.6
Mid-Atlantic Ports of New York/New Jersey	47.7	8.7	5,157.1	-	78.8	374.4	64.5	879.8	3.8	640.3	-	-	7,255.0
Mid-Atlantic Delaware Bay	51.1	1.4	609.0	12.8	169.0	38.4	891.2	134.3	2.3	577.4	-	-	2,487.0
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	89.3	3.0	807.0	-	206.8	120.7	16.0	871.9	0.7	145.7	-	-	2,261.1
Hampton Roads, VA	105.3	9.6	4,088.1	0.9	130.4	179.2	31.5	324.8	0.7	118.8	-	-	4,989.1
Mid-Atlantic Morehead City and Beaufort, NC	5.8	0.3	19.4	-	14.0	12.9	-	-	-	17.1	-	-	69.5
Mid-Atlantic Wilmington, NC	9.6	0.9	152.8	-	134.2	10.8	-	44.4	4.9	89.7	-	-	447.2
Mid-Atlantic Georgetown, SC	4.3	-	1.6	-	23.9	3.4	-	-	-	-	-	-	33.1
Mid-Atlantic Charleston, SC	22.3	-	2,905.5	-	112.7	155.6	12.0	197.6	2.4	71.2	-	-	3,479.2
Mid-Atlantic Savannah, GA	24.9	2.6	2,743.0	-	177.1	118.0	83.7	220.7	0.8	128.4	-	-	3,499.2
Southeastern US													
Brunswick, GA	20.4	-	26.9	-	73.1	26.7	24.1	345.3	-	0.1	-	-	516.5
Fernandina, FL	17.3	-	80.4	2.5	119.7	56.8	36.5	9.8	-	-	-	-	323.0
Jacksonville, FL	110.9	3.8	765.6	124.0	225.5	475.1	13.4	777.6	19.0	285.2	-	-	2,800.1
Port Canaveral, FL	2.4	-	3.8	0.0	9.8	334.9	5.8	5.6	0.8	3.0	-	-	366.1
Total	596.4	33.1	17,592.3	140.8	1,642.8	2,384.3	1,195.2	3,936.3	572.1	2,770.6	-	-	30,863.9

a/ Includes recreational vessels

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

4.4.1.7 Comparison of Direct Economic Impacts by Alternative

This section compares the direct economic impact on the shipping industry resulting from the operational measures proposed in Alternatives 2 through Alternative 6 by port area for 2003 and 2004. The estimated direct economic impact for US-flag and foreign-flag vessels is also presented. The alternatives are discussed in descending order in terms of highest direct economic impact in 2003 at a 12-knot speed restriction. Section 4.4.1.8 provides information on the 10- and 14-knot speed restrictions, which have the same ranking at 12 knots.

- **Alternative 5 – Combination of Alternatives** has the highest direct economic impact on the shipping industry estimated at $52.4 million in 2003 (Data Chart 4-20). This alternative also has the highest direct economic impact on US-flag vessels at $5.0 million and foreign–flag vessels at $47.4 million in 2003. With the exception of port areas in the SEUS, this alternative results in the highest direct economic impact on the shipping industry for each port area. It ranks second highest for the ports of the SEUS.
- **Alternative 3 – Speed Restrictions in Designated Areas** has the second highest direct economic impact on the shipping industry estimated at $50.5 million in 2003. This alternative also has the second highest direct economic impact on US-flag vessels at $4.7 million and foreign-flag vessels at $45.7 million in 2003. With the exception of the four port areas in the Southeastern US, this alternative results in the second highest direct economic impact on the shipping industry for each port area. For the port area of Fernandina, the direct economic impact under Alternative 3 is third highest among the alternatives studied. For the other Southeast port areas, the impact under this alternative is the fourth highest.
- **Alternative 6 (Preferred) – NOAA Ship Strike Reduction Strategy** has the third highest direct economic impact on the shipping industry estimated at $28.7 million in 2003. This is slightly more than half of the direct economic impact estimated for Alternative 5. Alternative 6 also has the third highest direct economic impact on US-flag vessels at $3.2 million and foreign-flag vessels at $25.5 million in 2003. This alternative has the highest direct economic impact of the alternatives proposed for the Southeast port areas of Brunswick, Fernandina and Jacksonville. For all other port areas, Alternative 6 ranks third in terms of highest direct economic impact.
- **Alternative 2 – Dynamic Management Areas** ranks fourth in terms of highest direct economic impact on the shipping industry estimated at $9.8 million in 2003. This alternative also has the fourth highest direct economic impact on US-flag vessels at $0.8 million and foreign-flag vessels at $9.1 million in 2003. For the port area of Port Canaveral, Alternative 2 results in the highest direct economic impact of the alternatives proposed at $1.5 million. For the port areas of Brunswick and Jacksonville this alternative ranks third; for all other port areas it ranks fourth.
- **Alternative 4 – Recommended Routes** has the lowest direct economic impact of the proposed alternatives estimated at $1.0 million in 2003. This alternative also has the lowest direct economic impact on US-flag vessels at $0.2 million and foreign-flag vessels at $0.9 million in 2003.

Data Chart 4-21 presents a comparison of the direct economic impact of the operational measures on US and foreign flag vessels by port area for each alternative for 2004. The relative ranking of each alternative is the same as described for 2003 with the minor exception that Alternative 2 moves into the third rank for the port area of Fernandina.

4.4.1.8 Impacts of Alternate Speeds

The EIS considers speeds of 10, 12, and 14 knots for all speed restrictions under each of the alternatives. The economic impact analysis uses 12 knots as the base case assumption. However, this section provides one component of the estimated direct economic impact to the shipping industry at a 10-knot and 14-knot speed restriction. The estimated impacts are obtained through a sensitivity analysis based on the range of speed restrictions. The dollar amounts refer to annual economic impact.

Data Chart 4-22 presents the results of the sensitivity analysis by port area for 2004. The ranking of the alternatives in terms of economic impact does not change with restricted speeds of 10 knots or 14 knots. A change in the speed restriction from 12 knots to 10 knots would generally increase the direct economic impact of each alternative by 60 percent, whereas a change in the restricted speed from 12 knots to 14 knots would generally lower the direct economic impact of each alternative by 40 percent.[20]

The results of the sensitivity analysis show that alternative restricted speed levels dramatically alter the direct economic impact. For example, under Alternative 5, the direct economic impact ranges from $32.9 million dollars with a restricted speed of 14 knots to $89.7 million at 10 knots. For Alternative 6, the range is from $18.4 million to $49.4 million.

At a restricted speed of 10 knots, the direct economic impact on the shipping industry is $89.7 million for Alternative 5; $86.8 million for Alternative 3; $49.4 million dollars for Alternative 6; $17.0 million dollars for Alternative 2; and $1.1 million for Alternative 4.

At a restricted speed of 14 knots, the direct economic impact on the shipping industry is $32.9 million for Alternative 5; $31.2 million for Alternative 3; $18.4 million dollars for Alternative 6; $6.5 million dollars for Alternative 2; and $1.1 million for Alternative 4.

Data Chart 4-23 displays the sensitivity analysis results for each alternative using the economic impact of the 12-knot speed restriction as an index. Thus this Data Chart shows the percent change in direct economic impact of a 10-knot or 14-knot speed restriction from the impact presented for a 12-knot speed restriction. It is evident that changes in economic impacts due to alternative speed restrictions are not uniformly incurred by all port areas. Port areas that are characterized by arrivals of slower vessels show a disproportionate increase in economic impact when the restricted speed is changed from 12 knots to 10 knots since a greater number of vessels become affected. The port areas within Block Island Sound demonstrate this phenomenon. Other port areas such as Charleston and Hampton Roads, whose arrivals consist more of faster vessels do not show as dramatic an increase in direct economic impacts at alternative restricted speeds of 10 knots. This is because the economic impact at 12 knots is more significant for these port areas than those with arrivals of slower vessels and in relative terms do not have many slower vessels that are only affected at the slower restricted speed.

[20] The exception is Alternative 4 that does not change with restricted speeds as this alternative uses the time to cover the increased distance of recommended routes at normal vessel operating speed.

This Page Intentionally Left Blank

Data Chart 4-20
Direct Economic Impact on the Shipping Industry for US and Foreign Flag Vessels by Port Area and Alternative, 2003 ($000s)

Port Area	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total
Northeastern US - Gulf of Maine															
Eastport, ME	-	19.2	19.2	-	98.0	98.0	-	-	-	-	102.2	102.2	-	22.3	22.3
Searsport, ME	7.3	169.0	176.4	37.4	861.5	898.9	-	-	-	39.1	898.8	937.8	7.5	131.9	139.4
Portland, ME	7.1	218.6	225.7	36.2	1,114.4	1,150.6	-	-	-	37.7	1,162.6	1,200.4	13.2	282.8	296.0
Portsmouth, NH	3.0	43.5	46.5	15.3	221.7	237.0	-	-	-	16.0	231.3	247.3	5.2	67.6	72.9
Northeastern US - Off Race Point															
Boston, MA	1.9	288.8	290.7	9.5	1,469.3	1,478.8	3.7	352.4	356.1	13.6	1,885.5	1,899.1	2.4	394.9	397.3
Salem, MA	0.1	2.7	2.8	0.5	13.5	14.1	0.5	5.2	5.7	1.1	19.3	20.4	0.1	4.2	4.2
	-	-	-	-	-	-	-	-	-	-	-	-			
Northeastern US - Cape Cod Bay	-	6.7	6.7	-	77.1	77.1	-	-	-	-	78.0	78.0	-	27.6	27.6
Mid-Atlantic Block Island Sound															
New Bedford, MA	0.6	4.8	5.4	15.3	86.2	101.4	-	-	-	15.3	86.2	101.4	10.1	51.1	61.2
Providence, RI	1.0	37.7	38.7	19.8	608.1	628.0	-	-	-	19.8	608.1	628.0	13.2	233.9	247.2
New London, CT	11.9	3.7	15.6	242.0	60.3	302.3	-	-	-	242.0	60.3	302.3	108.6	29.4	138.0
New Haven, CT	13.3	15.5	28.8	255.1	266.8	521.9	-	-	-	255.1	266.8	521.9	116.1	124.2	240.4
Bridgeport, CT	9.3	5.2	14.5	132.2	37.0	169.2	-	-	-	132.2	37.0	169.2	66.8	15.5	82.3
Long Island, NY	34.0	8.6	42.6	642.1	185.9	828.0	-	-	-	642.1	185.9	828.0	288.7	79.6	368.3
Mid-Atlantic Ports of New York/New Jersey	69.4	1,088.4	1,157.8	919.8	13,622.0	14,541.9	-	-	-	919.8	13,622.0	14,541.9	434.6	6,335.2	6,769.7
Mid-Atlantic Delaware Bay	5.0	307.2	312.2	65.3	4,919.4	4,984.7	-	-	-	65.3	4,919.4	4,984.7	32.3	2,419.8	2,452.0
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	10.1	272.7	282.9	158.6	4,146.9	4,305.5	-	-	-	158.6	4,146.9	4,305.5	78.0	2,015.1	2,093.1
Hampton Roads, VA	65.5	604.9	670.4	976.1	8,945.8	9,921.9	-	-	-	976.1	8,945.8	9,921.9	487.4	4,363.0	4,850.4
Mid-Atlantic Morehead City and Beaufort, NC	0.8	8.6	9.4	4.2	59.5	63.7	-	-	-	4.2	59.5	63.7	2.6	41.1	43.7
Mid-Atlantic Wilmington, NC	5.8	63.9	69.7	40.2	523.9	564.0	-	-	-	40.2	523.9	564.0	28.4	380.7	409.1
Mid-Atlantic Georgetown, SC	-	5.2	5.2	-	29.6	29.6	-	-	-	-	29.6	29.6	-	23.4	23.4
Mid-Atlantic Charleston, SC	115.4	477.6	593.1	778.5	3,162.3	3,940.8	-	-	-	778.5	3,162.3	3,940.8	663.5	2,640.9	3,304.4
Mid-Atlantic Savannah, GA	65.9	2,741.8	2,807.7	95.5	3,899.9	3,995.4	-	-	-	95.5	3,899.9	3,995.4	87.9	3,129.3	3,217.2
Southeastern US															
Brunswick, GA	26.7	273.3	300.1	31.6	217.6	249.2	6.4	48.5	54.9	45.5	338.8	384.3	53.1	430.6	483.7
Fernandina, FL	1.6	120.9	122.5	5.3	151.0	156.3	1.8	41.1	42.9	9.6	259.9	269.5	9.6	311.0	320.6
Jacksonville, FL	297.3	757.0	1,054.3	252.2	729.2	981.4	144.6	422.0	566.7	481.9	1,377.9	1,859.8	643.4	1,684.2	2,327.6
Port Canaveral, FL	10.8	1,530.8	1,541.6	1.2	216.8	218.0	-	-	-	3.3	523.0	526.3	2.2	306.2	308.3
Total	763.8	9,076.5	9,840.3	4,734.0	45,723.7	50,457.7	157.0	869.3	1,026.3	4,992.5	47,431.0	52,423.5	3,155.0	25,545.5	28,700.5

Source: Nathan Associates Inc.

Data Chart 4-21
Direct Economic Impact on the Shipping Industry for US and Foreign Flag Vessels by Port Area and Alternative, 2004 ($000s)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
Port Area	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total	US	Foreign	Total
Northeastern US - Gulf of Maine															
Eastport, ME	-	34.7	34.7	-	176.8	176.8	-	-	-	-	184.5	184.5	-	46.0	46.0
Searsport, ME	22.5	175.1	197.7	114.8	892.7	1,007.6	-	-	-	119.8	931.3	1,051.2	17.7	135.6	153.3
Portland, ME	16.8	232.3	249.1	85.5	1,184.0	1,269.6	-	-	-	89.2	1,235.3	1,324.5	21.6	286.5	308.2
Portsmouth, NH	2.0	38.7	40.7	10.1	197.1	207.3	-	-	-	10.6	205.7	216.2	1.3	51.7	53.0
Northeastern US - Off Race Point															
Boston, MA	1.9	288.8	290.7	9.5	1,469.3	1,478.8	3.7	352.4	356.1	13.6	1,885.5	1,899.1	2.4	394.9	397.3
Salem, MA	2.0	10.9	12.9	10.0	55.4	65.5	4.6	10.6	15.2	15.0	68.5	83.5	1.3	7.2	8.5
	-	-	-	-	-	-	-	-	-	-	-	-			
Northeastern US - Cape Cod Bay	1.0	12.0	12.9	11.0	138.2	149.2	-	-	-	11.2	139.9	151.1	0.4	28.6	29.0
Mid-Atlantic Block Island Sound															
New Bedford, MA	0.9	4.2	5.2	5.9	70.9	76.8	-	-	-	5.9	70.9	76.8	3.8	44.8	48.6
Providence, RI	3.5	36.2	39.8	46.6	683.8	730.3	-	-	-	46.6	683.8	730.3	23.0	261.4	284.3
New London, CT	18.2	11.8	30.0	203.2	174.5	377.7	-	-	-	203.2	174.5	377.7	75.0	76.6	151.6
New Haven, CT	20.0	13.3	33.3	407.0	233.5	640.6	-	-	-	407.0	233.5	640.6	192.7	106.7	299.4
Bridgeport, CT	12.1	3.3	15.4	191.2	34.2	225.3	-	-	-	191.2	34.2	225.3	98.8	17.2	116.1
Long Island, NY	39.3	8.6	47.9	782.5	160.9	943.4	-	-	-	782.5	160.9	943.4	366.0	76.6	442.6
Mid-Atlantic Ports of New York/New Jersey	69.6	1,200.5	1,270.1	929.9	14,706.3	15,636.1	-	-	-	929.9	14,706.3	15,636.1	428.7	6,826.3	7,255.0
Mid-Atlantic Delaware Bay	6.8	312.8	319.6	106.1	4,815.1	4,921.2	-	-	-	106.1	4,815.1	4,921.2	49.0	2,437.9	2,487.0
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	13.5	313.2	326.8	181.0	4,609.1	4,790.1	-	-	-	181.0	4,609.1	4,790.1	82.5	2,178.6	2,261.1
Hampton Roads, VA	67.5	616.6	684.1	1,007.6	9,152.6	10,160.2	-	-	-	1,007.6	9,152.6	10,160.2	504.4	4,484.7	4,989.1
Mid-Atlantic Morehead City and Beaufort, NC	2.4	9.2	11.6	17.4	67.4	84.8	-	-	-	17.4	67.4	84.8	15.3	54.2	69.5
Mid-Atlantic Wilmington, NC	5.8	67.2	73.0	55.0	529.5	584.6	-	-	-	55.0	529.5	584.6	43.2	403.9	447.2
Mid-Atlantic Georgetown, SC	0.3	4.3	4.6	3.8	38.2	42.0	-	-	-	3.8	38.2	42.0	3.4	29.8	33.1
Mid-Atlantic Charleston, SC	131.7	496.3	628.0	877.1	3,284.5	4,161.6	-	-	-	877.1	3,284.5	4,161.6	743.6	2,735.6	3,479.2
Mid-Atlantic Savannah, GA	77.3	2,892.0	2,969.3	126.6	4,198.7	4,325.3	-	-	-	126.6	4,198.7	4,325.3	118.0	3,381.2	3,499.2
Southeastern US															
Brunswick, GA	44.3	245.1	289.4	35.2	246.9	282.1	7.1	53.5	60.7	53.6	368.8	422.4	86.8	429.7	516.5
Fernandina, FL	23.8	109.3	133.1	11.7	114.3	126.1	3.7	36.3	40.0	24.3	214.2	238.5	58.4	264.5	323.0
Jacksonville, FL	311.2	954.4	1,265.6	280.9	908.1	1,189.0	157.3	516.0	673.3	527.9	1,705.9	2,233.8	681.8	2,118.3	2,800.1
Port Canaveral, FL	18.1	1,812.4	1,830.5	2.5	241.5	244.0	-	-	-	6.1	603.9	610.1	3.6	362.5	366.1
Total	912.6	9,903.3	10,815.9	5,512.1	48,383.6	53,895.7	176.3	968.9	1,145.2	5,812.0	50,302.6	56,114.6	3,622.9	27,241.0	30,863.9

Source: Nathan Associates Inc.

Data Chart 4-22
Direct Economic Impact on the Shipping Industry at Restricted Speeds of 10, 12 and 14 knots, 2004 ($000s)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots		
Port Area	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
Northeastern US - Gulf of Maine															
Eastport, ME	56.1	34.7	21.4	285.1	176.8	109.4	-	-	-	297.5	184.5	114.1	74.8	46.0	28.6
Searsport, ME	330.1	197.7	100.6	1,679.2	1,007.6	514.0	-	-	-	1,752.0	1,051.2	536.2	267.5	153.3	69.2
Portland, ME	490.6	249.1	87.2	2,495.2	1,269.6	445.1	-	-	-	2,603.4	1,324.5	464.4	636.1	308.2	89.6
Portsmouth, NH	92.2	40.7	9.2	468.9	207.3	47.0	-	-	-	489.2	216.2	49.0	121.3	53.0	12.1
Northeastern US - Off Race Point															
Boston, MA	511.7	290.7	134.4	2,707.8	1,478.8	658.1	356.1	356.1	356.1	3,178.5	1,899.1	981.3	721.4	397.3	177.6
Salem, MA	22.3	12.9	6.3	118.1	65.5	30.7	15.2	15.2	15.2	138.2	83.5	43.2	14.8	8.5	4.1
Northeastern US - Cape Cod Bay	18.7	12.9	7.3	258.9	149.2	71.9	-	-	-	261.5	151.1	72.9	52.5	29.0	11.5
Mid-Atlantic Block Island Sound															
New Bedford, MA	11.6	5.2	1.2	183.8	76.8	12.8	-	-	-	183.8	76.8	12.8	117.8	48.6	8.7
Providence, RI	69.9	39.8	19.5	1,323.2	730.3	337.0	-	-	-	1,323.2	730.3	337.0	555.7	284.3	112.7
New London, CT	52.3	30.0	13.8	681.5	377.7	166.4	-	-	-	681.5	377.7	166.4	282.0	151.6	64.5
New Haven, CT	77.8	33.3	4.1	1,536.2	640.6	69.5	-	-	-	1,536.2	640.6	69.5	726.5	299.4	31.9
Bridgeport, CT	38.9	15.4	1.3	628.8	225.3	2.0	-	-	-	628.8	225.3	2.0	330.5	116.1	1.1
Long Island, NY	109.2	47.9	7.3	2,211.6	943.4	136.1	-	-	-	2,211.6	943.4	136.1	1,058.4	442.6	62.1
Mid-Atlantic Ports of New York/New Jersey	1,889.4	1,270.1	815.6	23,626.3	15,636.1	9,897.9	-	-	-	23,626.3	15,636.1	9,897.9	11,161.0	7,255.0	4,519.8
Mid-Atlantic Delaware Bay	548.6	319.6	157.7	8,597.9	4,921.2	2,392.2	-	-	-	8,597.9	4,921.2	2,392.2	4,403.4	2,487.0	1,194.9
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	510.4	326.8	195.1	7,634.9	4,790.1	2,809.4	-	-	-	7,634.9	4,790.1	2,809.4	3,662.7	2,261.1	1,308.6
Hampton Roads, VA	994.7	684.1	459.3	15,056.8	10,160.2	6,699.3	-	-	-	15,056.8	10,160.2	6,699.3	7,520.4	4,989.1	3,238.5
Mid-Atlantic Morehead City and Beaufort, NC	22.5	11.6	4.6	166.2	84.8	33.1	-	-	-	166.2	84.8	33.1	134.6	69.5	27.3
Mid-Atlantic Wilmington, NC	125.9	73.0	37.7	1,044.5	584.6	291.4	-	-	-	1,044.5	584.6	291.4	792.7	447.2	225.1
Mid-Atlantic Georgetown, SC	9.4	4.6	2.3	85.8	42.0	19.7	-	-	-	85.8	42.0	19.7	66.9	33.1	15.6
Mid-Atlantic Charleston, SC	904.1	628.0	425.6	6,236.0	4,161.6	2,708.7	-	-	-	6,236.0	4,161.6	2,708.7	5,211.7	3,479.2	2,265.9
Mid-Atlantic Savannah, GA	4,331.5	2,969.3	1,990.8	6,564.6	4,325.3	2,790.8	-	-	-	6,564.6	4,325.3	2,790.8	5,306.5	3,499.2	2,257.0
Southeastern US															
Brunswick, GA	461.9	289.4	172.1	460.2	282.1	165.2	60.7	60.7	60.7	631.2	422.4	280.9	771.5	516.5	341.6
Fernandina, FL	239.5	133.1	67.0	243.4	126.1	59.9	40.0	40.0	40.0	370.3	238.5	145.8	496.9	323.0	203.1
Jacksonville, FL	2,194.5	1,265.6	689.8	2,130.8	1,189.0	630.5	673.3	673.3	673.3	3,473.4	2,233.8	1,480.8	4,344.2	2,800.1	1,868.8
Port Canaveral, FL	2,875.6	1,830.5	1,078.0	397.1	244.0	139.0	-	-	-	972.2	610.1	354.6	575.1	366.1	215.6
Total	16,989.3	10,815.9	6,509.1	86,822.9	53,895.7	31,237.0	1,145.2	1,145.2	1,145.2	89,745.6	56,114.6	32,889.4	49,406.8	30,863.9	18,355.3

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-23
Direct Economic Impact on the Shipping Industry at Restricted Speeds of 10, 12 and 14 knots, 2004 (Indexed 12 Knots = 100)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots		
Port Area	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
Northeastern US - Gulf of Maine															
Eastport, ME	161.6	100.0	61.7	161.2	100.0	61.8	-	-	-	161.3	100.0	61.8	162.6	100.0	62.1
Searsport, ME	167.0	100.0	50.9	166.7	100.0	51.0	-	-	-	166.7	100.0	51.0	174.5	100.0	45.1
Portland, ME	197.0	100.0	35.0	196.5	100.0	35.1	-	-	-	196.6	100.0	35.1	206.4	100.0	29.1
Portsmouth, NH	226.7	100.0	22.6	226.2	100.0	22.7	-	-	-	226.3	100.0	22.7	228.9	100.0	22.7
Northeastern US - Off Race Point															
Boston, MA	176.0	100.0	46.2	183.1	100.0	44.5	100.0	100.0	100.0	167.4	100.0	51.7	181.6	100.0	44.7
Salem, MA	173.4	100.0	48.7	180.4	100.0	46.8	100.0	100.0	100.0	165.6	100.0	51.7	173.4	100.0	48.7
Northeastern US - Cape Cod Bay	144.6	100.0	56.2	173.4	100.0	48.1	-	-	-	173.1	100.0	48.2	181.4	100.0	39.6
Mid-Atlantic Block Island Sound															
New Bedford, MA	222.9	100.0	22.4	239.3	100.0	16.7	-	-	-	239.3	100.0	16.7	242.6	100.0	17.9
Providence, RI	175.7	100.0	49.1	181.2	100.0	46.1	-	-	-	181.2	100.0	46.1	195.4	100.0	39.6
New London, CT	174.4	100.0	46.1	180.4	100.0	44.1	-	-	-	180.4	100.0	44.1	186.0	100.0	42.6
New Haven, CT	233.5	100.0	12.3	239.8	100.0	10.8	-	-	-	239.8	100.0	10.8	242.6	100.0	10.6
Bridgeport, CT	251.9	100.0	8.7	279.0	100.0	0.9	-	-	-	279.0	100.0	0.9	284.7	100.0	0.9
Long Island, NY	227.9	100.0	15.3	234.4	100.0	14.4	-	-	-	234.4	100.0	14.4	239.2	100.0	14.0
Mid-Atlantic Ports of New York/New Jersey	148.8	100.0	64.2	151.1	100.0	63.3	-	-	-	151.1	100.0	63.3	153.8	100.0	62.3
Mid-Atlantic Delaware Bay	171.7	100.0	49.3	174.7	100.0	48.6	-	-	-	174.7	100.0	48.6	177.1	100.0	48.0
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	156.2	100.0	59.7	159.4	100.0	58.7	-	-	-	159.4	100.0	58.7	162.0	100.0	57.9
Hampton Roads, VA	145.4	100.0	67.1	148.2	100.0	65.9	-	-	-	148.2	100.0	65.9	150.7	100.0	64.9
Mid-Atlantic Morehead City and Beaufort, NC	193.4	100.0	39.7	196.0	100.0	39.0	-	-	-	196.0	100.0	39.0	193.6	100.0	39.3
Mid-Atlantic Wilmington, NC	172.6	100.0	51.7	178.7	100.0	49.8	-	-	-	178.7	100.0	49.8	177.3	100.0	50.3
Mid-Atlantic Georgetown, SC	203.6	100.0	49.2	204.5	100.0	46.8	-	-	-	204.5	100.0	46.8	201.8	100.0	46.9
Mid-Atlantic Charleston, SC	143.9	100.0	67.8	149.8	100.0	65.1	-	-	-	149.8	100.0	65.1	149.8	100.0	65.1
Mid-Atlantic Savannah, GA	145.9	100.0	67.0	151.8	100.0	64.5	-	-	-	151.8	100.0	64.5	151.7	100.0	64.5
Southeastern US															
Brunswick, GA	159.6	100.0	59.5	163.2	100.0	58.6	100.0	100.0	100.0	149.4	100.0	66.5	149.4	100.0	66.1
Fernandina, FL	179.9	100.0	50.3	193.1	100.0	47.5	100.0	100.0	100.0	155.3	100.0	61.1	153.8	100.0	62.9
Jacksonville, FL	173.4	100.0	54.5	179.2	100.0	53.0	100.0	100.0	100.0	155.5	100.0	66.3	155.1	100.0	66.7
Port Canaveral, FL	157.1	100.0	58.9	162.8	100.0	57.0	-	-	-	159.4	100.0	58.1	157.1	100.0	58.9
Total	157.1	100.0	60.2	161.1	100.0	58.0	100.0	100.0	100.0	159.9	100.0	58.6	160.1	100.0	59.5

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

4.4.2 Additional Direct Economic Impacts on the Shipping Industry

This section describes additional direct economic impacts on the shipping industry as result of vessels making multiple port calls on the US East Coast and on coastwise shipping vessels. The end of this section ties all of the direct economic costs on the shipping industry together, and describes the impacts relative to the value of US East Cost trade and ocean freight costs.

Impacts on Vessels with Multiple Port Calls on the East Coast

Many of the vessels arrivals at US East Coast ports occur as part of a “string” of port calls by the vessel. For containerships, ro-ro cargo ships, and some specialty tankers, these multi-port calls constitute a scheduled cargo service offered by the shipping lines. Other types of vessels may have multiple US East Coast port calls at part of a coastwise cabotage service for delivering specialty chemicals or other products, or to lighten or top off in order to maximize vessel utilization.

Shipping industry representatives and port officials raised concerns during the stakeholder meetings regarding the cumulative effect of the proposed operational measures of the Strategy and alternatives on vessels calling at multiple East Coast ports during speed-restricted periods. This section identifies the number of vessel arrivals at each port area that are part of a multi-port string during proposed restriction periods and estimates the additional direct economic impact on the shipping industry.

The USCG Vessel Arrival Database described in Chapter 3 was used to determine which vessels made multiple port calls along the US East Coast in 2003 and 2004. For purposes of this analysis, if a vessel arrived at another US East Coast port area within the next two days after its arrival at the preceding US East Coast port, that arrival was considered to be a part of a multi-port string.[21]

Data Chart 4-24 lists sets of multi-port strings that occurred at least 20 times in 2003. Of the total 4,278 occurrences of multi-port strings in 2003, those strings with at least 20 occurrences totaled 2,760 or 65 percent of the total observed. The multi-port string of New York/New Jersey–Hampton Roads–Charleston was the most frequent with 293 occurrences in 2003 followed by the string of New York/New Jersey–Hampton Roads–Savannah with 194 occurrences. The string of New York/New Jersey–Hampton Roads was third with 151 occurrences in 2003.

Data Chart 4-25 presents a similar listing of US East Coast multi-port strings in 2004. Those strings with 20 or more occurrences accounted for 63 percent of the 4,461 total occurrences of multi-port strings that year. While some of the rankings change slightly, it is interesting to note that the port areas of New York/New Jersey or Hampton Roads are part of each of the top ten multi-port strings in 2003 and 2004.

Other port areas with significant participation in multi-port strings each year include Charleston, Savannah, Baltimore, and Philadelphia.

[21] Vessels making multiple port calls within the same port area were not considered as part of a multi-port string as they would not be passing through a speed restricted area for the second port call.

Data Chart 4-24
US East Coast: Most Frequent Multi-Port Strings, 2003

Port Area 1	Port Area 2	Port Area 3	Port Area 4	Occurrences
New York City, NY	Hampton Roads, VA	Charleston, SC		293
New York City, NY	Hampton Roads, VA	Savannah, GA		194
New York City, NY	Hampton Roads, VA			151
Hampton Roads, VA	New York City, NY			143
New York City, NY	Baltimore, MD			139
New York City, NY	Philadelphia, PA			104
Charleston, SC	Hampton Roads, VA	New York City, NY		93
Baltimore, MD	New York City, NY			92
Savannah, GA	Hampton Roads, VA	New York City, NY		84
Savannah, GA	Hampton Roads, VA			76
Charleston, SC	Hampton Roads, VA			69
Charleston, SC	Jacksonville, FL			67
Savannah, GA	New York City, NY			65
Savannah, GA	Charleston, SC			58
Baltimore, MD	Hampton Roads, VA			54
Philadelphia, PA	Hampton Roads, VA			54
Charleston, SC	Wilmington, NC			53
Brunswick, GA	Charleston, SC			46
New York City, NY	Savannah, GA			46
Charleston, SC	New York City, NY			45
New York City, NY	Charleston, SC			43
Charleston, SC	Savannah, GA			41
Philadelphia, PA	New York City, NY			38
Hampton Roads, VA	Savannah, GA			38
Savannah, GA	Charleston, SC	Hampton Roads, VA	New York City, NY	37
Hampton Roads, VA	Charleston, SC			36
Jacksonville, FL	New York City, NY			36
Jacksonville, FL	Charleston, SC			35
Wilmington, NC	Savannah, GA			35
New York City, NY	Hampton Roads, VA	Charleston, SC	New York City, NY	33
Long Island, NY	New York City, NY			33
Philadelphia, PA	Baltimore, MD			28
Savannah, GA	Philadelphia, PA			28
New York City, NY	Baltimore, MD	Hampton Roads, VA		27
Jacksonville, FL	Baltimore, MD	New York City, NY		27
New York City, NY	Baltimore, MD	Savannah, GA		26
Hampton Roads, VA	Philadelphia, PA			26
Jacksonville, FL	Savannah, GA			26
New York City, NY	Baltimore, MD	Hampton Roads, VA	Charleston, SC	25
Hampton Roads, VA	Baltimore, MD			24
Portland, ME	Searsport, ME			24
New York City, NY	Savannah, GA	Hampton Roads, VA	New York City, NY	23
Jacksonville, FL	New York City, NY	Baltimore, MD		22
New York City, NY	Port Canaveral, FL			22
Savannah, GA	Jacksonville, FL			21
New York City, NY	Baltimore, MD	Charleston, SC		20
Hampton Roads, VA	Baltimore, MD	New York City, NY		20
Portland, ME	Boston, MA			20
New Haven, CT	New York City, NY			20
Subtotal				2,760
Other Strings				1,518
Total				4,278

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in the text.

Data Chart 4-25
US East Coast: Most Frequent Multi-Port Strings, 2004

Port Area 1	Port Area 2	Port Area 3	Port Area 4	Occurrences
New York City, NY	Hampton Roads, VA	Charleston, SC		279
New York City, NY	Hampton Roads, VA	Savannah, GA		223
New York City, NY	Hampton Roads, VA			187
Charleston, SC	Hampton Roads, VA	New York City, NY		183
New York City, NY	Baltimore, MD			162
Baltimore, MD	New York City, NY			119
Charleston, SC	Hampton Roads, VA			100
New York City, NY	Philadelphia, PA			99
Hampton Roads, VA	New York City, NY			86
Savannah, GA	New York City, NY			83
Philadelphia, PA	Hampton Roads, VA			69
Savannah, GA	Charleston, SC			65
Charleston, SC	Jacksonville, FL			64
Savannah, GA	Hampton Roads, VA	New York City, NY		58
Jacksonville, FL	New York City, NY			51
Wilmington, NC	Savannah, GA			49
Charleston, SC	Savannah, GA			47
Savannah, GA	Charleston, SC	New York City, NY		45
New York City, NY	Charleston, SC			42
New York City, NY	Hampton Roads, VA	Charleston, SC	New York City, NY	42
New York City, NY	Savannah, GA			40
Hampton Roads, VA	Charleston, SC			39
Charleston, SC	Wilmington, NC			39
New York City, NY	Baltimore, MD	Hampton Roads, VA	Charleston, SC	38
Baltimore, MD	Hampton Roads, VA			38
Philadelphia, PA	New York City, NY			38
New York City, NY	Baltimore, MD	Hampton Roads, VA	New York City, NY	37
Savannah, GA	Philadelphia, PA			37
Hampton Roads, VA	Baltimore, MD			35
Hampton Roads, VA	Savannah, GA			35
Jacksonville, FL	Baltimore, MD	New York City, NY		31
Charleston, SC	Brunswick, GA			31
New York City, NY	Port Canaveral, FL			31
Savannah, GA	Hampton Roads, VA			30
Jacksonville, FL	Savannah, GA			29
New York City, NY	Baltimore, MD	Hampton Roads, VA		28
New York City, NY	Savannah, GA	Hampton Roads, VA	New York City, NY	28
Hampton Roads, VA	Baltimore, MD	New York City, NY		25
Brunswick, GA	Charleston, SC			23
Hampton Roads, VA	Philadelphia, PA			22
Portland, ME	Searsport, ME			22
New York City, NY	Wilmington, NC	Savannah, GA		22
Baltimore, MD	Philadelphia, PA			21
Long Island, NY	New York City, NY			20
Subtotal				2,792
Other Strings				1,669
Total				4,461

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in the text.

The occurrences of multi-port strings presented is based on total US East Coast vessel movements in 2003 and 2004. In the following sections, the impacts are examined for each of the proposed alternatives. The same text and data charts are applicable for Alternatives 3 and 5 (which includes Alternative 3), and are described first in Section 4.4.2.3, and referenced in Section 4.4.2.5.

As with the other sections, this discussion provides details of the economic impact at the base case scenario of a 12-knot speed restriction. The economic impacts of 10- and 14-knot speed restrictions were estimated for 2003 and 2004 and can be referenced in Data Chart 4-43. The impact of a 10-knot speed restriction was assumed to be 20 percent higher than the estimate at 12 knots. The impact of a 14-knot speed restriction was assumed to be 16 percent lower than the estimate at 12 knots.

4.4.2.1 Alternative 1 – No Action Alternative

There are no impacts on vessels making multiple port calls for Alternative 1.

4.4.2.2 Alternative 2 – Dynamic Management Areas

There are no impacts on vessels making multiple US East Coast port calls for Alternative 2. Due to the limited geographic scope at any single point in time, Alternative 2 would not generate an additional direct economic impact due to multi-port strings.

4.4.2.3 Alternative 3 – Speed Restrictions in Designated Areas

The additional direct economic impact on vessels making multiple US East Coast port calls under Alternative 3 was estimated at $5.7 million in 2003 and $6.0 million in 2004.

Seasonal speed restrictions by port area under Alternative 3 were presented earlier in Figure 4-4. They include speed restrictions which would be in place year round in the NEUS, from October 1 through April 30 for the MAUS, and from December 1 through March 31 for the SEUS. The same seasonal speed restrictions apply for Alternative 5, along with other operational measures.[22]

Data Chart 4-26 presents vessel arrivals in 2003 for port areas that are part of multi-port strings when at least two port areas in the string contained speed restrictions. In 2003, 5,955 vessel arrivals fell into this category with the 3,383 containerships arrivals accounting for 57 percent of the total multi-port vessel arrivals during speed-restricted periods. Ro-ro cargo ships with 1,143 arrivals (19 percent) and tankers with 931 arrivals (16 percent) were the other vessel types with the most port calls as part of multi-port strings during restricted periods.

These 5,955 multi-port string restricted arrivals in 2003 represent roughly 39 percent of total US East Coast Alternative 3 restricted vessel arrivals (see Data Chart 4-3). For containerships, the multi-port string restricted arrivals represents 66 percent of the total containership restricted period arrivals. For ro-ro cargo ships, the multi-port string restricted arrivals represents 62 percent of those vessels total restricted arrivals in 2003.

The port area of New York/New Jersey had the most multi-port string restricted arrivals with 1,483 arrivals in 2003. The port area of Hampton Roads was second with 1,081 arrivals, followed by the port areas of Charleston (722 arrivals), Savannah (624 arrivals), Baltimore (570 arrivals), and Philadelphia (343 arrivals).

[22] For simplicity, this section refers to Alternative 3; however, the comments apply equally to Alternative 5.

Data Chart 4-26
Alternatives 3 and 5: US East Coast Restricted Vessel Arrivals that are a part of a Multi-Port String, by Port Area and Vessel Type, 2003

Port Area	Vessel Type: Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	5	-	-	-	6	-	-	-	-	-	-	-	11
Searsport, ME	-	1	-	-	-	56	-	1	-	32	-	-	90
Portland, ME	6	-	-	-	6	12	-	19	-	65	1	-	109
Portsmouth, NH	2	1	-	-	-	1	-	-	-	35	1	-	40
Northeastern US - Off Race Point													
Boston, MA	1	-	21	-	1	57	-	21	-	50	-	-	151
Salem, MA	1	-	-	-	-	1	-	-	-	1	-	-	3
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	8	-	-	-	5	-	-	13
Mid-Atlantic Block Island Sound													
New Bedford, MA	5	-	-	-	4	-	-	-	-	6	-	-	15
Providence, RI	3	1	-	-	3	14	2	25	-	25	-	-	73
New London, CT	5	-	2	-	2	1	-	-	1	3	-	-	14
New Haven, CT	10	-	1	-	6	-	-	-	11	36	2	-	66
Bridgeport, CT	3	-	-	-	-	-	7	-	9	13	-	-	32
Long Island, NY	-	1	-	-	-	1	-	-	8	51	-	-	61
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	14	5	965	-	5	23	8	259	6	194	4	-	1,483
Mid-Atlantic Delaware Bay													
Philadelphia, PA	32	-	122	-	21	7	7	48	2	99	5	-	343
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	24	-	195	-	13	14	-	267	-	53	2	2	570
Hampton Roads, VA	23	2	898	-	25	8	-	82	-	41	-	2	1,081
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	2	-	5	-	5	-	-	1	-	5	-	1	19
Mid-Atlantic Wilmington, NC													
Wilmington, NC	19	4	41	-	18	-	1	6	6	54	1	-	150
Mid-Atlantic Georgetown, SC													
Georgetown, SC	4	-	1	-	3	-	-	-	-	-	-	-	8
Mid-Atlantic Charleston, SC													
Charleston, SC	11	-	550	-	13	10	-	69	3	64	2	-	722
Mid-Atlantic Savannah, GA													
Savannah, GA	21	5	464	-	34	4	5	45	2	43	-	1	624
Southeastern US													
Brunswick, GA	6	-	5	-	3	1	-	53	-	-	-	-	68
Fernandina, FL	-	-	6	-	7	1	-	-	-	-	-	-	14
Jacksonville, FL	6	-	45	-	4	-	-	91	3	28	1	-	178
Port Canaveral, FL	2	-	3	-	5	1	-	6	-	-	-	-	17
All Port Areas	205	20	3,324	0	184	220	30	993	51	903	19	6	5,955

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-27 presents similar information for 2004. The total number of multi-port string restricted arrivals increased by 5.6 percent to 6,287 arrivals. The ranking by vessel type remained unchanged from 2003 with the exception of general cargo vessels moving ahead of bulk carriers for fifth place. In terms of vessel arrivals by port area, the rankings for the top eight port areas remained unchanged from 2003.

Additional Direct Economic Impact

There are several reasons why the cumulative effect of multiple port calls at restricted ports could affect a vessel more than the sum of the individual direct impacts presented in the prior sections. First, the delays incurred from speed restrictions at one port when combined with speed restrictions at a subsequent port may diminish the ability of the vessel to maintain its schedule and could result in missed tidal windows. Second, even brief delays in arrival at the second port could result in increased costs for scheduled, but unused, port labor. Third, some shipping lines felt that the cumulative impact of three or four port calls at port areas with restrictions could cause them to rework vessel itineraries and could result in dropping of one of the port calls in order to maintain a weekly service without having to add an additional vessel to the service.

However, these cumulative factors will not affect every vessel making multiple port calls at restricted ports. In addition, the impact may vary from an eight-hour delay due to a missed tidal window to incurring charges for unused labor if a vessel is late arriving at the port. It is realistic to assume that the shipping industry will revise their itineraries to account for the delays imposed by the speed restrictions and that occurrences of missed tidal widows will be rare. The economic analysis assumes an average additional delay of 30 minutes for each vessel arrival that is part of a multi-port string to account for this cumulative impact. The economic value of this additional time has been calculated for each port area based on the 2005 vessel operating costs by type and size of vessel. The results by port area and type of vessel at a 12-knot speed restriction are presented in Data Chart 4-28 for 2003 and Data Chart 4-29 for 2004.

The additional direct economic impact of multi-port strings on the shipping industry in 2003 is estimated at $5.7 million. The port area of New York/New Jersey has the largest additional economic impact at $1.4 million followed by Hampton Roads at $1.1 million, Charleston at $0.8 million, Savannah at $0.7 million, and Baltimore at $0.4 million. Containerships accounted for 64 percent of the additional economic impact of multi-port strings in 2003.

The additional direct economic impact of multi-port strings in 2004 is estimated at $6.0 million. The ranking of the top six port areas in terms of largest impact remains unchanged from 2003.

The additional direct economic impact of multi-port strings in 2004 at a speed restriction of 10 knots is $7.2 million and $5.0 million at 14 knots. The impacts by alternative and restricted speed can be compared in Data Chart 4-43.

4.4.2.4 Alternative 4 – Recommended Shipping Routes

There are no impacts on vessels making multiple US East Coast port calls for Alternative 4. Due to the limited geographic scope at any single point in time, Alternative 4 would not generate an additional direct economic impact due to multi-port strings.

Data Chart 4-27
Alternatives 3 and 5: US East Coast Restricted Vessel Arrivals that are a Part of a Multi-Port String, by Port Area and Vessel Type, 2004

	Vessel Type												
Port Area	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	9	-	-	-	4	-	-	-	-	-	-	-	13
Searsport, ME	-	-	-	-	1	35	-	-	1	41	3	-	81
Portland, ME	13	-	-	-	7	16	-	14	2	59	6	-	117
Portsmouth, NH	4	2	-	-	2	1	-	-	-	24	1	-	34
Northeastern US - Off Race Point													
Boston, MA	1	-	6	-	-	19	-	15	-	29	-	-	70
Salem, MA	6	-	-	-	-	5	-	-	-	-	-	-	11
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	11	-	-	-	5	-	-	16
Mid-Atlantic Block Island Sound													
New Bedford, MA	10	-	-	-	3	-	-	-	-	6	-	-	19
Providence, RI	8	-	-	-	1	22	-	27	-	19	1	-	78
New London, CT	1	-	3	-	3	1	-	-	2	3	-	-	13
New Haven, CT	2	-	3	-	2	-	-	-	45	36	-	-	88
Bridgeport, CT	4	-	-	-	-	-	6	-	43	17	-	-	70
Long Island, NY	-	-	-	-	-	-	-	-	29	52	-	-	81
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	14	5	1,003	-	20	39	8	261	1	189	2	1	1,543
Mid-Atlantic Delaware Bay													
Philadelphia, PA	13	1	112	2	26	10	7	51	-	99	5	-	326
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	15	-	216	-	24	18	2	278	-	60	4	1	618
Hampton Roads, VA	24	3	921	-	33	14	4	82	-	48	2	2	1,133
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	3	1	3	-	3	4	-	-	-	12	-	1	27
Mid-Atlantic Wilmington, NC													
Wilmington, NC	16	2	39	-	28	4	-	12	-	64	1	1	167
Mid-Atlantic Georgetown, SC													
Georgetown, SC	7	-	-	-	2	1	-	-	-	-	-	-	10
Mid-Atlantic Charleston, SC													
Charleston, SC	4	-	610	-	22	22	2	71	-	67	1	1	800
Mid-Atlantic Savannah, GA													
Savannah, GA	10	4	462	-	29	16	8	50	-	56	1	1	637
Southeastern US													
Brunswick, GA	5	-	6	-	7	1	-	68	-	-	-	-	87
Fernandina, FL	1	-	12	-	7	2	-	1	-	-	-	-	23
Jacksonville, FL	5	-	42	2	7	2	-	93	-	42	2	-	195
Port Canaveral, FL	2	-	4	-	4	7	-	8	-	4	1	-	30
All Port Regions	190	18	3,506	6	260	262	37	1,201	123	978	33	8	6,287

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-28
Alternatives 3 and 5: Additional Direct Economic Impact of Multi-Port Strings on the Shipping Industry, by Port Area and Vessel Type, 2003

	Vessel Type												
Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	2.1	-	-	-	3.8	-	-	-	-	-	-	-	5.9
Searsport, ME	-	0.5	-	-	-	126.4	-	0.4	-	17.9	-	-	145.2
Portland, ME	2.4	-	-	-	2.7	27.5	-	7.7	-	36.3	0.9	-	77.5
Portsmouth, NH	0.8	0.5	-	-	-	3.1	-	-	-	19.1	0.9	-	24.3
Northeastern US - Off Race Point													
Boston, MA	0.4	-	22.8	-	0.3	94.7	-	9.0	-	27.4	-	-	154.6
Salem, MA	0.5	-	-	-	-	1.7	-	-	-	0.6	-	-	2.8
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	14.0	-	-	-	2.9	-	-	16.8
Mid-Atlantic Block Island Sound													
New Bedford, MA	3.9	-	-	-	1.4	-	-	-	-	3.3	-	-	8.5
Providence, RI	1.3	0.5	-	-	1.0	31.8	2.0	14.1	-	14.9	-	-	65.6
New London, CT	2.2	-	1.9	-	1.8	3.1	-	-	0.9	2.0	-	-	11.7
New Haven, CT	4.3	-	1.1	-	5.3	-	-	-	9.8	24.6	1.7	-	46.8
Bridgeport, CT	1.4	-	-	-	-	-	7.3	-	8.0	10.6	-	-	27.3
Long Island, NY	-	0.5	-	-	-	3.1	-	-	7.1	35.7	-	-	46.4
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	6.1	2.6	1,050.9	-	2.2	51.8	11.9	191.0	5.3	123.2	3.5	-	1,448.6
Mid-Atlantic Delaware Bay													
Philadelphia, PA	13.4	-	105.0	-	11.4	14.7	15.9	26.9	1.8	60.4	4.3	-	253.9
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	10.2	-	178.3	-	6.7	30.9	-	189.9	-	29.8	1.7	1.5	449.0
Hampton Roads, VA	11.8	1.1	965.9	-	12.5	19.4	-	78.4	-	23.2	-	1.5	1,113.8
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	1.2	-	4.4	-	2.4	-	-	1.0	-	3.1	-	0.5	12.6
Mid-Atlantic Wilmington, NC													
Wilmington, NC	8.4	2.0	42.7	-	16.4	-	0.9	6.2	5.5	31.5	0.9	-	114.5
Mid-Atlantic Georgetown, SC													
Georgetown, SC	1.7	-	0.7	-	3.2	-	-	-	-	-	-	-	5.6
Mid-Atlantic Charleston, SC													
Charleston, SC	4.7	-	632.9	-	10.8	22.4	-	48.3	2.8	39.8	1.7	-	763.3
Mid-Atlantic Savannah, GA													
Savannah, GA	8.8	2.4	536.9	-	25.7	8.7	14.1	33.0	1.8	26.4	-	0.5	658.3
Southeastern US													
Brunswick, GA	2.4	-	4.5	-	2.8	3.1	-	36.6	-	-	-	-	49.3
Fernandina, FL	-	-	3.0	-	5.4	3.1	-	-	-	-	-	-	11.5
Jacksonville, FL	2.5	-	41.8	-	4.0	-	-	53.2	2.8	15.3	0.9	-	120.4
Port Canaveral, FL	0.8	-	2.8	-	3.0	2.4	-	3.1	-	-	-	-	12.0
All Port Regions	91.2	10.2	3,595.3	0.0	123.0	461.7	52.2	698.7	45.8	547.9	16.5	4.0	5,646.4

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-29
Alternatives 3 and 5: Additional Direct Economic Impact of Multi-Port Strings on the Shipping Industry, by Port Area and Vessel Type, 2004

	Vessel Type												
Port Area	Bulk Carriers	Combination Carriers	Containerships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	3.6	-	-	-	5.6	-	-	-	-	-	-	-	9.2
Searsport, ME	-	-	-	-	0.3	77.5	-	-	0.9	22.6	1.8	-	103.1
Portland, ME	5.3	-	-	-	6.0	42.7	-	5.7	1.8	32.9	3.1	-	97.5
Portsmouth, NH	1.8	0.9	-	-	1.5	3.1	-	-	-	12.3	0.5	-	20.0
Northeastern US - Off Race Point													
Boston, MA	0.4	-	6.8	-	-	31.6	-	6.1	-	14.8	-	-	59.6
Salem, MA	4.1	-	-	-	-	10.4	-	-	-	-	-	-	14.5
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	25.2	-	-	-	2.8	-	-	27.9
Mid-Atlantic Block Island Sound													
New Bedford, MA	6.8	-	-	-	1.0	-	-	-	-	2.9	-	-	10.8
Providence, RI	4.1	-	-	-	0.3	49.6	-	15.8	-	10.2	0.5	-	80.5
New London, CT	0.4	-	2.9	-	4.2	2.4	-	-	1.8	2.0	-	-	13.7
New Haven, CT	0.9	-	2.3	-	1.0	-	-	-	40.0	24.9	-	-	69.0
Bridgeport, CT	1.8	-	-	-	-	-	6.2	-	37.9	14.5	-	-	60.4
Long Island, NY	-	-	-	-	-	-	-	-	25.6	38.2	-	-	63.7
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	5.7	2.3	1,075.8	-	13.1	92.4	9.7	206.2	0.9	118.2	1.7	0.5	1,526.5
Mid-Atlantic Delaware Bay													
Philadelphia, PA	5.4	0.5	93.3	1.3	12.9	17.3	17.8	29.2	-	64.3	4.3	-	246.4
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	8.3	-	194.8	-	14.8	37.5	3.0	198.9	-	36.8	2.6	0.3	497.0
Hampton Roads, VA	12.6	1.4	982.5	-	18.4	32.8	5.9	81.3	-	26.9	1.7	0.7	1,164.1
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	1.6	0.4	2.8	-	2.1	12.2	-	-	-	6.2	-	0.5	25.9
Mid-Atlantic Wilmington, NC													
Wilmington, NC	7.2	1.0	38.5	-	25.3	10.8	-	11.9	-	37.7	0.9	0.5	133.7
Mid-Atlantic Georgetown, SC													
Georgetown, SC	2.9	-	-	-	1.3	3.1	-	-	-	-	-	-	7.3
Mid-Atlantic Charleston, SC													
Charleston, SC	1.6	-	676.8	-	16.1	49.7	3.0	49.6	-	38.9	0.5	0.5	836.7
Mid-Atlantic Savannah, GA													
Savannah, GA	4.3	1.9	539.6	-	28.3	42.6	19.9	37.0	-	32.7	0.9	0.5	707.5
Southeastern US													
Brunswick, GA	2.0	-	4.7	-	6.7	3.1	-	47.9	-	-	-	-	64.3
Fernandina, FL	0.4	-	5.7	-	8.0	6.1	-	1.4	-	-	-	-	21.5
Jacksonville, FL	2.0	-	36.8	1.3	3.7	4.7	-	55.4	-	24.3	1.7	-	130.1
Port Canaveral, FL	0.9	-	3.7	-	3.1	16.5	-	5.2	-	2.1	0.9	-	32.3
All Port Regions	89.6	8.3	3,717.8	3.9	195.1	601.6	65.5	861.4	108.7	592.6	23.7	3.3	6,023.2

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

4.4.2.5 Alternative 5 – Combination of Alternatives

The additional direct economic impact on vessels making multiple US East Coast port calls under Alternative 5 at 12 knots was estimated at $5.7 million in 2003 and $6.0 million in 2004. The additional direct economic impact of multi-port strings in 2004 at a speed restriction of 10 knots is $7.2 million and $5.0 million at 14 knots. As these impacts are the same as Alternative 3, the description in Section 4.4.2.3 also applies to Alternative 5.

4.4.2.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

The additional direct economic impact on vessels making multiple US East Coast port calls under Alternative 6 was estimated at $4.4 million in 2003 and $4.8 million in 2004.

Seasonal speed restrictions by port area under Alternative 6 were presented earlier in Figure 4-8. They include speed restrictions during March and April in the NEUS, from November 1 through April 30 for the MAUS region, and from November 15 through April 15 for the SEUS.

Data Chart 4-30 presents vessel arrivals in 2003 for port areas with speed restrictions that are part of multi-port strings when at least two port areas in the string contained speed restrictions. In 2003, there were 4,829 such total vessel arrivals with the 2,870 containerships arrivals accounting for 59 percent of the total multi-port vessel arrivals during speed restricted periods. Ro-ro cargo ships with 1,075 arrivals (22 percent) and tankers with 722 arrivals (15 percent) were the other vessel types with the most port calls as part of multi-port strings during restricted periods.

The total of 4,829 multi-port string restricted arrivals in 2003 represents roughly 41 percent of total US East Coast Alternative 6 restricted vessel arrivals (see Data Chart 4-15). For containerships, the multi-port string restricted arrivals represents 69 percent of the total containership restricted period arrivals. For ro-ro cargo ships the multi-port string restricted arrivals represents 73 percent of those vessels total restricted arrivals in 2003.

The port area of New York/New Jersey had the most multi-port string restricted arrivals with 1,236 arrivals in 2003. The port area of Hampton Roads was second with 912 arrivals followed by the port areas of Charleston (620 arrivals), Savannah (523 arrivals), Baltimore (481 arrivals) and Philadelphia (289 arrivals).

Data Chart 4-31 presents similar information for 2004. The total number of multi-port string restricted arrivals increased by 6.6 percent to 5,147 arrivals. The ranking by type of vessel remained unchanged from 2003 with the exception of general cargo vessels moving ahead of bulk carriers for fourth place. In terms of vessel arrivals by port area, the rankings for the top eight port areas remained unchanged from 2003.

Additional Direct Economic Impact

The additional direct economic impact of multi-port strings on the shipping industry in 2003 is estimated at $4.4 million (Data Chart 4-32). The port area of New York/New Jersey has the largest additional economic impact at $1.2 million followed by Hampton Roads at $0.9 million, Charleston at $0.6 million, Savannah at $0.5 million, and Baltimore at $0.4 million. Containerships accounted for 69 percent of the additional economic impact of multi-port strings in 2003.

Data Chart 4-30
Alternative 6: US East Coast Restricted Vessel Arrivals that are a Part of Multi-Port String, by Port Area and Vessel Type, 2003

	Vessel Type												
Port Area	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	1	-	-	-	-	-	-	-	-	-	-	-	1
Searsport, ME	-	-	-	-	-	-	-	-	-	9	-	-	9
Portland, ME	1	-	-	-	-	-	-	5	-	20	-	-	26
Portsmouth, NH	-	-	-	-	-	-	-	-	-	15	-	-	15
Northeastern US - Off Race Point													
Boston, MA	1	-	9	-	1	-	-	7	-	26	-	-	44
Salem, MA	1	-	-	-	-	-	-	-	-	-	-	-	1
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	-	-	-	-	4	-	-	4
Mid-Atlantic Block Island Sound													
New Bedford, MA	3	-	-	-	4	-	-	-	-	5	-	-	12
Providence, RI	3	1	-	-	3	-	2	20	-	17	-	-	46
New London, CT	3	-	2	-	2	1	-	-	1	2	-	-	11
New Haven, CT	7	-	1	-	5	-	-	-	11	30	1	-	55
Bridgeport, CT	2	-	-	-	-	-	6	-	9	10	-	-	27
Long Island, NY	-	1	-	-	-	1	-	-	8	42	-	-	52
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	11	5	814	-	5	1	7	226	6	159	2	-	1,236
Mid-Atlantic Delaware Bay													
Philadelphia, PA	25	-	103	1	19	1	7	40	2	86	5	-	289
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	17	-	164	-	14	4	-	236	-	44	1	1	481
Hampton Roads, VA	18	2	764	-	22	1	-	69	-	35	-	1	912
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	2	-	3	-	3	-	-	1	-	4	-	1	14
Mid-Atlantic Wilmington, NC													
Wilmington, NC	18	4	33	-	12	-	1	5	6	46	1	-	126
Mid-Atlantic Georgetown, SC													
Georgetown, SC	4	-	1	-	2	-	-	-	-	-	-	-	7
Mid-Atlantic Charleston, SC													
Charleston, SC	10	-	459	-	10	4	-	75	3	57	2	-	620
Mid-Atlantic Savannah, GA													
Savannah, GA	16	5	387	-	29	2	5	37	2	39	-	1	523
Southeastern US													
Brunswick, GA	7	-	6	-	3	1	-	70	-	-	-	-	87
Fernandina, FL	1	-	6	-	10	1	-	-	-	-	-	-	18
Jacksonville, FL	5	-	53	1	6	-	-	107	3	36	2	-	213
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	0
All Port Regions	169	18	2,870	3	169	19	28	1,075	54	722	16	4	4,829

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-31
Alternative 6: US East Coast Restricted Vessel Arrivals that are a Part of Multi-Port String, by Port Area and Vessel Type, 2004

Port Area	Vessel Type												
	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	3	-	-	-	-	-	-	-	-	-	-	-	3
Searsport, ME	-	-	-	-	-	-	-	-	1	10	-	-	11
Portland, ME	3	-	-	-	1	-	-	5	2	19	-	-	30
Portsmouth, NH	-	1	-	-	-	-	-	-	-	6	-	-	7
Northeastern US - Off Race Point													
Boston, MA	-	-	3	-	-	-	-	5	-	11	-	-	19
Salem, MA	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	1	-	-	-	3	-	-	4
Mid-Atlantic Block Island Sound													
New Bedford, MA	8	-	-	-	2	-	-	-	-	5	-	-	15
Providence, RI	5	-	-	-	-	5	-	22	-	15	-	-	47
New London, CT	1	-	3	-	3	-	-	-	2	3	-	-	12
New Haven, CT	2	-	3	-	2	-	-	-	39	33	-	-	79
Bridgeport, CT	3	-	-	-	-	-	6	-	42	12	-	-	63
Long Island, NY	-	-	-	-	-	-	-	-	24	46	-	-	70
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	9	4	843	-	16	5	7	224	1	151	2	-	1,262
Mid-Atlantic Delaware Bay													
Philadelphia, PA	8	1	100	2	22	4	7	41	-	88	5	-	278
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	10	-	182	-	23	6	2	240	-	49	2	-	514
Hampton Roads, VA	19	3	779	-	28	8	4	69	-	40	2	-	952
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	3	1	3	-	3	4	-	-	-	10	-	-	24
Mid-Atlantic Wilmington, NC													
Wilmington, NC	13	2	33	-	23	3	-	10	-	58	1	-	143
Mid-Atlantic Georgetown, SC													
Georgetown, SC	6	-	-	-	2	1	-	-	-	-	-	-	9
Mid-Atlantic Charleston, SC													
Charleston, SC	4	-	519	-	20	14	2	69	-	60	-	1	689
Mid-Atlantic Savannah, GA													
Savannah, GA	8	4	390	-	23	15	8	42	-	52	1	1	544
Southeastern US													
Brunswick, GA	6	-	6	-	11	4	-	80	-	-	-	-	107
Fernandina, FL	-	-	15	-	9	5	1	1	-	-	-	-	31
Jacksonville, FL	5	-	54	2	10	6	-	103	-	53	1	-	234
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	-
All Port Regions	127	16	3,008	6	228	96	38	1,095	111	777	15	2	5,147

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

Data Chart 4-32
Alternative 6: Additional Direct Economic Impact on the Shipping Industry by Port Area and Vessel Type, 2003

Port Area	Vessel Type												
	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	0.4	-	-	-	-	-	-	-	-	-	-	-	0.4
Searsport, ME	-	-	-	-	-	-	-	-	-	5.2	-	-	5.2
Portland, ME	0.4	-	-	-	-	-	-	2.0	-	11.8	-	-	14.2
Portsmouth, NH	-	-	-	-	-	-	-	-	-	8.0	-	-	8.0
Northeastern US - Off Race Point													
Boston, MA	0.4	-	9.4	-	0.3	-	-	3.0	-	13.9	-	-	27.0
Salem, MA	0.5	-	-	-	-	-	-	-	-	-	-	-	0.5
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3
Mid-Atlantic Block Island Sound													
New Bedford, MA	2.3	-	-	-	1.4	-	-	-	-	2.8	-	-	6.5
Providence, RI	1.3	0.5	-	-	1.0	-	2.0	11.4	-	10.6	-	-	26.8
New London, CT	1.3	-	1.9	-	1.8	3.1	-	-	0.9	1.5	-	-	10.3
New Haven, CT	3.1	-	1.1	-	3.8	-	-	-	9.8	20.3	0.9	-	38.9
Bridgeport, CT	0.9	-	-	-	-	-	6.3	-	8.0	8.7	-	-	23.9
Long Island, NY	-	0.5	-	-	-	3.1	-	-	7.1	29.1	-	-	39.8
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	4.7	2.6	889.0	-	2.2	2.4	10.9	162.6	5.3	100.1	1.7	-	1,181.5
Mid-Atlantic Delaware Bay													
Philadelphia, PA	10.6	-	88.4	0.8	10.1	2.4	15.9	22.3	1.8	51.0	4.3	-	207.7
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	7.3	-	151.6	-	7.0	9.4	-	166.8	-	24.0	0.9	0.8	367.7
Hampton Roads, VA	8.9	1.1	823.3	-	11.1	2.4	-	65.7	-	19.9	-	0.8	933.1
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	1.2	-	2.5	-	2.0	-	-	1.0	-	2.5	-	0.5	9.7
Mid-Atlantic Wilmington, NC													
Wilmington, NC	8.0	2.0	34.5	-	11.2	-	0.9	5.1	5.5	26.8	0.9	-	94.8
Mid-Atlantic Georgetown, SC													
Georgetown, SC	1.7	-	0.7	-	2.3	-	-	-	-	-	-	-	4.6
Mid-Atlantic Charleston, SC													
Charleston, SC	4.2	-	531.6	-	8.2	8.7	-	52.3	2.8	35.3	1.7	-	644.8
Mid-Atlantic Savannah, GA													
Savannah, GA	6.8	2.4	452.1	-	22.5	4.7	14.1	27.2	1.8	24.4	-	0.5	556.3
Southeastern US													
Brunswick, GA	2.9	-	5.4	-	2.8	3.1	-	47.9	-	-	-	-	62.1
Fernandina, FL	0.5	-	3.0	-	8.9	3.1	-	-	-	-	-	-	15.4
Jacksonville, FL	2.1	-	49.7	0.8	5.2	-	-	62.9	2.8	20.9	1.7	-	146.0
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	0.0
All Port Regions	74.9	9.2	3,102.1	2.3	118.8	48.2	50.1	740.9	48.5	440.0	13.9	2.4	4,427.7

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

The additional direct economic impact of multi-port strings in 2004 is estimated at $4.8 million (Data Chart 4-33). The ranking of the top six port areas in terms of largest impact remains unchanged from 2003.

The additional direct economic impact of multi-port strings in 2004 at a 10-knot speed restriction is $5.8 million and $4.1 million at 14 knots. These impacts at alternate speeds are presented in Data Chart 4-41, along with direct and indirect economic impacts.

Re-routing of Southbound Coastwise Shipping

Some of the operational measures would have a direct effect on coastwise shipping. There are no impacts on coastwise shipping under Alternatives 1, 2, or 4; therefore, impacts are only described for Alternatives 3, 5, and 6.

Coastwise shipping or cabotage trade along the US East Coast has always been an important segment of our nation's maritime heritage. In recent years, attention has been focused on the further development of coastwise shipping (also referred to as short-sea shipping) as a means of reducing highway congestion on the eastern seaboard. Benefits of coastwise shipping also include lowering transport and environmental costs and reducing our demand for imported fuel. For these reasons, it is important that the speed restrictions not unduly affect the development of increased coastwise shipping.

However, for commercial and navigation purposes, it appears unlikely that speed restrictions would significantly affect coastwise shipping. Northbound vessels prefer to use the Gulf Stream further offshore and benefit from the enhanced operating speed and fuel efficiency. Southbound traffic routes closer to the East Coast; generally within 7–10 nm (13-18.5 km) of the shoreline. However, during the proposed seasonal management periods, masters of southbound vessels would likely route outside of seasonal speed-restricted areas incurring an overall increase in distance. This affects southbound vessels between the entrance to the Chesapeake Bay and Port Canaveral.

For Alternatives 3 and 5, the proposed speed restrictions would be in effect for a distance of 25 nm (46.3 km) from the coastline along the entire mid-Atlantic coastline. Containerships and ro-ro cargo ships are the vessel types that would be most affected by speed restrictions at intermediate seasonal speed-restricted areas. In 2003, there were 4,142 containership and ro-ro cargo ship restricted period arrivals at East Coast port areas from Baltimore through Port Canaveral. Assuming half of these calls were in the southbound direction and that the typical vessel made calls at three US East Coast ports per service, there would be about 690 southbound vessels that would need to route outside of the seasonal speed restricted areas. Based on an increase in routing of 108 nm[23] and an average operating speed of 20 knots, the containership would have an increased sailing time of 5.4 hours. Using an average hourly operating cost at sea of $1,000, the estimated economic impact for each southbound vessel would be $5,400. For 2003, the additional economic impact for containerships for coastwise shipping under Alternative 3 is estimated at $3.7 million. In 2004, the same assumptions result in an estimated economic impact of $3.8 million.

[23] The vessels are assumed to sail at a distance of 25 nm offshore instead of 8 nm. Based on a diagonal routing to the further offshore sailing route an additional distance of 27 nm is assumed per arrival and departure at the intermediate port calls.

Data Chart 4-33
Alternative 6: Additional Direct Economic Impact on the Shipping Industry by Port Area and Vessel Type, 2004

Port Area	Vessel Type												
	Bulk Carriers	Combination Carriers	Container ships	Freight Barges	General Cargo Vessels	Passenger Vessels a/	Refrigerated Cargo Vessels	Ro-Ro Cargo Ship	Tank Barges	Tankers	Towing Vessels	Other b/	Total
Northeastern US - Gulf of Maine													
Eastport, ME	0.4	-	-	-	-	-	-	-	-	-	-	-	0.4
Searsport, ME	-	-	-	-	-	-	-	-	-	5.2	-	-	5.2
Portland, ME	0.4	-	-	-	-	-	-	2.0	-	11.8	-	-	14.2
Portsmouth, NH	-	-	-	-	-	-	-	-	-	8.0	-	-	8.0
Northeastern US - Off Race Point													
Boston, MA	0.4	-	9.4	-	0.3	-	-	3.0	-	13.9	-	-	27.0
Salem, MA	0.5	-	-	-	-	-	-	-	-	-	-	-	0.5
Northeastern US - Cape Cod Bay													
Cape Cod, MA	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3
Mid-Atlantic Block Island Sound													
New Bedford, MA	2.3	-	-	-	1.4	-	-	-	-	2.8	-	-	6.5
Providence, RI	1.3	0.5	-	-	1.0	-	2.0	11.4	-	10.6	-	-	26.8
New London, CT	1.3	-	1.9	-	1.8	3.1	-	-	0.9	1.5	-	-	10.3
New Haven, CT	3.1	-	1.1	-	3.8	-	-	-	9.8	20.3	0.9	-	38.9
Bridgeport, CT	0.9	-	-	-	-	-	6.3	-	8.0	8.7	-	-	23.9
Long Island, NY	-	0.5	-	-	-	3.1	-	-	7.1	29.1	-	-	39.8
Mid-Atlantic Ports of New York/New Jersey													
New York City, NY	4.7	2.6	889.0	-	2.2	2.4	10.9	162.6	5.3	100.1	1.7	-	1,181.5
Mid-Atlantic Delaware Bay													
Philadelphia, PA	10.6	-	88.4	0.8	10.1	2.4	15.9	22.3	1.8	51.0	4.3	-	207.7
Mid-Atlantic Chesapeake Bay													
Baltimore, MD	7.3	-	151.6	-	7.0	9.4	-	166.8	-	24.0	0.9	0.8	367.7
Hampton Roads, VA	8.9	1.1	823.3	-	11.1	2.4	-	65.7	-	19.9	-	0.8	933.1
Mid-Atlantic Morehead City and Beaufort, NC													
Morehead City, NC	1.2	-	2.5	-	2.0	-	-	1.0	-	2.5	-	0.5	9.7
Mid-Atlantic Wilmington, NC													
Wilmington, NC	8.0	2.0	34.5	-	11.2	-	0.9	5.1	5.5	26.8	0.9	-	94.8
Mid-Atlantic Georgetown, SC													
Georgetown, SC	1.7	-	0.7	-	2.3	-	-	-	-	-	-	-	4.6
Mid-Atlantic Charleston, SC													
Charleston, SC	4.2	-	531.6	-	8.2	8.7	-	52.3	2.8	35.3	1.7	-	644.8
Mid-Atlantic Savannah, GA													
Savannah, GA	6.8	2.4	452.1	-	22.5	4.7	14.1	27.2	1.8	24.4	-	0.5	556.3
Southeastern US													
Brunswick, GA	2.9	-	5.4	-	2.8	3.1	-	47.9	-	-	-	-	62.1
Fernandina, FL	0.5	-	3.0	-	8.9	3.1	-	-	-	-	-	-	15.4
Jacksonville, FL	2.1	-	49.7	0.8	5.2	-	-	62.9	2.8	20.9	1.7	-	146.0
Port Canaveral, FL	-	-	-	-	-	-	-	-	-	-	-	-	0.0
All Port Regions	74.9	9.2	3,102.1	2.3	118.8	48.2	50.1	740.9	48.5	440.0	13.9	2.4	4,427.7

a/ Includes recreational vessels.

b/ Includes fishing vessels, industrial vessels, research vessels, and school ships.

Source: Prepared by Nathan Associates Inc. based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

For Alternative 6, the proposed speed restrictions in the mid-Atlantic region would be implemented for the 30 nm (56 km) radius around each port area. Hence, the additional distance incurred by southbound vessels would be 80 nm (148 km) (20 nm per arrival and departure at intermediate port calls). In 2003, there were 3,688 containership and ro-ro cargo ship restricted period arrivals at US East Coast port areas from Baltimore thorough Port Canaveral. Assuming half of these calls were in the southbound direction and that the typical vessel made calls at three East Coast ports per service, there would be about 615 southbound vessels that would need to route outside of the seasonal speed restricted areas. Based on an increase in routing of 80 nm (148 km)[23] and an average operating speed of 20 knots, the containership would have increased sailing time of 4 hours. Using an average hourly operating cost at sea of $1,000, the estimated economic impact for each southbound vessel would be $4,000. For 2003 and 2004, the additional economic impact for containerships for coastwise shipping under Alternative 6 is estimated at $2.5 million.

Direct Economic Impact on the Shipping Industry Relative to the Value of US East Coast Trade and Ocean Freight Costs

Chapter 3 (Section 3.4.2), presents data collected by the US Census Bureau on volume and value of goods carried by vessels calling at US East Coast ports. It also presents information on vessel import charges that represent the aggregate cost of all freight, insurance, and other charges (excluding US import duties) incurred in bringing the merchandise from alongside the carrier at the port of exportation and placing it alongside the carrier at the first port of entry. In this section the estimates of the direct economic impact on the shipping industry are compared to these indicators of the economic significance of US East Coast maritime activity.

Data Chart 4-34 presents for each port area the significance of the estimated economic impact of the operational measures relative to the value of US East Coast trade in 2003 and 2004. This comparison is useful to determine whether increased shipping costs associated with the proposed operational measures would significantly affect the price and volume of traded goods via US East Coast ports. The direct economic impact on the shipping industry for each alternative is based on the base case analyses presented in this chapter including a speed restriction of 12 knots, unless otherwise stated. The value of trade merchandise is the same as reported in Chapter 3 for US East Coast imports and exports by Customs District and Port. In 2003, the total annual direct economic impact on the shipping industry is of Alternative 5 is $61.8 million while the value of US East Coast trade is $298.7 billion. Thus the direct economic impact represents two-hundredths of one percent of the value of traded merchandise in 2003. For other alternatives the direct economic impact is even smaller. For example, Alternative 6 has a direct economic impact of $35.6 million in 2003, which translates into one one-hundredth of one percent, and remains less than two-hundredths (0.018 percent) at 10 knots. These results indicate that implementation of the proposed operational measures would not have any measurable impact on the volume of merchandise traded through US East Coast ports.

To measure the significance of the operational measures on the shipping industry, it is interesting to compare the estimated direct economic impact with ocean freight costs associated with US East Coast trade. Ocean freight costs are considered as a proxy for shipping industry revenues. Section 3.4.2 states that ocean freight charges averaged 5.3 percent of the value of imports. Given the composition of our trade, it is reasonable to assume that ocean freight charges would represent no less than the same percentage of the value of our exports. Based on these factors, it is estimated that the direct economic impact on the shipping industry for Alternative 5 represents less than four-tenths of one percent of the ocean freight costs for US East Coast trade. For other alternatives the relative economic impact is even smaller. For Alternative 6, the direct economic impact represents only two-tenths of one percent of the ocean freight costs. Even at a 10-knot speed restriction, Alternative 6 represents less than four-tenths of one percent (0.335 percent) in 2004. These results indicate that the implementation of the proposed operational measures would have an insignificant impact on the financial performance of the vessel operators calling at US East Coast ports.

Data Chart 4-34
Economic Impact as a Percent Value of US East Coast Maritime Trade and Ocean Freight Costs, 2003 and 2004

	Alternative				
Item	2	3	4	5	6
2003					
Direct economic impact	9.8	50.5	1.0	52.4	28.7
Additonal direct economic impact due to cumulative effect of mulit-port strings	-	5.7	-	5.7	4.4
Direct economic impact of re-routing of southbound coastwise shipping	-	3.7	-	3.7	2.5
Total direct economic impact on shipping industry	9.8	59.9	1.0	61.8	35.6
Trade Merchandise Value	298,741	298,741	298,741	298,741	298,741
Total direct economic impact as a percent of trade value (%)	0.003%	0.020%	0.000%	0.021%	0.012%
Ocean Freight Costs	15,833	15,833	15,833	15,833	15,833
Total direct economic impact as a percent of ocean freight cost (%)	0.062%	0.378%	0.006%	0.390%	0.225%
2004					
Direct economic impact	10.8	53.9	1.1	56.1	30.8
Additonal direct economic impact due to cumulative effect of mulit-port strings	-	6.0	-	6.0	4.8
Direct economic impact of re-routing of southbound coastwise shipping	-	3.8	-	3.8	2.5
Total direct economic impact on shipping industry	10.8	63.7	1.1	65.9	38.1
Trade Merchandise Value	325,051	325,051	325,051	325,051	325,051
Total direct economic impact as a percent of trade value (%)	0.003%	0.020%	0.000%	0.020%	0.012%
Ocean Freight Costs	17,228	17,228	17,228	17,228	17,228
Total direct economic impact as a percent of ocean freight cost (%)	0.063%	0.370%	0.006%	0.383%	0.221%

Source: Prepared by Nathan Associates from U.S Census Bureau Foreign Trade Statistics for 2003 and 2004 and analysis of U.S. Coast Guard data on vessel calls at U.S. ports as described in text.

4.4.3 Indirect Economic Impacts

Depending on the nature and significance of the direct economic impact, it is possible that implementation of the proposed operational measures could have indirect economic impacts. Potential indirect economic impacts were raised by port authorities, shipping industry representatives, and community leaders during the public stakeholder meetings. Potential indirect economic impacts include:

- Diversion of traffic to other ports.
- Increased intermodal costs due to missed rail and truck connections.
- Impact on local economies of decreased income from jobs lost to traffic diversions.

There are many factors that influence a shipping line's decision to call at specific ports. These include the adequacy and suitability of port facilities and equipment, the ability of the terminal operator to quickly turnaround the vessel, overall cargo demand, efficiency of intermodal transportation, port charges, and the port location relative to other ports and cargo markets. At the stakeholders meeting in Boston, there was particular concern raised over the possibility of traffic diverting to other ports such as Halifax.

The Maritime Administration (MARAD), an agency of the US Department of Transportation has developed a Port Economic Impact Kit that allows users to assess the economic impact of port activity on a region's economy. The MARAD Port Economic Impact Kit uses an adaptation of input-output analysis that is a widely established tool for undertaking economic impact assessments. The model calculates the total economic impacts or multiplier effect on the deep-draft port industry and includes an indirect effect that reflects expenditures made by the supplying firms to meet the requirements of the deep-draft port industry as well as expenditures by firms stocking the supplying firms.

The model also includes an induced effect that corresponds to the change in consumer spending that is generated by changes in labor income accruing to the workers in the deep-draft port industry as well as employment in the supplying businesses.

The MARAD Port Economic Impact Kit was applied in two recent studies of the economic implications of port calls in Boston.[24] These studies estimate that an average containership port call in Boston results in a positive economic impact for the region of approximately $900,000. This analysis used this estimate for the port area of Boston and other major ports and to estimate the impact of port calls diverted to Canadian ports.[25] For other port areas such as Portland and Providence that would generally have smaller vessels calling at the port, this analysis used an estimate of $500,000 of total economic impact per port call.

The indirect economic impact of port diversions in 2003 by alternative, port area, and restricted speed is presented in Data Chart 4-35.

4.4.3.1 Alternative 1 – No Action Alternative

There would be no indirect economic impacts on local economies or vessel operations under the No Action Alternative

4.4.3.2 Alternative 2 – Dynamic Management Areas

There would be no significant, indirect economic impacts on local economies or vessel operations associated with the use of DMAs in Alternative 2.

[24] Haute Kite-Powell, Economic Implications of Possible Reductions in Boston Port Calls due to Ship Strike Management Measures, a report produced for NOAA National Marines Fisheries and MASSPORT, March 2005; and Leigh Fisher Associates, Economic Impact Study of Massachusetts Port Authority and Port of Boston facilities, prepared for MASSPORT and the Greater Boston Chamber of Commerce, Draft Technical Report June 30, 2005.

[25] For purposes of this section, other major port areas are New York/New Jersey, Philadelphia, Baltimore, Hampton Roads, Charleston, Savannah, Jacksonville and Port Canaveral.

Data Chart 4-35
Indirect Economic Impact of Port Diversions by Alternative, Restricted Speed, and Port Area, 2003 ($000s)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restricted speed in knots			Restricted speed in knots			Restricted speed in knots			Restricted speed in knots			Restricted speed in knots		
Port Area	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
Northeastern US - Gulf of Maine															
Eastport, ME	-	-	-	625	500	375	-	-	-	675	550	425	75	50	35
Searsport, ME	-	-	-	125	100	75	-	-	-	135	110	85	-	-	-
Portland, ME	-	-	-	8,375	6,700	5,025	-	-	-	9,045	7,370	5,695	825	550	385
Portsmouth, NH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Off Race Point															
Boston, MA	-	-	-	24,750	19,800	14,850	-	-	-	26,730	21,780	16,830	(700)	(150)	(10)
Salem, MA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Cape Cod Bay															
Cape Cod, MA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Block Island Sound															
New Bedford, MA	-	-	-	75	50	25	-	-	-	80	55	30	15	10	5
Providence, RI	-	-	-	3,375	2,250	1,125	-	-	-	3,600	2,475	1,350	4,750	2,850	1,900
New London, CT	-	-	-	150	100	50	-	-	-	160	110	60	30	20	10
New Haven, CT	-	-	-	75	50	25	-	-	-	80	55	30	15	10	5
Bridgeport, CT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Island, NY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Ports of New York/New Jersey															
New York City, NY	-	-	-	48,222	24,111	8,037	-	-	-	56,259	27,326	11,252	20,507	6,836	1,367
Mid-Atlantic Delaware Bay															
Philadelphia, PA	-	-	-	10,044	5,022	1,674	-	-	-	11,718	5,692	2,344	4,293	1,431	286
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	-	-	-	16,686	8,343	2,781	-	-	-	19,467	9,455	3,893	7,155	2,385	477
Hampton Roads, VA	-	-	-	29,646	14,823	4,941	-	-	-	34,587	16,799	6,917	12,636	4,212	842
Mid-Atlantic Morehead City and Beaufort, NC															
Morehead City, NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Wilmington, NC															
Wilmington, NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Georgetown, SC															
Georgetown, SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Charleston, SC															
Charleston, SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Savannah, GA															
Savannah, GA	-	-	-	38,835	23,301	7,767	(3,250)	(1,950)	(975)	-	-	-	(2,490)	(1,660)	(830)
Southeastern US															
Brunswick, GA	-	-	-	(9,709)	(5,825)	(1,942)	2,325	1,395	698	-	-	-	1,845	1,230	615
Fernandina, FL	-	-	-	(9,709)	(5,825)	(1,942)	925	555	278	-	-	-	645	430	215
Jacksonville, FL	-	-	-	(19,418)	(11,651)	(3,884)	540	360	180	1,440	1,080	720	2,880	2,160	1,440
Port Canaveral, FL	-	-	-	(540)	(360)	(180)	(540)	(360)	(180)	(1,440)	(1,080)	(720)	(2,880)	(2,160)	(1,440)
All Port Areas	-	-	-	141,608	81,489	38,803	-	-	-	162,536	91,777	48,911	49,601	18,204	5,303

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004 as described in text.

4.4.3.3 Alternative 3 – Speed Restrictions in Designated Areas

There would be indirect, long-term, adverse effects on certain port areas and vessel operations as a result of implementing Alternative 3. For Alternative 3, the net indirect economic impact is estimated at a total of $81.5 million in 2003 at a speed restriction of 12 knots. The port areas of New York/New Jersey ($24.1 million), Savannah ($23.3 million), Boston ($19.8 million) and Hampton Roads ($14.8 million) have the largest indirect economic impacts. Note that the port areas of Jacksonville, Brunswick, and Fernandina show a positive net economic impact (in parentheses) as they gain vessel calls diverted from Savannah.

As described in Section 2.2.3, under Alternative 3, there would be year-round speed restrictions established for a large area eastward of Massachusetts Bay, which would extend through the Great South Channel critical habitat area. This speed-restricted area would significantly affect vessel traffic in the Northeast region and port areas from Hampton Roads northward in the mid-Atlantic region. As shown in Data Chart 4-6, the average minutes of delay for a containership in Boston would be 100 minutes per arrival and another 100 minutes per departure. A permanent delay of 3.3 hours per call year-round would be sufficient for shippers and vessel operators to look at alternative ports such as Halifax, Nova Scotia, that would not be affected by the proposed regulations.

A good portion of a port's traffic is often considered captive to that port. For cargoes that are destined for the port's immediate hinterland, it does not make economic sense to call at a distant port and then to ship back to the port via expensive land transport. However, most ports also accommodate traffic that is not destined for its immediate hinterland but is through traffic that may have economically attractive routing alternatives. Port areas in the Northeast and northern parts of the mid-Atlantic region serve as gateways to inland population centers and industrial areas such as western New York, western Pennsylvania, Ohio, Indiana, Illinois, and Michigan. These areas may be served via the Canadian ports of Halifax and Montreal, Quebec, without incurring delays caused by the right whale ship strike reduction measures.

Alternative 3 assumes that 20 percent of the containership and ro-ro cargo ship calls at Northeast ports would divert to Canadian ports with a speed restriction of 12 knots.[26] Port areas in the Block Island area are assumed to lose 10 percent of their vessel calls during restricted periods while the port areas of New York/New Jersey, Philadelphia, Baltimore, and Hampton Roads are assumed to lose 1.5 percent of their containership and ro-ro cargo ship vessel calls during restricted periods.

The economic analysis also assumes that a 12-knot speed restriction under Alternative 3 would lead to the diversion of three percent of the containership and ro-ro cargo ship calls from the port area of Savannah during restricted periods. The speed restrictions would be in effect in Savannah for 212 days as compared to 121 days for the nearby Southeastern port areas of Brunswick, Fernandina, and Jacksonville. This analysis assumes that 25 percent of the diverted Savannah calls would be handled each at Brunswick and Fernandina and the remaining half of the diverted calls would be handled at Jacksonville.

[26] Other types of vessels are less likely to divert as their cargo are more likely to be for the port's immediate hinterland.

On the other hand, the analysis assumes that ten percent of the restricted period cruise vessel calls at Jacksonville would divert to the nearby port area of Port Canaveral under Alternative 3. The diversion is due to over 2.4 hour savings per vessel call since the effective distance of speed restrictions in Port Canaveral is only 4.5 nm (8.3 km) compared to the 30.9 nm (57.2 km) at Jacksonville.

Data Chart 4-36 presents the assumed diversion rates for Alternative 3 with restricted speeds of 10 knots and 14 knots. The economic impact of port diversions in 2003 at 10 knots is $141.6 million and $38.8 million at a 14-knot speed restriction (Data Chart 4-35).

Data Chart 4-36
Percent of Restricted Period Vessel Calls Assumed to be Diverted, by Alternative and Port Area

	Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restricted speed in knots			Restricted speed in knots			Restricted speed in knots			Restricted speed in knots		
Port Area	10	12	14	10	12	14	10	12	14	10	12	14
Northeastern US	25.0%	20.0%	15.0%	-	-	-	27.0%	22.0%	17.0%	15.0%	10.0%	7.0%
Mid-Atlantic Block Island Sound	15.0%	10.0%	5.0%	-	-	-	16.0%	11.0%	6.0%	3.0%	2.0%	1.0%
Selected Mid-Atlantic Ports a/	3.0%	1.5%	0.5%	-	-	-	3.5%	1.7%	0.7%	1.5%	0.5%	0.1%
Savannah, GA	5.0%	3.0%	1.0%	-	-	-	-	-	-	-	-	-
Brunswick, GA	-	-	-	5.0%	3.0%	1.5%	-	-	-	3.0%	2.0%	1.0%
Fernandina, FL	-	-	-	5.0%	3.0%	1.5%	-	-	-	3.0%	2.0%	1.0%
Jacksonville, FL	15.0%	10.0%	5.0%	15.0%	10.0%	5.0%	40.0%	30.0%	20.0%	40.0%	30.0%	20.0%

a/ Includes port areas of New York/New Jersey, Philadelphia, Baltimore and Hampton Roads.

Source: Prepared by Nathan Assoicates as described in text.

4.4.3.4 Alternative 4 – Recommended Shipping Routes

While there may be minor, indirect, long-term, adverse economic impacts on certain ports in the SEUS region, the overall economic impact of Alternative 4 is negligible. The port areas of Brunswick and Fernandina would have delays due to the increased distance associated with the use of recommended routes. Because of these delays, it is assumed that 3 percent of the containership and ro-ro cargo ship calls at these two port areas would divert to the port area of Savannah, which has no proposed operational measures. Under Alternative 4, cruise vessels are assumed to divert again to Port Canaveral where no operational measures have been proposed.

From the perspective of the national economy, there are no indirect economic impacts under Alternative 4. The diverted vessel call at the southeastern port areas of Brunswick, Fernandina, and Jacksonville are offset by the gains in vessels calling at the port areas of Savannah and Port Canaveral.

4.4.3.5 Alternative 5 – Combination of Measures

There would be indirect, long-term, adverse effects on certain port areas and vessel operations under Alternative 5. The indirect economic impact at a speed limit of 12 knots is estimated at $91.8 million in 2003, which is about 13 percent higher than under Alternative 3. The ranking of results is similar to Alternative 3 (Section 4.4.3.3) with the exception that the port of Savannah is not assumed to have vessel calls diverted to the southeastern ports.

Under Alternative 5, the rates of diversion for the affected port areas in the Northeast and mid-Atlantic regions are similar to Alternative 3, except that the additional impact of DMAs and recommended routes is assumed to slightly increase the rate of diversion. The port area of Savannah is assumed not to incur any diversions under Alternative 5 as the delays associated with the increased recommended routes for the Southeast port areas are assumed to offset the longer duration of speed restrictions at Savannah. The port area of Jacksonville would be disadvantaged twice as much under Alternative 5 relative to Port Canaveral. First, Jacksonville would be subject to the increased distance associated with the use of recommended routes, and second, the speed restrictions would be in effect for 30.9 nm (57.2 km) as compared to the 4.5 nm (8.3 km) at Port Canaveral. For these reasons the analysis assumes that 30 percent of the restricted period cruise vessel calls would divert from Jacksonville to Port Canaveral.

The diversion rates for Alternative 5 vary by speed restriction (Data Chart 4-36), thus there is a higher economic impact at a speed restriction of 10 knots ($162.5 million) and a lower impact at 14 knots ($48.9 million) in 2003 (Data Chart 4-35).

4.4.3.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

There would be indirect, long-term, adverse impacts on certain port areas and vessel operations under Alternative 6. For this alternative, the net indirect economic impact at a restricted speed of 12 knots is estimated at $18.2 million. The largest indirect economic losses would be generated in the port areas of New York/New Jersey ($6.8 million), Hampton Roads ($4.2 million), Providence ($2.9 million), Baltimore ($2.4 million), Philadelphia ($1.4 million), and Brunswick ($1.2 million). Two port areas would experience a net indirect economic impact gain: Port Canaveral ($2.2 million) and Savannah ($1.7 million).

Data Chart 4-37 presents the estimated indirect economic impacts for 2004. In general, the estimated indirect economic impacts match closely with those described for 2003. It is interesting to note the large increase in secondary economic impact in Jacksonville under Alternative 6 in 2004 as cruise vessel arrivals increased substantially.

Under Alternative 6, the speed restrictions for a large area in the Northeast will be in effect during the month of April.[27] Hence, the diversion is assumed to be 10 percent for containerships and ro-ro cargo ships during the restricted period.[28] For the port areas in Block Island Sound, the analysis assumes a diversion rate of two percent for containerships and ro-ro cargo ships due to the limited duration of the large speed restriction area. For the affected mid-Atlantic ports, a diversion of 0.5 percent of restricted period containership and ro-ro cargo ship vessel calls has been assumed.

An additional diversion was assumed to occur under Alternative 6 for the port area of Providence. This port area has speed restrictions in effect for 181 days as compared to 61 days for the port area of Boston. Hence it is assumed that 15 percent of the containership and ro-ro cargo ship restricted period calls at Providence would divert to the nearby port area of Boston.

The southeastern ports of Brunswick and Fernandina are assumed to have two percent of their restricted period arrivals of containerships and ro-ro cargo ships diverted to Savannah as the effect of the use of recommended routes creates additional delays relative to Savannah. Finally, 30 percent of the restricted period cruise vessel calls at Jacksonville are assumed to divert to Port Canaveral as that port is not affected by speed restrictions or the use of recommended routes.

[27] Speed restrictions will be in effect for other months in the Northeast region but not the large combined area encompassing Off Race Point and Great South Channel SMAs.
[28] For Alternative 6, speed restrictions are only in place for the months of March and April thus the 10 percent diversion only applies to vessel calls during those months.

Data Chart 4-37
Indirect Economic Impact of Port Diversions by Alternative, Restricted Speed, and Port Area, 2004 ($000s)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restricted speed in knots			Restricted speed in knots			Restricted speed in knots			Restricted speed in knots			Restricted speed in knots		
Port Area	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
Northeastern US - Gulf of Maine															
Eastport, ME	-	-	-	500	400	300	-	-	-	540	440	340	150	100	70
Searsport, ME	-	-	-	375	300	225	-	-	-	405	330	255	-	-	-
Portland, ME	-	-	-	5,125	4,100	3,075	-	-	-	5,535	4,510	3,485	825	550	385
Portsmouth, NH	-	-	-	125	100	75	-	-	-	135	110	85	-	-	-
Northeastern US - Off Race Point															
Boston, MA	-	-	-	24,750	19,800	14,850	-	-	-	26,730	21,780	16,830	(200)	150	190
Salem, MA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeastern US - Cape Cod Bay															
Cape Cod, MA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Block Island Sound															
New Bedford, MA	-	-	-	75	50	25	-	-	-	80	55	30	15	10	5
Providence, RI	-	-	-	3,150	2,100	1,050	-	-	-	3,360	2,310	1,260	4,250	2,550	1,700
New London, CT	-	-	-	375	250	125	-	-	-	400	275	150	60	40	20
New Haven, CT	-	-	-	225	150	75	-	-	-	240	165	90	45	30	15
Bridgeport, CT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Island, NY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Ports of New York/New Jersey															
New York City, NY	-	-	-	49,680	24,840	8,280	-	-	-	57,960	28,152	11,592	21,209	7,070	1,414
Mid-Atlantic Delaware Bay															
Philadelphia, PA	-	-	-	9,369	4,685	1,562	-	-	-	10,931	5,309	2,186	3,996	1,332	266
Mid-Atlantic Chesapeake Bay															
Baltimore, MD	-	-	-	16,605	8,303	2,768	-	-	-	19,373	9,410	3,875	6,980	2,327	465
Hampton Roads, VA	-	-	-	29,052	14,526	4,842	-	-	-	33,894	16,463	6,779	12,366	4,122	824
Mid-Atlantic Morehead City and Beaufort, NC															
Morehead City, NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Wilmington, NC															
Wilmington, NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Georgetown, SC															
Georgetown, SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Charleston, SC															
Charleston, SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mid-Atlantic Savannah, GA															
Savannah, GA	-	-	-	39,015	23,409	7,803	(3,175)	(1,905)	(953)	-	-	-	(2,265)	(1,510)	(755)
Southeastern US															
Brunswick, GA	-	-	-	(9,754)	(5,852)	(1,951)	2,500	1,500	750	-	-	-	1,800	1,200	600
Fernandina, FL	-	-	-	(9,754)	(5,852)	(1,951)	675	405	203	-	-	-	465	310	155
Jacksonville, FL	-	-	-	(15,458)	(9,005)	(2,552)	4,050	2,700	1,350	10,800	8,100	5,400	15,480	11,610	7,740
Port Canaveral, FL	-	-	-	(4,050)	(2,700)	(1,350)	(4,050)	(2,700)	(1,350)	(10,800)	(8,100)	(5,400)	(15,480)	(11,610)	(7,740)
All Port Areas	-	-	-	139,406	79,603	37,251	-	-	-	159,582	89,308	46,956	49,695	18,280	5,355

Source: Prepared by Nathan Associates based on analysis of U.S. Coast Guard data on vessel calls at U.S. ports, 2003-2004 as described in text.

At a speed restriction of 10 knots, the economic impact increases to $49.6 million in 2003, and is only $5.3 million at 14 knots. Data Chart 4-35 presents these impacts by alternative, restricted speed, and port area for 2003.

4.4.3.7 Summary of All Direct and Indirect Economic Impacts on the Shipping Industry and Port Areas

As mentioned in Section 4.4.1, there are several types of impacts on port areas and vessel operations. The total of all the direct, additional direct, and indirect economic impacts on the shipping industry is summarized in Table 4-2. The ranking of the alternatives is the same as mentioned in Section 4.4.1.7.

4.4.4 Impacts on Commercial Fishing Vessels

Commercial fishing is a multimillion dollar industry along the US East Coast. In 2004, commercial fish landings at US East Coast ports totaled $706 million (Data Chart 3-5). The port of New Bedford, MA is the leading US port in terms of value of commercial fish landings with $206.5 million in 2004.

The operational measures of the right whale ship strike reduction strategy and alternatives apply to vessels with a length of 65 feet and greater. Because the USCG data excludes commercial fishing vessels less than 150 GRT, the analysis also evaluated data that included fishing vessels over 65 feet in length and weigh less than 150 GRT, using information provided by NMFS' database of commercial fishing permits. Section 3.4.3 identified that for the Southeast region approximately 84 percent of the fishing vessels over 65 feet are less than 150 tons. For the Northeast region, nearly 67 percent of the fishing vessels over 65 feet are less than 150 tons.

The estimated economic impact of the operational measures on commercial fishing vessels in 2003 at 10 and 12 knots is presented in Data Chart 4-38. The analysis is based on the fishing permits issued in the Northeast and Southeast regions to vessels over 65 feet of LOA and under 150 GRT. The analysis assumes that the commercial fishing vessels are affected for an effective distance of 25 nm (46.3 km) under Alternatives 3 and 5, and 30 nm (56 km) under Alternative 6 each way as they steam to and from fishing areas.

Many commercial fishing vessels steam at 10 knots or below and would not be affected by the operational measures if they were implemented at a 12-knot speed restriction. The typical steaming speed for other commercial fishing vessels is assumed at 12 knots. Based on these assumptions, the commercial fishing vessels would not be affected by alternative speed restrictions of 12 knots or higher. However, these vessels would be affected by the proposed alternative speed restrictions of 10 knots; therefore, all the economic impacts in the following sections would only occur if a 10-knot speed limit were implemented.

4.4.4.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be no impact on the commercial fishing industry. The ship strike reduction measures currently in place would remain unchanged, vessels would continue to go unregulated beyond these measures already in place, and the threat of ship strikes would remain unchanged. All vessels would still be required to adhere to the 500-yard no approach rule for right whales.

Table 4-2
Summary of All Impacts by Alternative at 10, 12, and 14 knots, 2003 and 2004 (millions of dollars)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restriction speed(knots)			Restriction speed(knots)			Restriction speed(knots)			Restriction speed(knots)			Restriction speed(knots)		
Item	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
2003															
Direct economic impact															
Shipping industry vessels	15.4	9.8	5.9	81.0	50.5	29.4	1.0	1.0	1.0	83.5	52.4	30.8	45.8	28.7	17.1
Cumulative effect of multi-port strings	-	-	-	6.8	5.6	4.7	-	-	-	6.8	5.6	4.7	5.3	4.4	3.7
Re-routing of southbound coastwise shipping	-	-	-	3.7	3.7	3.7	-	-	-	3.7	3.7	3.7	2.5	2.5	2.5
Subtotal direct economic impact	15.4	9.8	5.9	91.4	59.8	37.8	1.0	1.0	1.0	94.0	61.8	39.3	53.6	35.6	23.3
Indirect economic impact of port diversions	-	-	-	141.6	81.5	38.8	-	-	-	162.5	91.8	48.9	49.6	18.2	5.3
Total economic impact	15.4	9.8	5.9	233.1	141.3	76.6	1.0	1.0	1.0	256.5	153.5	88.2	103.2	53.8	28.6
2004															
Direct economic impact															
Shipping industry vessels	17.0	10.8	6.5	86.8	53.9	31.2	1.1	1.1	1.1	89.7	56.1	32.9	49.4	30.9	18.4
Cumulative effect of multi-port strings	-	-	-	7.2	6.0	5.1	-	-	-	7.2	6.0	5.1	5.8	4.8	4.1
Re-routing of southbound coastwise shipping	-	-	-	3.8	3.8	3.8	-	-	-	3.8	3.8	3.8	2.5	2.5	2.5
Subtotal direct economic impact	17.0	10.8	6.5	97.9	63.7	40.1	1.1	1.1	1.1	100.8	65.9	41.7	57.7	38.2	24.9
Indirect economic impact of port diversions	-	-	-	139.4	79.6	37.3	-	-	-	159.6	89.3	47.0	49.7	18.3	5.4
Total economic impact	17.0	10.8	6.5	237.3	143.3	77.3	1.1	1.1	1.1	260.4	155.2	88.7	107.4	56.5	30.3

Source: Prepared by Nathan Associates as described in text.

This page intentionally left blank.

Data Chart 4-38
Estimated Economic Impact of Proposed Operational Measures on Commercial Fishing Vessels by Region, 2003

Item	Alternatives 3 and 5 Northeast Region	Alternatives 3 and 5 Southeast Region	Alternative 6 Northeast Region	Alternative 6 Southeast Region
Commercial fishing permits for vessel over 65 ft LOA and under 150 GRT	572	290	572	290
Percent with steaming speed over 10 knots	40%	40%	40%	40%
Vessels potentially affected by speed restrictions	229	116	229	116
Typical steaming speed of affected vessels (knots)	12	12	12	12
Number of trips per year per vessel	20	20	20	20
Minutes of delay per trip with restricted speed of				
12 knots	-	-	-	-
10 knots	50.0	50.0	60.0	60.0
Operating cost per hour of steaming (dollars)	150	150	150	150
Estimated impact per year with restricted speed (dollars)				
12 knots	-	-	-	-
10 knots	572,000	290,000	686,400	348,000

Source: Prepared by Nathan Associates Inc.

4.4.4.2 Alternative 2 – Dynamic Management Areas

Under Alternative 2, commercial fishing vessels 65 feet and greater would not be affected by DMA implementation because captains would have the option of transiting slowly through a DMA precautionary area at a reduced speed. Since the majority of fishing vessels operate at an average of 10 knots, only a select few fishing vessels would have to slow down through a precautionary area. Unlike DAM restrictions under the ALWTRP, there are not any associated fishing gear regulations associated with DMAs in Alternative 2. However, if the DMA is implemented in an area covered by the ALWTRP regulations, then a dual-DAM/DMA may be implemented to reduce the risk of both fishing gear entanglement and ship strike. In this case, fishermen would have to adhere to the restrictions associated with both measures. In the case of a DMA implementation, a captain also has the discretion to route around the DMA, instead of slowing down to transit through the precautionary area. If this option is utilized, then the vessel could incur additional costs in fuel due to the added mileage onto their trip. Although it is assumed that the captain would chose the smallest cost alternative, thus there would be minimal adverse effects, if any. Therefore, there are negligible economic impacts on the commercial fishing industry under Alternative 2.

4.4.4.3 Alternative 3 – Speed Restrictions in Designated Areas

Commercial fishing vessels would not be adversely affected by speed restrictions unless they normally travel at speeds over an average of 12 knots. Vessels that may take fishing trips further offshore and travel at speeds in excess of 12 knots would be slightly affected by Alternative 3. These vessels would remain at sea for longer periods and thus burn more fuel; however, a delay in arriving at the dock or processing plant should not result in any additional costs. With a 10-

knot speed restriction, the estimated impact on commercial fishing vessels in 2003 under Alternative 3 would be $572,000 in the NEUS region, and $290,000 in the SEUS region.

4.4.4.4 Alternative 4 – Recommended Shipping Routes

Alternative 4 would have a negligible effect on fishing vessel operations that utilize the recommended routes in Cape Cod Bay and the ATBA in the Great South Channel. The recommended routes into the ports of Brunswick, Jacksonville, and Port Canaveral in the SEUS should not have an impact on commercial fishing vessel operations because their trips are destined for fishing grounds or the location of fixed gear such as lobster pots, and these vessels do not regularly utilize shipping lanes. Shipping lanes and TSSs are developed for use by vessels calling at specific ports, and fishing vessels generally dock at smaller ports that are separate from larger commercial shipping ports.

Fishing vessels utilizing the Cape Cod Canal would be affected by Alternative 4 if they utilize the recommended routes (Figure 2-12). However if they are concentrating fishing effort within Cape Cod Bay and outside of the lanes, vessels would not adhere to these measures and would not be adversely affected. The majority of fishing vessels are under the weight threshold of 300 GRT for complying with the ATBA (Section 3.4.3), therefore they would not be required to route around the ATBA. Vessels over 65 feet, however would have to transit through the area at a reduced speed, regardless of the vessel weight. Faster fishing vessels could potentially be affected by this measure and would remain at sea for a longer time, possibly burning more fuel, resulting in higher costs; however, as mentioned most of these vessels travel at 10 knots or below. Due to the circumstances mentioned above and the options available to a captain, there are no estimated economic impacts on this industry under Alternative 4.

4.4.4.5 Alternative 5 – Combination of Measures

Under Alternative 5, commercial fishing vessels would not be adversely affected by speed restrictions unless they normally travel at speeds averaging 12 knots or greater. With a 10-knot speed restriction, the estimated adverse impact on commercial fishing vessels in 2003 under Alternative 3 is $572,000 in the NEUS region and $290,000 in the SEUS region.

4.4.4.6 Alternative 6 (Preferred) –Right Whale Ship Strike Reduction Strategy

Under Alternative 6, the estimated adverse economic impact in 2003 on commercial fishing vessels is estimated at $686,000 for the NEUS region and $348,000 for the SEUS region at a speed of 10 knots. The combined NEUS and SEUS regional economic impact of slightly more than $1 million is approximately two-tenths of one percent of the US East Coast commercial fishery landings of $628.2 million in 2003. There would be no impact on vessels if a speed limit of 12 knots is implemented. As the majority of commercial fishing vessels travel at 10 knots or less, there would be minor, if any, impacts on these slower vessels under Alternative 6.

4.4.5 Impacts on Passenger Vessels

The following sections describe the economic impact of the operational measures of the strategy on specific types of other vessels operating within the geographic scope of the strategy.

4.4.5.1 Cruise Industries

The proposed action and alternatives would affect the vast majority of cruise ships since they are longer than 65 ft (19.8 m). The effects on the cruise industry are included in Sections 4.4.1 and 4.4.3, as cruise vessels are included in the USCG arrival database. Please refer to these sections for a description of the operational and economic impacts on the cruise industry by alternative.

4.4.5.2 Ferry Boat Industry

As described in Section 3.4.4.2, the vast majority of passenger vessels operating along the US East Coast sail within the COLREGS lines and thus would not be affected by the proposed operational measures in the alternatives. However, in the southern New England area, a well-developed passenger ferry sector operates beyond the COLREGS line and hence is subject to being affected by the proposed operational measures. A list of major southern New England passenger ferry operators, routes served and service characteristics are presented in Data Chart 4-39 and a complete inventory of ferry vessel operations is included in Appendix E.

Data Chart 4-39
Southern New England Ferry Operators, 2005

Operator	Route	Vessel Speed	Distance	Summer Schedule	Average Adult Fare
Fast Ferries					
Bay State Cruises	Boston-Provincetown	30	50	6 trips daily	32
Boston Harbor Cruises	Boston-Provincetown	39	50	4 trips daily	30
Cross Sound Ferry Service	New London-Block Island	35	30	10 trips daily	15
Cross Sound Ferry Service	New London-Orient Point LI	30	16	12 trips daily	15
Freedom Cruise Line	Harwich-Nantucket	24	30	6 trips daily	26
Hy-Line Cruises	Hyannis- Nantucket	30	27	10 trips daily	31
Hy-Line Cruises	Hyannis-Martha's Vineyard	24	20	8 trips daily	14
Island High Speed Ferry	Point Judith-Block Island	33	11	12 trips daily	15
New England Fast Ferry	New Bedford- Martha's Vineyard	30	30	10 trips daily	25
Steamship Authority	Hyannis- Nantucket	30	27	10 trips daily	28
Vineyard Fast Ferry	Quonset Point-Martha's Vineyard	33	50	4 trips daily	30
Regular Ferries					
Bay State Cruises	Boston-Provincetown	16	50	2 trips Sat and Sun	15
Capt. John Boats	Plymouth-Provincetown	14	25	2 trips daily	18
Cross Sound Ferry Service	New London-Orient Point LI	13	16	30 trips daily	10
Hy-Line Cruises	Hyannis- Nantucket	15	27	6 trips daily	16
Hy-Line Cruises	Hyannis-Martha's Vineyard	12	20	6 trips daily	16
Hy-Line Cruises	Nantucket-Martha's Vineyrd	16	20	6 trips daily	16
Interstate Navigation Comapny	Point Judith-Block Island	12	11	8 trips daily	10
Interstate Navigation Comapny	Newport-Block Island	12	22	2 trips daily	12
Patriot Party Boats	Falmouth- Martha's Vineyard	15	5	8 trips daily	7
Pied Piper	Falmouth-Edgartown	12	9	6 trips daily	15
Steamship Authority	Woods Hole-Martha's Vineyard	12	7	32 trips daily	6
Steamship Authority	Hyannis- Nantucket	12	27	12 trips daily	14

Source: Prepared by Nathan Associates from data on operator websites and selected interviews.

Passenger ferry operations in southern New England generally fall into two categories: fast ferry service with vessel speeds ranging from 24–39 knots and regular ferry service with vessel speeds from 12–16 knots. As shown in Data Chart 4-39 there are nine operators providing fast ferry service on eight routes utilizing eleven vessels. Key destinations include Provincetown, Block Island, Nantucket, and Martha's Vineyard, while important origins include Boston, New London, Hyannis, Harwich, Point Judith, and Quonset Point.

Eight operators on 11 routes provide regular ferry service utilizing 16 vessels. Vessel speeds range from 12–16 knots and serve many of the same origins and destinations as the fast ferry service. Additional origins served by regular ferries include Plymouth, Falmouth, and Woods Hole.

Alternative 1– No Action Alternative

There would be no impact on passenger ferry service because of Alternative 1.

Alternative 2 – Dynamic Management Areas

Under Alternative 2, there would potentially be direct, long-term, adverse effects on passenger ferry service. This alternative calls for establishing a DMA over a 39.6 nm (73 km) buffer square based on the trigger conditions described in Section 2.1.4. Interviews with passenger ferry operators identified their particular concern of the situation where a DMA would be implemented during the peak summer season. For a fast ferry operator, a DMA implemented directly along their route would result in the suspension of service for the entire period that the DMA is in effect. There are several reasons for this conclusion. First, the demand for fast ferries that normally operate between 24–39 knots would virtually disappear if the ferries were restricted to speed ranging from 10–14 knots. Second, any remaining demand would not be sufficient to cover vessel operating costs, and third, many of the handling and comfort characteristics of fast ferries would suffer at these reduced speeds.

The analysis estimates the net economic loss of the implementation of a single DMA for these eleven fast ferry operators at $2.2 million (Data Chart 4-40).[29] This is based on a daily operating cost of a fast ferry vessel of $13,320 excluding fuel costs. Some operators have stated that the loss of income and profits from a single 15-day DMA during peak season would cause them to go out of business. However, the analysis assumes that many of the fast ferry operators who also operate regular ferries would be able to remain in business, as they would generate some incremental profits from passengers that would have otherwise used the fast ferry service.[30]

Operators of regular ferry services would also be affected by the DMAs. For these operators it is assumed that a speed restriction of 12 knots would cause an average delay of 20 minutes for each ferry trip. The 118 daily trips of regular ferry services would incur additional costs of $2.0 million for the implementation of a single DMA. With a restricted speed of 10 knots, the average delay increases to 30 minutes and the estimated economic impact to regular speed ferries is $3.0

[29] This same estimate applies to alternative restricted speeds of 10, 12 and 14 knots as it is assumed that the fast ferry service would be temporarily suspended under any of those speeds

[30] It is very difficult to estimate the portion of passenger demand that would cancel their travel by ferry entirely during a DMA. Relevant factors include the purpose of the trip, the availability of alternative ferry origins that may not be affected by the DMA, availability of other economically viable transport modes and competing entertainment options.

million. With a restricted speed of 14 knots, the average delay is 6 minutes and the estimated economic is $1.0 million.

Data Chart 4-40
Estimated Economic Impact of Proposed Operational Measures on Southern New England Ferry Operators, 2005 ($)

Type of vessel and alternative	Restricted speed in knots 10	12	14
Fast Ferries			
Alternative 2	2,178,000	2,178,000	2,178,000
Alternative 3	3,564,000	3,564,000	3,564,000
Alternative 6	2,577,600	2,577,600	2,577,600
Regular Ferries			
Alternative 2	2,950,000	1,966,667	983,333
Alternative 3	2,950,000	1,966,667	590,000
Alternative 6	3,015,625	1,994,792	992,708
Total			
Alternative 2	5,128,000	4,144,667	3,161,333
Alternative 3	6,514,000	5,530,667	4,154,000
Alternative 6	5,593,225	4,572,392	3,570,308

Source: Prepared by Nathan Associates from data on operator websites and selected interviews.

Alternative 3 – Speed Restrictions in Designated Areas

There would be direct, long-term, adverse effects on passenger ferry service from implementing Alternative 3. Under Alternative 3, speed restrictions would be in place year round in Cape Cod Bay and for the months of October–April for Block Island Sound.[31] The two fast ferry operations from Boston to Provincetown would cease and be replaced by regular ferry service. However, overall ferry demand would diminish as passengers curtail day trips or seek alternative transport modes. It is assumed that the fast ferry operators would either sell their vessels or deploy them in other routes. While a loss for the distressed sale of the vessels may be incurred, this would not represent a recurring annual economic impact and is not included in this assessment.

Fortunately, the proposed speed restrictions for Block Island Sound are outside the peak summer season. Hence, it is assumed that the nine fast ferry operators in this area would lose an average of 30 business days per year. The economic impact of suspending operations for these 30 days for these nine operators is calculated as double the impact of the DMA previously described. The resulting estimate is $3.6 million annually.

Regular ferries will incur average delays of approximately 20 minutes per trip with a speed restriction of 12 knots. As the restrictions are during the off-peak season for Block Island Sound, these delays can be absorbed in the more open ferry schedule without losing any round-trip daily service. The estimated incremental cost of the delay is $2.0 million annually at 12 knots, $3.0 million at 10 knots, and $0.6 million at 14 knots.

[31] The analysis in this section for Alternative 3 also applies to Alternative 5.

Alternative 4 – Recommended Shipping Routes

There would be no economic impact on passenger ferry services under Alternative 4. Ferry vessels have separate routes from the shipping lanes and other routing measures contained in this alternative; therefore, ferry service would not be affected.

Alternative 5 – Combination of Measures

There would be direct, long-term, adverse effects on passenger ferry service under Alternative 5. This alternative has the same economic impacts as Alternative 3.

Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Under Alternative 6, speed restrictions for Cape Cod Bay would be implemented from January 1 through May 15. As such, the fast ferry service from Boston to Provincetown would remain in operation. Speed restrictions for Block Island sound would be from November 1 through April 30. However, the speed-restricted area for Block Island Sound under Alternative 6 would not extend to the shoreline and hence would not affect fast ferry operations.[32] DMAs would also be implemented under Alternative 6 and the economic impact of those are estimated the same as under Alternative 2. The estimated economic impact for fast ferry service under Alternative 6 is thus similar to Alternative 2, with an increment for speed restrictions on the Boston-Provincetown route during January through May 15. The resulting estimated economic impact is $2.6 million annually.

For regular ferries, the economic impact for Alternative 6 is again similar to Alternative 2, with an increment for speed restrictions on the Boston-Provincetown route during January through May 15. The estimated economic impact is $2.0 million at 12 knots, $3.0 million at 10 knots, and $1.0 million at 14 knots.

4.4.6 Impacts on Whale Watching Vessels

The whale watching industry can also be categorized into operations that deploy high-speed vessels ranging from 25 to 38 knots; and operations that deploy regular speed vessels with speeds from 16 to 20 knots. Data Chart 4-41 presents information for the major whale watching operators in Massachusetts Bay. There are four operators of high-speed vessels; two are based in Boston, one in Barnstable, and one in Provincetown (two vessels). There are five operators of regular speed vessels that have operations based in Newburyport, Boston, Gloucester, Plymouth (six vessels), and Provincetown (four vessels). A survey of whale watching operators in New England indicated that the majority of whale watching vessels are 65 feet (19.8 m) and greater, therefore the majority of operators would be affected by the operational measures.

4.4.6.1 Alternative 1 – No Action Alternative

The No Action Alternative would have negligible, indirect effects on the whale watching industry. Whale watching vessels derive profits from bringing customers to whale habitats, with the intention of sighting one or more whales. In order to please and retain customers, they prefer that whales are sighted at least once on every trip. The higher the population number of whales,

[32] The rectangular area proposed has its northern limits running approximately in a line from Montauk to the southwestern coast of Block Island.

Data Chart 4-41
Massachusetts Bay Whale Watching Operators, 2005

Operator	Location	Vessel Speed	Vessels
High-Speed Vessels			
Boston Harbor Cruises	Boston, MA	37	1
Hyannis Whale Watcher Cruises	Barnstable, MA	38	1
New England Aquarium	Boston, MA	25	1
Portuguese Princess Excursions	Provincetown, MA	25	2
Regular Speed Vessel			
Massachusetts Bay Lines	Boston, MA	18	1
Capt. John Boats	Plymouth, MA	17	6
Newburyport Whale Watch	Newburtyport, MA	20	1
Yankee Whale Watching	Gloucester, MA	20	1
Dolphin Fleet of Provincetown	Provincetown, MA	16	4

Source: Prepared by Nathan Associates from data on operator websites and selected interviews.

and specifically right whales, the higher the probability that they would be sighted on a regular basis. No further operational measures are proposed in Alternative 1, and the current mitigation measures have proved ineffective at reducing the amount of ship strikes with whales. Therefore, the right whale population would continue to decline, which would reduce the probability that right whales would be sighted regularly on whale watching trips. However, most whale watching trips are not solely targeted on spotting right whales, thus passengers would still benefit from sighting other whale species, and there would not be a noticeable effect on the whale watching industry as a whole.

4.4.6.2 Alternative 2 – Dynamic Management Areas

Implementing Alternative 2 would have direct, long-term, adverse effects on whale watching vessels that are 65 feet in length and greater operating in the vicinity of DMAs. Under Alternative 2, the high-speed vessels are assumed to suspend operations during periods when DMAs are implemented along their route. Communications with persons in the whale watching industry indicated that it would not be economically viable to operate a high-speed vessel at less than half of normal operating speed. The estimated economic impact of the suspension of five high-speed vessels for a single 15-day DMA is $0.4 million.[33] For regular speed vessels, the estimated economic impact at 12 knots is $0.3 million for the 13 regular speed vessels, which incur a 30-minute delay each way for two trips per day. At 10 knots, the estimated economic impact to regular speed whale watching vessels is $0.5 million and at 14 knots $0.2 million.

The economic impact of Alternative 2 is high for the industry as a whole, although individual vessels have the option to alter their destination based on the occurrence of a DMA, which would reduce the economic impacts. High-speed ferry operators indicated they would not reduce speed through a DMA; instead, they would chose to travel to alternate sighting grounds, or target another whale species, which would reduce the economic impacts. Regular speed whale watching vessels over 65 ft (19.8 m) would still be able to travel to or transit through DMAs, but would need to reduce their speed when transiting through a DMA. Therefore, regular speed vessels are affected by the delays from speed restrictions. If whales were located in a DMA, it is likely that a whale watching vessel would already be traveling at a slow speed to allow the

[33] Calculated at $13,320 daily operating costs excluding fuel times 15 days for 5 vessels.

passengers to look and take pictures, thus reducing the estimated delay. If a DMA were located in an area where the vessel would have to transit in order to reach a particular destination, and the captain did not want to slow down, he could route around the area or seek other potential whale watching areas that day to reduce the effects of a time delay.

The number effective days of DMA restrictions in the Northeast (excluding Cape Cod Bay) is estimated to be 68 days per year (Table 4-1), thus the economic impact, as described here, is based on a single DMA implementation, may actually be four or more times higher in a year with multiple DMAs. The estimated effective days of DMA restrictions in Cape Cod Bay is estimated to be 105 days, which could increase the economic impact six fold. However, each DMA would not necessarily affect all whale watching operators, so even if there were multiple DMAs in the Northeast in one year, it is unlikely that they would result in the higher impacts mentioned in this paragraph.

4.4.6.3 Alternative 3 – Speed Restrictions in Designated Areas

If implemented, the speed restrictions in Alternative 3 would have direct, long-term, adverse effects on whale watching vessels 65 feet and over along the US East Coast. Under Alternative 3, the year-round speed restrictions in the Northeast region and Cape Cod Bay (Section 2.2.3) would render the high-speed whale watching vessels unprofitable and they may be sold or diverted into other service.[34] As this would not be a recurring economic cost, any loss associated with the sale of the vessel is not included in this economic assessment. It is also assumed that regular-speed whale watching vessels would be put into service in their place. However, demand for whale watching from locations such as Boston would diminish as the additional time required to reach whale feeding areas will discourage passengers. It is possible some of this demand would divert to other whale watching operations located closer to the feeding areas.

Regular-speed whale watching vessels would be subject to the year-round speed restrictions extending 25 nm (46.3) from the Northeast region coastline and in Cape Cod Bay. It is assumed that at 12 knots, the 13 regular-speed vessels would incur a 30-minute delay each way for two round-trips daily during a 90-day summer whale-watching period. The estimated economic impact is $1.6 million for a speed restriction of 12 knots, $2.8 million at 10 knots, and $0.9 million at 14 knots (Data Chart 4-42).

Speed restrictions proposed in the mid-Atlantic from October 1 to April 30 extend out 25 nm (46.3 km), which would also include the majority of the right whale migratory corridor. In the Southeast, speed restrictions from December 1 through March 31 in the MSRS WHALESSOUTH reporting area and critical habitat would also affect the majority of whale watching trips if the vessel is 65 ft (19.8 m) or greater and if the designated speed limit is lower than the average vessel operating speed. Due to the seasonal nature of the speed restrictions in the MAUS and SEUS, and the small number of whale watching operators in these regions, it is assumed any economic impact on the whale watching industry in these regions could be avoided or would be a negligible.

[34] This analysis also applies to Alternative 5.

Data Chart 4-42
Estimated Economic Impact of Proposed Operational Measures on Massachusetts Bay Whale Watching Operators, 2005 ($)

Type of vessel	Restricted speed in knots		
and alternative	10	12	14
High-Speed Vessels			
Alternative 2	399,600	399,600	399,600
Alternative 3	-	-	-
Alternative 6	399,600	399,600	399,600
Regular Speed Vessel			
Alternative 2	468,000	260,000	156,000
Alternative 3	2,808,000	1,560,000	936,000
Alternative 6	468,000	260,000	156,000
Total			
Alternative 2	867,600	659,600	555,600
Alternative 3	2,808,000	1,560,000	936,000
Alternative 6	867,600	659,600	555,600

Source: Prepared by Nathan Associates from data on operator websites and selected interviews.

4.4.6.4 Alternative 4 – Recommended Shipping Routes

The use of recommended shipping lanes proposed in Alternative 4 would not affect whale watching operations. The shipping lanes into Cape Cod Bay, Brunswick, Fernandina, and Jacksonville port areas are primarily utilized by commercial shipping vessels, not smaller, passenger vessels such as whale watching vessels, which typically are based in smaller harbors.

4.4.6.5 Alternative 5 – Combination of Measures

Alternative 5 would have direct, long-term, adverse effects on whale watching vessels 65 feet and over operating in the waters off the East Coast. The economic impacts of Alternative 5 are the same as Alternative 3 ($2.8 at 10 knots, $1.6 at 12 knots, and $0.9 at 14 knots), described above (Section 4.4.6.3).

4.4.6.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Alternative 6 would have direct, long-term, adverse impacts on whale watching vessels 65 feet and greater. Under Alternative 6, speed restrictions for Cape Cod Bay are implemented from January 1 through May 15. Hence, the peak summer whale watching season would not be affected for high-speed or regular speed vessels. Similarly, the proposed speed restrictions for an extended Off Race Point are proposed for March through April would not affect the whale watching season. Accordingly, the economic impact of Alterative 6 is assumed the same as Alternative 2 due to the implementation of DMAs (Section 4.4.6.2). When the impacts to both regular and high-speed vessels are added, they amount to $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.6 million at 14 knots (Data Chart 4-41).

The number of whale watching operators in the MAUS and SEUS regions is minimal and the impact of the strategy on the whale watching industry in these areas is likely to be negligible.

4.4.7 Impacts on Charter Vessel Operations

During the stakeholder meetings, representatives of the charter fishing industry raised concerns regarding the negative effects the speed restrictions may have on the industry. In some areas, charter vessels travel up to 50 nm (92.6 km) offshore to reach prime fishing areas. At vessel speeds of up to 17 knots, they can reach their fishing areas in less than 3 hours (Section 3.4.6). Under Alternative 6, a speed restriction of 12 knots for 30 nm (56 km) would add about 90 minutes to the roundtrip steaming time, and could severely affect client demand.

As described above an increase of 1.5 hours roundtrip steaming time would reduce the competitiveness of the larger headboats (more than 65 ft [19.8 m] LOA) particularly for the half-day and full-day charters. It is expected that vessels of less than 65 feet LOA would increase their share of those market segments. For extended full-day charters, headboats of LOA in excess of 65 feet would incur additional costs associated with the 1.5-hour increase in roundtrip steaming time.

4.4.7.1 Alternative 1 – No Action Alternative

The No Action Alternative would have no effect on charter vessels or the charter industry on the East Coast. There are no operational measures contained in Alternative 1 that would affect charter boat operations.

4.4.7.2 Alternative 2 – Dynamic Management Areas

Under Alternative 2, DMAs would not affect the operation of the majority of charter vessels, which are under 65 feet, but would affect larger vessels during the periods that DMAs are being implemented. Those vessels 65 feet and greater could either route around a DMA or reduce speed through a DMA, thereby choosing the option that would be the most time and cost efficient but still incurring some time penalty.

4.4.7.3 Alternative 3 – Speed Restrictions in Designated Areas

Under Alternative 3, a speed restriction of 12 knots over 25 nm (46.3 km) would have minor, direct, long-term, adverse economic impacts on charter vessels of $600,000 a year. This impact increases to $1.1 million at a 10-knot speed restriction and decreases to $200,000 at 14 knots. As described in Section 4.4.7, the impacts only apply to headboats in excess of 65 feet that have full-day charters.

4.4.7.4 Alternative 4 – Recommended Shipping Routes

There would be no impacts on charter vessels under Alternative 4.

4.4.7.5 Alternative 5 – Combination of Measures

The impacts under Alternative 5 ($1.1 million at 10 knots, $600,000 at 12 knots, and $200,000 at 14 knots) are the same as for Alternative 3 (Section 4.4.7.3).

4.4.7.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Charter vessels equal to or larger than 65 ft (19.8 m) would be affected by implementation of Alternative 6. It is estimated that the annual economic impact of a speed restriction of 12 knots for these vessels over 30 nm (56 km) would be approximately $720,000.[35] At a 10-knot speed restriction, the estimated impact is $1.2 million. At 14 knots, there is a $240,000 impact.

4.4.7.7 Summary of the Direct and Indirect Economic Impacts on all Maritime Sectors

This section summarizes the findings regarding the economic impacts of the alternatives on US East Coast maritime activity in 2004. This includes the shipping industry and port areas, commercial fishing vessels, cruise vessels, passenger ferries, whale watching vessels, and charter vessels (Sections 4.4.1–4.4.7). Data Chart 4-43 presents the direct and indirect economic impacts by alternative and speed restriction for 2003 and 2004.

- **Alternative 5** has the largest estimated economic impact in terms of direct economic impact, indirect economic impact, and total economic impact. In 2004, the estimated total economic impact of Alternative 5 at a speed restriction of 12 knots is $163 million annually. The operational measure of speed restrictions year-round under Alternative 5 (and Alternative 3) will have substantial repercussions through the Northeast region port areas and the northern mid-Atlantic port areas. The combination of DMAs, recommended routes and speed restrictions also contributes to substantial total economic impact for Alternative 5. The brunt of the direct economic impact is borne by the commercial shipping industry with a combined direct economic impact of $66 million. This represents 87 percent of the total direct economic impact for a speed restriction of 12 knots. The total annual economic impact with a speed restriction of 10 knots is estimated at $272 million and with a speed restriction of 14 knots at $94 million.
- **Alternative 3** has the second largest annual economic impact of $151 million with a speed restriction of 12 knots. The direct economic impact is estimated at $71 million while the indirect economic impact is estimated at $80 million. The total annual economic impact with a speed restriction of 10 knots is estimated at $249 million and with a speed restriction of 14 knots at $83 million.
- **Alternative 6** (Preferred) has the third largest total economic impact of $62 million with a speed restriction of 12 knots. This is comprised of $44 million in direct economic impact and $18 million in indirect economic impact. The total economic impact with a speed restriction of 10 knots is $116 million and with a speed restriction of 14 knots, the total economic impact is $35 million.
- **Alternative 2** ranks fourth in terms of the largest total economic impact with an annual impact of $16 million for a speed restriction of 12 knots. This alternative did not have any estimated indirect economic impact as vessel calls were assumed not to be diverted to Canadian ports. The total annual economic impact with a speed restriction of 10 knots is estimated at $23 million and with a speed restriction of 14 knots at $10 million.
- **Alternative 4** has the lowest total economic impact at $1 million annually for 10, 12, and 14 knots. This alternative consists only of use of recommended routes and port areas that may incur negative secondary economic impacts were offset by port areas with gains.

[35] This calculation assumes 40 headboat vessels with 60 roundtrips per year and an hourly steaming operating cost of $200.

This page intentionally left blank.

Data Chart 4-43
Total Direct and Secondary Economic Impact by Alternative and Restriction Speed, 2003 and 2004
($000s)

	Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
	Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots			Restriction speed in knots		
Item	10	12	14	10	12	14	10	12	14	10	12	14	10	12	14
2003															
Direct economic impact															
Shipping industry vessels	15,401.6	9,840.3	5,925.9	80,969.3	50,457.7	29,362.5	1,026.3	1,026.3	1,026.3	83,527.8	52,423.5	30,820.0	45,764.0	28,700.5	17,112.4
Cumulative effect of multi-port strings	-	-	-	6,775.7	5,646.4	4,743.0	-	-	-	6,775.7	5,646.4	4,743.0	5,313.2	4427.7	3,719.3
Re-routing of southbound coastwise shipping	-	-	-	3,700.0	3,700.0	3,700.0	-	-	-	3,700.0	3,700.0	3,700.0	2,500.0	2,500.0	2,500.0
Commercial fishing vessels	-	-	-	862.0	-	-	-	-	-	862.0	-	-	1,034.4	-	-
Charter fishing vessels	-	-	-	1,100.0	600.0	200.0	-	-	-	1,100.0	600.0	200.0	1,200.0	720.0	240.0
Passenger ferries	5,128.0	4,145.7	3,161.3	6,514.0	5,530.7	4,154.0	-	-	-	6,514.0	5,530.7	4,154.0	5,593.2	4,572.4	3,570.3
Whale watching vessels	867.6	659.6	555.6	2,808.0	1,560.0	936.0	-	-	-	2,808.0	1,560.0	936.0	867.6	659.6	555.6
Subtotal direct economic impact	21,397.2	14,645.6	9,642.8	102,729.0	67,494.8	43,095.5	1,026.3	1,026.3	1,026.3	105,287.5	69,460.6	44,553.0	62,272.4	41,580.2	27,697.6
Indirect economic impact of port diversions	-	-	-	141,608.0	81,489.0	38,803.0	-	-	-	162,536.0	91,777.2	48,911.2	49,600.5	18,203.5	5,302.7
Total economic impact	21,397.2	14,645.6	9,642.8	244,337.0	148,983.8	81,898.5	1,026.3	1,026.3	1,026.3	267,823.5	161,237.8	93,464.2	111,872.9	59,783.7	33,000.3
2004															
Direct economic impact															
Shipping industry vessels	16,989.3	10,815.9	6,509.1	86,822.9	53,895.7	31,237.0	1,145.2	1,145.2	1,145.2	89,745.6	56,114.6	32,889.4	49,406.8	30,863.9	18,355.3
Cumulative effect of multi-port strings	-	-	-	7,227.8	6,023.2	5,059.5	-	-	-	7,227.8	6,023.2	5,059.5	5,805.5	4,837.9	4,063.8
Re-routing of southbound coastwise shipping	-	-	-	3,800.0	3,800.0	3,800.0	-	-	-	3,800.0	3,800.0	3,800.0	2,500.0	2,500.0	2,500.0
Commercial fishing vessels	-	-	-	862.0	-	-	-	-	-	862.0	-	-	1,034.4	-	-
Charter fishing vessels	-	-	-	1,100.0	600.0	200.0	-	-	-	1,100.0	600.0	200.0	1,200.0	720.0	240.0
Passenger ferries	5,128.0	4,145.7	3,161.3	6,514.0	5,530.7	4,154.0	-	-	-	6,514.0	5,530.7	4,154.0	5,593.2	4,572.4	3,570.3
Whale watching vessels	867.6	659.6	555.6	2,808.0	1,560.0	936.0	-	-	-	2,808.0	1,560.0	936.0	867.6	659.6	555.6
Subtotal direct economic impact	22,984.9	15,621.2	10,226.0	109,134.7	71,409.6	45,386.5	1,145.2	1,145.2	1,145.2	112,057.5	73,628.5	47,038.9	66,407.5	44,153.8	29,285.0
Indirect economic impact of port diversions	-	-	-	139,406.0	79,603.0	37,251.0	-	-	-	159,582.0	89,308.4	46,956.4	49,695.0	18,280.0	5,355.0
Total economic impact	22,984.9	15,621.2	10,226.0	248,540.7	151,012.6	82,637.5	1,145.2	1,145.2	1,145.2	271,639.5	162,936.9	93,995.3	116,102.5	62,433.8	34,640.0

Source: Prepared by Nathan Associates as described in text.

This page intentionally left blank.

4.4.8 Impacts on Environmental Justice

The proposed operational measures evaluated in this EIS were developed based on the range of the right whale and vessel traffic patterns; they do not specifically target any one port community. Depending on the alternative, the 26 port areas considered here would experience negligible to minor adverse economic impacts (only economic impacts have any potential to raise economic justice issues). Within each port area, these impacts would not be localized and limited to or focused on specific minority or poor neighborhoods. Rather, they would be distributed throughout the entire region and local economy. The activities and businesses likely to be directly or indirectly affected by the proposed action are varied and are not disproportionately identified with a given ethnic or economic minority. Therefore, within each port area, the economic impacts of the proposed action would not likely disproportionately affect minority or low-income populations.

However, as shown in Section 3.4.8, 10 of the 26 port areas considered in this EIS have a higher percentage of minority or low-income residents than the United States as a whole and, as such, qualify as environmental justice communities, warranting closer scrutiny. Of these 10 areas, six have a minority population greater than the United States or representing more than 50 percent of the area's total population (New York City, Hampton, Georgetown, Charleston, Baltimore, and Savannah); four (Eastport, Morehead City, Wilmington, and Brunswick)[36] have a higher percentage of residents living below the poverty line than the United States as a whole. If any of these ten areas experienced proportionately greater impacts than the other 16 areas, the proposed action could raise issues of environmental justice.

Comparison of economic impacts among the 26 affected port areas is not easily done because of the wide differences in size and economic activities between the areas. To allow for such a comparison, an index must be defined. For the purposes of this analysis, this index is the ratio of the estimated direct economic impacts on the shipping industry (in dollars) to the total value (in dollars) of the merchandise shipped to and from a given port area in 2004 as shown in Data Chart 3-3. While this index does not incorporate all economic impacts, the direct impacts on the shipping industry represent a sufficient component of those impacts to provide a reliable ranking of, and allow for a meaningful comparison among, potential economic impacts to the 26 port areas under each of the six alternatives considered.

4.4.8.1 Alternative 1 – No Action Alternative

Under this alternative, existing mitigation measures would continue, and none of the operational measures would be implemented. Therefore, there would be no change to existing socioeconomic conditions and no potential for environmental justice issues.

4.4.8.2 Alternative 2 – Dynamic Management Areas

Table 4-3 shows how each port area would be affected under Alternative 2 using the previously defined index. The areas are ranked based on the intensity of impacts as measured by the index (in descending order) with the ten areas that are environmental justice communities shown in boldface.

[36] The cities of Georgetown, Charleston and Savannah occur in both categories, and are not counted twice.

Table 4-3
Relative Intensity of Economic Impacts by Port Area – Alternative 2

Port Area	Economic Impact Index[1]	Port Area	Economic Impact Index[1]
Cape Cod, MA	3.22	Boston, MA	0.0042
Port Canaveral, FL	0.34	New Bedford, MA	0.0038
Searsport, ME	0.050	New Haven, CT	0.0033
Fernandina, FL	0.045	*All Areas*	*0.0033*
Salem, MA	0.038	**Wilmington, NC**	**0.0028**
Eastport, ME	**0.030**	**Morehead City, NC**	**0.0020**
Bridgeport, CT	0.018	**Hampton Roads, VA**	**0.0018**
Portland, ME	0.017	Providence, RI	0.0014
Savannah, GA	**0.011**	**Charleston, SC**	**0.0014**
New London, CT	0.010	**New York, NY[2]**	**0.0012**
Jacksonville, FL	0.0092	Philadelphia, PA	0.0010
Portsmouth, NH	0.0056	**Baltimore, MD**	**0.0010**
Brunswick, GA	**0.0047**	Long Island, NY[2]	N/A[2]
Georgetown, SC	**0.0046**		

Note 1: Direct impacts on shipping industry as a percentage of total 2004 merchandise value for each port. Impacts calculated for the 12-knot speed restriction level were used.
Note 2: For the purposes of this analysis, New York and Long Island are factored together.

As demonstrated, only four of the ten environmental justice areas have an impact index superior to that of the areas together. Even in those cases, while the impacts would be relatively high compared to those on the area as a whole, they would remain very small in absolute terms (for instance, annual direct impacts on the shipping industry at Eastport would amount to $34,700) as well as in relative terms (impacts on Eastport, the most heavily affected of all ten environmental justice areas, would still represent only three hundredths of a percent of the value of all merchandise traded at the port in 2004). Additionally, as already noted, within each area, impacts would not specifically affect any particular ethnic or economic group since the shipping and other industries likely to be affected are not disproportionately identified with such groups and the cost of the proposed action would be spread across private companies, the port city and surrounding jurisdictions, and the consumer. Therefore, Alternative 2 would not raise substantial issues of environmental justice.

4.4.8.3 Alternative 3 – Speed Restrictions in Designated Areas

Table 4-4 shows how each port area would be affected under Alternative 3 using the same method as previously defined.

As applied in Alternative 2, Alternative 3 also maintains that four out of ten environmental justice areas would experience relatively heavier impacts than all the areas taken together. However, like Alternative 2, these impacts would remain small compared to the overall activity of each port area, and they would not target specific minority or low-income groups. On this basis, Alternative 3 would not raise substantial issues of environmental justice.

Table 4-4
Relative Intensity of Economic Impacts by Port Area – Alternative 3

Port Area	Economic Impact Index[1]	Port Area	Economic Impact Index[1]
Cape Cod, MA	37.3	Providence, RI	0.025
Bridgeport, CT	0.27	**Wilmington, NC**	**0.022**
Searsport, ME	0.25	Boston, MA	0.021
Salem, MA	0.19	*All Areas*	*0.017*
Eastport, ME	**0.15**	**Savannah, GA**	**0.016**
New London, CT	0.13	Philadelphia, PA	0.016
Portland, ME	0.087	**Baltimore, MD**	**0.015**
New Haven, CT	0.063	**Morehead City, NC**	**0.014**
New Bedford, MA	0.056	**New York, NY[2]**	**0.014**
Port Canaveral, FL	0.046	**Charleston, SC**	**0.009**
Fernandina, FL	0.043	Jacksonville, FL	0.009
Georgetown, SC	**0.042**	**Brunswick, GA**	**0.005**
Portsmouth, NH	0.028	Long Island, NY[2]	N/A[2]
Hampton Roads, VA	**0.027**		

Note 1: Direct impacts on shipping industry as a percentage of total 2004 merchandise value for each port. Impacts calculated for the 12-knot speed restriction level were used.
Note 2: For the purposes of this analysis, New York and Long Island are factored together.

4.4.8.4 Alternative 4 – Recommended Shipping Routes

Table 4-5 shows how each port area would be affected under Alternative 4 using the index previously defined. The areas are ranked based on the intensity of impacts as measured by the index (in descending order) with the ten areas that are environmental justice communities shown in boldface.

Table 4-5
Relative Intensity of Economic Impacts by Port Area – Alternative 4

Port Area	Economic Impact Index[1]	Port Area	Economic Impact Index[1]
Salem, MA	0.031	Providence, RI	0
Fernandina, FL	0.014	**Wilmington, NC**	**0**
Jacksonville, FL	0.005	**Eastport, ME**	**0**
Boston, MA	0.0035	Cape Cod, MA	0
Brunswick, GA	**0.001**	**Savannah, GA**	**0**
All Areas	*0.0003*	Philadelphia, PA	0
Portland, ME	0	**Baltimore, MD**	**0**
New Haven, CT	0	**Morehead City, NC**	**0**
New Bedford, MA	0	**New York, NY[2]**	**0**
Port Canaveral, FL	0	**Charleston, SC**	**0**
Searsport, ME	0	Bridgeport, CT	0
Georgetown, SC	**0**	New London, CT	0
Portsmouth, NH	0	Long Island, NY[2]	N/A[2]
Hampton Roads, VA	**0**		

Note 1: Direct impacts on shipping industry as a percentage of total 2004 merchandise value for each port. Impacts calculated for the 12-knot speed restriction level were used.
Note 2: For the purposes of this analysis, New York and Long Island are factored together.

Under this alternative, Brunswick is the only environmental justice community that would incur economic impacts. However, these impacts would be very minor ($60,700 per year or one thousandth of a percent of the port's total 2004 merchandise value) and, as previously noted, would not target any specific ethnic or low-income community. Therefore, Alternative 4 would not raise substantial issues of environmental justice.

4.4.8.5 Alternative 5 – Combination of Measures

Table 4-6 shows how each port area would be affected under Alternative 5 using the same method as previously defined.

Under Alternative 5, four out of ten environmental justice areas would experience relatively heavier impacts than all the areas taken together. However, these impacts would remain small compared to the overall activity of each port area (though less so than under Alternatives 2, 3, or 4), and they would not target specific minority or low-income groups. On this basis, Alternative 5 would not raise substantial issues of environmental justice.

Table 4-6
Relative Intensity of Economic Impacts by Port Area – Alternative 5

Port Area	Economic Impact Index[1]	Port Area	Economic Impact Index[1]
Cape Cod, MA	37.8	Boston, MA	0.026
Bridgeport, CT	0.27	Providence, RI	0.025
Searsport, ME	0.26	**Wilmington, NC**	**0.022**
Salem, MA	0.23	*All Areas*	*0.017*
Eastport, ME	**0.16**	**Savannah, GA**	**0.016**
New London, CT	0.13	Jacksonville, FL	0.016
Port Canaveral, FL	0.11	Philadelphia, PA	0.016
Portland, ME	0.09	**Baltimore, MD**	**0.015**
Fernandina, FL	0.081	**Morehead City, NC**	**0.014**
New Haven, CT	0.063	**New York, NY[2]**	**0.013**
New Bedford, MA	0.056	**Charleston, SC**	**0.009**
Georgetown, SC	**0.042**	**Brunswick, GA**	**0.007**
Portsmouth, NH	0.03	Long Island, NY[2]	N/A[2]
Hampton Roads, VA	**0.027**		

Note 1: Direct impacts on shipping industry as a percentage of total 2004 merchandise value for each port. Impacts calculated for the 12-knot speed restriction level were used.
Note 2: For the purposes of this analysis, New York and Long Island are factored together.

4.4.8.6 Alternative 6 (Preferred) – Right Whale Ship Strike Reduction Strategy

Table 4-7 shows how each port area would be affected under Alternative 6.

Table 4-7
Relative Intensity of Economic Impacts by Port Area – Alternative 6

Port Area	Economic Impact Index[1]	Port Area	Economic Impact Index[1]
Cape Cod, MA	7.25	**Savannah, GA**	**0.013**
Bridgeport, CT	0.14	**Hampton Roads, VA**	**0.013**
Fernandina, FL	0.11	**Morehead City, NC**	**0.012**
Port Canaveral, FL	0.069	Providence, RI	0.010
New London, CT	0.054	*All Areas*	*0.0095*
Eastport, ME	**0.04**	**Brunswick, GA**	**0.0085**
Searsport, ME	0.039	Philadelphia, PA	0.008
New Bedford, MA	0.035	**Charleston, SC**	**0.0075**
Georgetown, SC	**0.033**	Portsmouth, NH	0.007
New Haven, CT	0.029	**Baltimore, MD**	**0.007**
Salem, MA	0.025	**New York, NY[2]**	**0.007**
Portland, ME	0.021	Boston, MA	0.006
Jacksonville, FL	0.020	Long Island, NY[2]	N/A[2]
Wilmington, NC	**0.017**		

Note 1: Direct impacts on shipping industry as a percentage of total 2004 merchandise value for each port. Impacts calculated for the 12-knot speed restriction level were used.
Note 2: For the purposes of this analysis, New York and Long Island are factored together.

Under Alternative 6, six of the ten environmental justice areas would experience impacts heavier than those on the 26 areas taken together. However, in all cases, these impacts would be very small (for example, impacts in Eastport, the most affected of the ten environmental justice areas, would represent four hundredths of a percent of the port's 2004 total merchandise value). Additionally, as already noted, within each area, impacts would not specifically affect any particular ethnic or economic group since the shipping and other industries likely to be affected are not disproportionately identified with such groups and the cost of the proposed action would be spread across private companies, the port city and surrounding jurisdictions, and the consumer. Therefore, Alternative 6 would not raise substantial issues of environmental justice.

4.5 Impacts on Cultural Resources

As described in Section 3.5, no cultural resources have been identified on the ocean surface in areas that would be affected by the proposed action and alternatives. Therefore, there would be no impacts to cultural resources. The proposed actions are limited to speed restrictions, spatial closures, and re-routing ships to recommended routes. Furthermore, the USCG is conducting the PARS to analyze any existing "navigational hazards" in the proposed shipping lanes. Any cultural resource located on the ocean surface would be considered a hazard to navigation, hence the lanes would not be designated in an area with potential hazards.

Consultation with the Advisory Council on Historic Preservation, a NOAA Marine Archeologist, and NOAA General Council, resulted in a consensus that the proposed operational measures in the alternatives have no potential to affect any cultural resources or historic properties.[37]

[37] Consensus gained through personal communication (via e-mail) with Bruce Terrell, Marine Archeologist, NOAA/National Marine Sanctuary Program, Mary Elliot Rolle, NOAA/General Counsel for Ocean Services, Ole Varmer, NOAA/General Counsel International Law, and Dr. Tom McCulloch, Archeologist, ACHP.

4.6 Regulatory Impacts

The proposed action and alternatives will comply with EO 12898 (Section 1.7.1). A Regulatory Impact Review/Regulatory Impact Analysis is provided in Chapter 5, in compliance with EO 12866 (Section 1.7.2). The Initial Regulatory Flexibility Analysis is located in Appendix F, in accordance with the Regulatory Flexibility Act (RFA). A discussion of impacts resulting from the implementation of the operational measures on minorities and low-income environmental justice communities is included in Section 4.4.8. The ESA, MMPA, and other relevant legislation are discussed in the following sections.

4.6.1 Endangered Species Act

4.6.1.1 No Action Alternative

The No Action Alternative would not be consistent with the objectives of the ESA. The ESA prohibits the "taking" of any listed species (Section 1.8.1). Under the No Action Alternative, the "taking" of right whales as a result of ship strikes would continue, and the population would not recover. The Right Whale Recovery Plan, which is required by the ESA, states that downlisting the species from endangered to threatened as a short-term goal. Under Alternative 1, ship strikes would continue and the right whale population would not be expected to increase, therefore this intermediate goal would not be reached. The western population of the North Atlantic right whale would continue to face extinction under this alternative.

4.6.1.2 Action Alternatives

Implementing any of the action Alternatives 2–6, which contain one or more operational measures aimed at reducing right whale mortalities by ship strikes, would reduce the number of "takes" under the ESA, and increase the probability that the population will recover. Under these alternatives, NMFS would be consistent with the objectives of the ESA to protect North Atlantic right whales, and the species would have a significantly increased chance of recovery and survival. Alternatives 5 and 6, which combine operational measures would result in a higher probability of population recovery and have the potential to meet the intermediate goal of the Recovery Plan to downlist right whales to threatened in a more timely matter than the alternatives that propose only one operational measure.

4.6.2 Marine Mammal Protection Act

4.6.2.1 No Action Alternative

The No Action Alternative would be inconsistent with the objectives of the MMPA. The MMPA also prohibits the "taking" of marine mammals without authorization (Section 1.8.2). The existing measures contained in this alternative have not been effectively reducing ship strikes that "take" marine mammals. Under the No Action Alternative, the endangered North Atlantic right whale, which is also a depleted marine mammal species under the act, would not be protected from the threat of ship strikes. The western population of the North Atlantic right whale would continue to face extinction.

4.6.2.2 Action Alternatives

Implementing any of the action Alternatives 2–6, which contain one or more operational measures aimed at reducing right whale mortalities by ship strikes, would reduce the number of "takes" under the MMPA, and increase the probability that the population will recover. NMFS would be consistent with the objectives of the MMPA to protect the North Atlantic right whales, and the species would have a significantly increased chance of recovery and survival. Alternatives 5 and 6, which combine operational measures would result in a higher probability of population recovery and have the potential to bring the right whale population to levels reaching Optimum Sustainable Population (Section 3.2.1).

4.6.3 Ports and Waterways Safety Act

4.6.3.1 No Action Alternative

Under the No Action Alternative, the USCG would not conduct the PARS and no routing measures would be implemented. Vessel traffic would continue to route through critical habitat and migratory corridors without any regard to the presence of whales. There would be no known additional action taken by the USCG under the Ports and Waterways Safety Act of 1972, beyond actions they are currently taking for the preservation of right whales and other marine species.

4.6.3.2 Action Alternatives

The USCG will make recommendations on NOAA's proposed shipping lanes through the PARS study. Shipping lanes are proposed in Alternatives 4, 5, and 6. Throughout the PARS, the USCG will fulfill its mandate to protect the marine environment under the Ports and Waterways Safety Act of 1972. These designated lanes will protect the right whale and other marine species, while ensuring navigational safety. The Vessel Traffic Service (VTS) system may also be expanded into additional port areas in order to disseminate information the NMFS strategy.

4.6.4 Regulatory Flexibility Act

4.6.4.1 No Action Alternative

Under the No Action Alternative, NMFS would not propose any regulatory measures and there would not be any subsequent effects that could have a significant economic impact on small entities. Therefore, analysis under the RFA would be unnecessary.

4.6.4.2 Action Alternatives

The operational measures contained in the alternatives require NMFS to prepare an initial regulatory flexibility analysis (IRFA) to determine whether the operational measures would have a significant economic impact on a substantial number of small entities. The IRFA will utilize the US Small Business Administration's (SBA) small business-size standards, which correspond to the North American Industry Classification System Codes (NAICS). The SBA defines a small business in the deep-sea freight transportation sector as a firm with 500 employees or less. The SBA defines a small business in the commercial fishing sector as a firm with gross revenues up to $3.5 million. All potentially affected sectors will be assessed in the IRFA. Based on these standards and industry data on firm size, the number of small entities in the affected industries will be identified and the impacts will be quantified. The IRFA is provided in Appendix F.

4.6.5 Coastal Zone Management Act

4.6.5.1 No Action Alternative

Implementing the No Action Alternative would not adversely affect any land or water uses in the states coastal zone. None of the existing mitigation measures that would continue under Alternative 1 have an effect on state coastal waters, therefore there would be no impacts with respect to the CZMA.

4.6.5.2 Action Alternatives

The operational measures in the alternatives would not affect land uses within state waters (out to 3 nm [6 km]); however, the measures may affect water uses and resources, as defined in Section 304 (10) and (18) of the CZMA. The SEUS management area extends out to 30 nm (56 km) offshore. The MAUS SMAs are proposed 30 nm (56 km) offshore into state waters in some cases, although only speed restrictions are proposed. In the NEUS, the GSC management area is offshore, and there are not any permanent measures proposed in the Gulf of Maine. The Off Race Point management area runs adjacent to the eastern land side of Cape Cod, although only speed restrictions are proposed in this area, which would not affect coastal or inland waters. The Cape Cod Bay management area does include state waters, and may affect coastal uses, but the proposed measures for this area, speed restrictions and recommended shipping routes, would not have a physical effect on coastal waters.

While several of the operational measures contained in the alternatives may be implemented within state waters (3 nm [5.6 km])—the actual associated action, speed restrictions, would have neutral or positive effects on a state’s coastal zone. Reducing the speed of ships into certain ports and other management areas would affect vessel traffic, although it would not interfere with public access or right of passage in state waters. The majority of the applicable state policies include a policy to conserve endangered and threatened wildlife, which is the main objective of the proposed measures, thus resulting in a positive impact on the policy’s of the state coastal zone management programs.

Given this situation, and following an evaluation of applicable state enforceable policies, NMFS determined that the implementation of the alternatives would be consistent to the maximum extent practicable with the enforceable policies of the coastal zone management programs of the states included within the geographic scope of the Strategy. These states include Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. The ‘Consistency Determination’ letters will be submitted to the states along with the proposed rule, and a copy of this document, for review and concurrence by the responsible state agencies under Section 307 of the Coastal Zone Management Act (CZMA).

4.6.6 Effect Analysis on Other Resources

4.6.6.1 Possible Conflicts Between the Proposed Action and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies, and Controls for the Area Concerned

Local land use plans are not applicable as the proposed action and alternatives occur in state and Federal waters. There are several Federal agencies with jurisdiction in the EEZ. The USCG is coordinating on the operational measures of the Strategy, specifically the PARS to identify recommended routes. Throughout this process, the USCG has not notified NMFS of any conflict between the proposed action and other USCG policies. As all sovereign vessels are exempt from the operational measures, there are no foreseeable conflicts with other Federal agency's policies, vessels or operations. NMFS has had numerous meetings with the Navy and has accepted written comments from them on the ANPR and the NOI to prepare a DEIS. The National Ocean Service's National Marine Sanctuary Program has two sanctuaries within the scope of the Strategy: Stellwagen Bank and Gray's Reef. A coordination letter will be sent to these sanctuaries along with copy of the DEIS to ensure consistency with their policies. The state coastal zone management programs were provided with consistency determination letters under the CZMA (Section 4.6.5). Should the states identify any conflicts between the proposed action and state policies, NMFS will develop mitigation measures to mediate any issues. States that have environmental clearinghouses will also be sent a coordination letter along with the DEIS to ensure consistency with other environmental protection divisions within the agency.

4.6.6.2 Public Health and Safety

NMFS may identify exemptions from the operational measures in the final rule. These exemptions would be granted if a situation persists where public safety is at risk (e.g., inclement weather at sea). The proposed action and alternatives would have a negligible effect on public health. If anything, the reduced vessel emissions at sea because of reduced speeds would have a positive impact on public health. Local and regional weather patterns would predict the transport and dispersion of any marine emissions, therefore it is difficult to predict the location of these positive effects on air quality and public health. In addition, maritime safety would be increased slightly because reduced vessel speeds in the affected areas would tend to decrease the risk of collisions between vessels or with natural or man-made obstacles, e.g. rocks, shoals, buoys.

The PARS considers safety and navigational hazards with respect to the recommended routes, therefore, routes would not be established in locations that posed a threat to mariner safety. Whereas some have argued that speed restrictions will increase navigational and human safety, a number of industry and federal sources indicate that the speeds being considered would not, a priori, endanger vessels or mariners. However, NMFS may consider exceptions for navigational safety in inclement weather conditions.

4.6.6.3 Energy Requirements and Conservation Potential

It has been estimated that world fleet fuel consumption, calculated for all main and auxiliary engines in the internationally registered oceangoing fleet (including military vessels), is approximately 289 million metric tons annually (Corbett and Koehler 2003). Table 4-8 shows that a profile of the world fleet, main engine power and the percent of energy demand by vessel type. The cargo fleet accounts for the large majority of fuel consumption (69 percent), while the noncargo fleet uses 20 percent and the military accounts for 14 percent. This review includes estimates for the world fleet as such data is readily available and a used as a standard measure for this research. As similar data is unavailable for the US East Coast, these estimates are provided for general background information on vessel energy requirements.

Table 4-8
Profile of World Fleet, Number of Main Engines, and Main Engine Power[a]

Ship Type	Number of Ships	Percent of Fleet	Number of Main Engines	Percent of Main Engines	Installed Power (MW)	Percent of Total Power	Percent of Energy Demand
Cargo Fleet							
Container vessels	2662	2%	2755	2%	43,764	10%	13%
General cargo vessels	23,739	22%	31,331	21%	72,314	16%	22%
Tankers	9098	8%	10,258	7%	48,386	11%	15%
Bulk/combined carriers	8353	8%	8781	6%	51,251	11%	16%
Noncargo Fleet							
Passenger	8370	8%	15,646	10%	19,523	4%	6%
Fishing vessels	23,371	22%	24,009	16%	18,474	4%	6%
Tugboats	9348	9%	16,000	11%	19,116	4%	5%
Other (research, supply)	3719	3%	7500	5%	10,265	2%	3%
Registered fleet total	88,660	82%	116,280	77%	280,093	62%	86%
Military vessels	19,646	18%	34,663	23%	172,478	38%	14%
World fleet total	108,306	100%	150,913	100%	452,571	100%	100%

[a]The world fleet represents internationally registered vessels greater than 100 gross tons; the cargo fleet represents vessels whose main purpose is transporting cargo for trade. Percent of energy demand mainly adjusts for reduced activity (in loads and hours) by military vessels under typical operations.
Source: Corbett and Koehler, 2003.

Many factors determine fuel consumption by marine vessels, including:

- **Engine Type, Age, and Condition.** Newer engines tend to use less fuel than older ones. Fuel consumption of marine diesel engines has decreased rapidly over the past 30 years, and modern engines can use more than 25 percent less fuel than an older engine (Georgakaki *et al.*, 2005). Fuel consumption also varies according to the vessel type and engine loads. "Average fuel consumption is a composite of the fuel-usage rates at various engine loads. In general, cargo ships have more fuel-efficient, larger engines than nontransport ships (fishing and factory vessels, research and supply ships, tugboats). Typical fleet[38] average fuel consumption rates were 206 g/kWh for transport ships and 221 g/kWh for nontransport ships…" (Corbett and Koehler, 2003).
- **Climatic and Sea Conditions.** Obviously, traveling into the wind or in rough seas will increase fuel requirements.

[38] Fleet refers to the world's merchant fleet, using ship registry data from Lloyd's Maritime Information System, 2002.

- **Hull Type and Condition.** Long, thin vessels consume less fuel per given speed than broad vessels. A smooth hull will also meet less resistance than a rough one. The cruise line Costa Crociere estimates it can achieve fuel savings of about 3 percent applying a silicone-base coating to its cruise ships (Cruise Industry News Winter 2005-2006).
- **Speed.** For any given vessel, speed is probably the singular most important factor influencing fuel consumption. Doubling the speed of a vessel increases fuel consumption three times and conversely, decreasing the speed of a vessel by one half decreases the fuel consumption by one third. The Food and Agricultural Organization of the United Nations has estimated that a 6 percent reduction in speed (from 9 to 8.5 knots) can result in a fuel savings of approximately 11 percent for fishing vessels (FAO, 1999).

Provided that there are many variables determining fuel consumption, the information above states the speed is the most important factor influencing fuel consumption, which is the only variable the operational measures affect. Therefore, in general, the speed restrictions proposed along the East Coast would slightly reduce vessel energy consumption. This reduction would vary according to the type of vessel, the load, and engine type and size. Routing measures such as recommended routes, and the option of routing around a DMA instead of slowing down, are likely end up using more fuel with the increase in distance traveled. However, the recommended routes should not be too far off from current vessel traffic patterns and DMAs are temporary and occur in a finite area, which can also be transited at reduced speeds to avoid extra distance. Weighing the benefits of fuel consumption resulting from large scale speed restrictions with the disadvantages of the routing measures in three states is likely to result in slight net benefits. Although fuel savings could be significant for specific vessels in certain areas at given times, the cumulative reduction in fuel use for all vessels is very difficult to estimate and is likely to be small.

4.6.6.4 Natural or Depletable Resource Requirements and Conservation Potential

Decreased fuel consumption resulting from speed reductions would have a very minor, direct, long-term, positive impact on depletable US and world petroleum resources. Although the fuel savings could be significant for individual marine vessels operating in the area, savings are unlikely to be significant compared to global or US petroleum demand and supply.

4.6.6.5 Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment

The proposed action involves measures at sea and includes no urban areas or areas with a built environment. Cultural resources are discussed in sections 3.4.8 and 4.5.

4.6.6.6 Relationships Between Local Short-term Use of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The proposed action would not make short-term use of man's environment. To the contrary, it would lessen the impact of the maritime industry on ocean resources by reducing the number and severity of right whale ship strikes. In the long-term, economic impacts on the industry would not be significant and productivity would not be substantially affected. While the shipping industry's initial adaptation to the new regulations would have a cost, after the first year the regulations are implemented, the proposed measures would become standard operating procedures and result in incrementally less costs to the industry over time.

4.6.6.7 Irreversible and Irretrievable Commitments of Resources which would be Involved in the Proposed Action should it be Implemented

The proposed action would result in an irretrievable commitment of resources in terms of the man-hours the industry would initially have to commit in adapting the operational measures and integrating the speed restrictions and recommended routes into their voyage planning on a seasonal basis. The regulations would not change after the initial implementation; therefore the human resources utilized to plan for the new regulations would only be necessary during the first year of implementation.

The proposed action would also require an irretrievable commitment of man-hours from the government in monitoring and enforcement of the operational measures. However, NOAA intends to use existing technology to monitor compliance, therefore, the amount of additional man-hours required for this particular action would be minimal.

4.6.6.8 Unavoidable Adverse Environmental Effects of the Proposed Action

The only unavoidable adverse effects of the proposed action on the natural environment are the potential minor, adverse effects on water quality in the SEUS, resulting from concentrating vessels in recommended shipping lanes. This is based on the premise that water pollution regulations are less stringent seaward of 12-24 nm (22-44 km), and the shipping lanes extend to approximately 30 nm (56 km) offshore. Although it is possible that there would be an increase in the concentration of pollution in these waters, it is unlikely that mariners would specifically discharge wastewater and other pollutants in the offshore sections of the shipping lanes instead of elsewhere during their voyage. Any effects would be short-term and would only occur when the speed restrictions are in place from November 15 through April 15.

The proposed action also results in unavoidable adverse effects on the human environment in the form of compliance costs. The level of the economic impact varies depending on the limit for the speed restrictions. A speed restriction of 10 knots has the highest economic impact, followed by 12, and 14 knots. The economic effects are unavoidable, but necessary to the implementation of the operational measures. NMFS will make efforts to inform the affected industries of the operational measures, and allow sufficient time for the industry to adapt to the new regulations, and integrate the measures into their voyage planning in order to minimize the economic impacts as much as possible through planning.

4.7 Cumulative Effects

NEPA requires the inclusion of a cumulative effects analysis in EISs. CEQ’s regulations for implementing NEPA define cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” regardless of what agency (local, state, Federal or non-Federal) or person undertakes other actions (40 CFR § 1508.7). CEQ’s guidelines for evaluating cumulative effects emphasize the growing evidence that “the most devastating environmental effects may result not from the direct effect of a particular action, but from the combination of individually minor effects of multiple actions over time” (CEQ, 1997). The purpose of the cumulative effects analysis is to ensure that a decision on the proposed action is not made in isolation without considering other past, present, and future influences on the affected resources.

This section analyzes the cumulative effects of implementing the alternatives on the biological, economic, and social resource components of the affected environment. The baseline against which the cumulative effects are measured is the affected environment as described in Chapter 3, "Existing Conditions." The geographic scope is defined by the areas described in Chapters 1 and 2. Cumulative effects will be addressed with respect to the physical, biological, and human environment.

4.7.1 Cumulative Effects on the Physical Environment

4.7.1.1 Air Quality

Air emissions from shipboard combustion engines are largely composed of the following gases that contribute to the greenhouse effect: carbon dioxide, methane, and nitrous oxide. Each greenhouse gas differs in its ability to absorb heat in the atmosphere. Methane, for example, traps over 21 times more heat per molecule than carbon dioxide, and nitrous oxide absorbs 270 times more heat per molecule than carbon dioxide. The greenhouse effect is the rise in temperature that Earth is experiencing because increasing amounts of these three gases are trapping energy from the sun within our atmosphere. Without these gases, heat would escape into space and the Earth's average temperature would be about 60 degrees Fahrenheit colder (EPA, 2005b).

> Human induced climate change, caused by increasing greenhouse concentrations, has the potential to introduce additional pressures on right whales. Key changes that may accompany global warming include increased precipitation, increased ocean temperature, decreased sea ice coverage, and changes in salinity. Climate change effects of this nature have the potential to influence many aspects of an ecosystem, including habitat, food webs, and species interactions (NMFS, 2005a).
>
> A number of studies review and discuss the likely impacts of global climate change on cetaceans, marine mammals, and marine environments in general. Evaluations of the direct effects of climate change on whales are generally confined to cetaceans in the Artic and Antarctic regions, where the impacts of climate change are expected to be the strongest. It is possible, however, that the indirect effects of climate change on prey availability and cetacean habitat will be more widespread, and could affect north Atlantic right whales. For example, climate change could exacerbate existing stresses on fish stocks that are already overfished and indirectly affect prey availability for large whale species. Increasing [ocean] temperatures could alter ocean upwelling patterns, fostering increased blooms of dinoflagellates that produce biotoxins. Increased precipitation is also associated with higher temperatures, which could result in more pollutant runoff to coastal waters, and elevating cetacean exposure to chemical contaminants (NMFS, 2005a).

> Habitat shifts are another possible implication of climate change. Walther *et al.* (2002)[39] examined recent shifts of marine communities in response to rising water temperatures, concluding that most cetaceans will experience roughly poleward shifts in prey distributions. Distributional habitat shifts may also occur at the local level, but these are highly dependent on complex local attributes, as well as ocean current and weather patterns. Baleen whales are highly mobile species, migrating annually from food-rich areas at high latitudes to breeding areas at low latitudes. It is postulated that baleen whales use currents, salinity, and temperature cues to locate regions of high prey abundance and thus may be less affected by climatic habitat shifts than by a general reduction in prey availability.[40] Nevertheless, any general depression of high latitude prey production and/or poleward shift of feeding grounds could place additional stress on migrating whales. For some whale species, these small changes may have little material effect, but for species already vulnerable because of severe existing problems, like the North Atlantic right whale, these changes could be significant obstacles to species survival (NMFS, 2005a).

EPA (2005b) reports that action is occurring “at every level to reduce, to avoid, and to better understand the risks associated with climate change.” Cities and states across the country have prepared greenhouse gas inventories and are actively pursuing programs and policies to reduce greenhouse gas emissions. Nationally, the US Global Change Research Program is coordinating the world’s most extensive research effort on climate change. US EPA and other Federal agencies are actively engaging the private sector, states, and local governments in partnerships to address global warming, while at the same time, strengthening their economies. For more information, consult the US Climate Action Report (US Department of State, May 2002). Globally, countries around the world have expressed a firm commitment to strengthening international responses to the risks of climate change. The US is working under the auspices of the United Nations Framework Convention on Climate Change to increase international action (EPA, 2005b).

4.7.1.2 Ocean Noise Levels

Whales, dolphins, and other marine mammals primarily rely on their hearing to locate food, detect predators, find mates, and keep herds together. Large whales communicate primarily using low-frequency sounds (typically below 1000 Hertz) that travel long distances through water (NRDC, 1999 *in* NMFS, 2005a). The growing amount of noise within this range from ships, supertankers, underwater explosions, and other sources represents an additional potential threat to large whales. Noise pollution may disrupt and inhibit feeding and reproduction; displace whales from traditional calving grounds, feeding grounds, or migratory routes; or, in the worst case, cause direct auditory damage and death. Noise pollution sources include ship and boat propeller noise; drilling, blasting, and dredging; acoustic deterrent devices used by fish farms and fishing vessels; sonar and airguns used in seismic exploration; and the use of low- and mid-frequency sonar in military operations. In recent years, this new source of stress has garnered

---

[39] For example, a doubling of greenhouse gases from pre-industrial times could reduce sea ice in the Southern Hemisphere by more than 40 percent. This could produce adverse effects on the abundance of krill, the primary source of food for whales in this area.

[40] Evidence suggests a strong relationship between right whale distribution and threshold densities of calanoid copepods (Finzi *et al*., 1999). For example, right whales do not appear to utilize Cape Cod Bay as a foraging ground unless the densities of copepods are above a certain minima (Kenney *et al*., 2001).

increased attention from both the scientific community and the general public. The impact of acoustic pollution, however, has been difficult to ascertain, and its effect on marine mammals is one of the least understood subjects within marine mammal science (NMFS, 2005a).

Although acute mortality from noise pollution is established, much less is known about the impact of chronic noise pollution on cetacean health. Potential impacts from long-distance undersea noise vary from no effect to temporary hearing loss or long-term behavioral changes that may reduce whale survival and reproduction. One response of particular concern is the potential for the displacement of cetacean populations because of high levels of anthropogenic noise (NMFS, 2005a).

As described in Section 3.3.4, the main sources of anthropogenic ocean noise in the Atlantic Ocean are shipping, offshore drilling and mineral exploration activities, and military exercises. The direct and indirect impacts of the proposed action on shipping noise are described in Section 4.3.

Offshore Drilling and Mineral Exploration Noise

The Minerals Management Service is the lead federal agency charged with managing offshore oil exploration and leasing. From 1976 to 1983, 10 oil and gas lease sales were held in the Atlantic outer continental shelf area. On the blocks leased during that period, 47 exploratory wells were drilled, but hydrocarbons were discovered in only five of the wells drilled. The last of these natural gas and oil leases was relinquished in 2000, and currently there are no leases for oil and gas in existence off the Atlantic coast. However, exploration for sand and gravel deposits is being conducted on the outer continental shelf of several Atlantic states (MMS, 2005).

Noise from Seismic Exploration for Scientific Research

Federal agencies such as the National Science Foundation (NSF) provide funding to Academic institutions and research facilities to conduct seismic research in the ocean. Seismic research focuses on the geology and geophysics of the seafloor, including earthquake and submarine volcano processes, and undersea landslides. The equipment used for the seismic programs includes multibeam bathymetric sonars, bottom profiling sonars, acoustic current profilers, and airguns. Airguns emit strong pulses of compressed air that result in sound pulses ~ 0.1 second in duration near the source, to ~ 1.0 second at a distance. Airguns are often used in arrays, and towed 30 to 50 meters behind the ship. Seismic surveys introduce low frequency sound (< 250 Hz) into the ocean. These devices are used to obtain information on the seafloor, the structure of sediments, and ocean currents and circulation patterns.

The noise from airguns and other seismic sources can have potentially adverse effects on marine mammals, sea turtles, fish, and other marine resources. The effects range from no response, to habitation, masking or hearing impairment, and other physical effects. To minimize or avoid adverse effects of seismic operations on marine resources, monitoring and mitigation are incorporated into the research programs. NSF and NMFS are currently conducting a programmatic EIS/OEIS on the environmental impacts of seismic operations conducted from NSF’s primary seismic ship, the R/V Marcus G. Langseth. The programmatic EIS/OEIS will address the planned program as a whole, rather than assessing individual cruises separately.

Shipping Vessel Noise

Shipping has been a constant source of anthropogenic noise in the ocean since the inception of waterborne commerce and transportation, and will only continue to increase with the steady increase in commercial shipping. From 1985 to 1999, world seaborne trade increased 50 percent to approximately 5 billion tons, and is estimated to account for 90 percent of world trade (Westwood *et al*., 2002). A modern day supertanker cruising at 17 knots fills the frequency band below 500 Hz and produces sounds of 190 decibels or more. Midsized ships such as tugboats and ferries produce quieter sounds, around 150 to 170 decibels in the same frequency range (Jasney *et al*., 2005).

Noise from Military Activities

Although direct, unequivocal evidence has been hard to obtain, there is growing evidence that military activities have the potential to disturb, injure, or kill marine mammals. In 1996 six right whale deaths were recorded in waters adjacent to the SEUS right whale critical habitat area (one death resulted from a ship strike). The Navy maintains a base adjacent to this area and uses offshore waters for gunnery exercises. Because several of the carcasses were found near a Navy gunnery range, it was suspected that some deaths were related to underwater explosions; however, no conclusive link was established (NMFS, 2005a). The Navy currently has mitigation measures in place to prevent similar events from reoccurring (Appendix A).

Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar

Controversy has surrounded the Navy's potential use of SURTASS LFA sonar, which is a long-range, low frequency (between 100 and 500 Hertz) sonar system that has both active and passive components. The sonar's detection capability does not rely on noise generated by the target, but rather on the use of active sounds or pulses originating from the system. SURTASS LFA sonar provides the Navy with a reliable system for long-range detection of quieter, harder-to-detect, newer-generation submarines. Its low frequency sound travels in seawater more effectively and for greater distances than the higher frequency sound used by most other active sonar systems (Department of the Navy [DoN], 2001 *in* NMFS, 2005a).

The Navy funded a study of the effect of low-frequency sonar to evaluate the impact of the SURTASS LFA system on endangered species. The study assessed the effects on four species of baleen whales (blue, fin, gray, and humpback whales) known to be sensitive to low-frequency sounds.[41] The findings were that when exposed to sound pressure levels ranging from 120 to 150 decibels, the marine mammals exhibited only minor, short-term behavioral responses. Given the uncertainty of the science in this area, however, a number of measures were included in the final NMFS rule on the military use of SURTASS LFA, including use restrictions in coastal zones and a monitoring and detection plan (NMFS, 2005a).

Undersea Warfare Training Range

The Navy is proposing to build a 500 nm^2 (1,713 km^2) undersea warfare training range, approximately 57 nm (105 km) off the coast of southeastern North Carolina. The impacts of this project are described in the *Draft Overseas Environmental Impact Statement/Environmental Impact Statement for the Undersea Warfare Training Range* (DoN, 2005a). The EIS assesses alternative sites for the range off the coast of northeastern Florida and northeastern Virginia. The area selected for the range would be fitted with undersea cables and sensor nodes (underwater

[41] The study was limited to these four species of baleen whales because (1) baleen whales are considered to have the best hearing in the low frequency band of all marine mammals, (2) these species have protected status under the law, and (3) there is prior evidence that these species react to low frequency sounds.

acoustic transducer[42] devices), which would be used for antisubmarine warfare training. The transducer nodes would transmit and receive acoustic signals from ships operating within the site. Training events would involve submarines, ships, and aircraft. The training exercises would utilize both passive and active sonar in the mid-frequency range.

In the DEIS, the Navy considers the potential noise effects of the undersea warfare training range on marine mammals, including the right whale. The preferred location for the training range off southeastern North Carolina would be located more than 47 nm (87 km) offshore. As 63.8 percent of North Atlantic right whales sightings are within 10 nm (18.5 km) of the coast with 94.1 percent reported within 30 nm (56 km) of the coast (Kraus *et al*., 1993 *in* DoN, 2005a; Knowlton *et al*., 2002), the DEIS concludes that there would be no significant impacts on right whales if the preferred alternative were selected. However, this finding has been challenged by scientists, government agencies and nongovernmental organizations through comments on the DEIS. NMFS specifically suggested the need for "further analysis of right whale sightings in this area…to evaluate the potential impacts of the preferred alternative" in their comment letter to the Navy, dated January 30, 2006. Until these analyses are conducted, the cumulative effects of this action on right whales are unknown.

If the Navy were to pick the alternative northeastern Florida site, which overlaps with right whale critical habitat for calving from December through April, the DEIS projects that some disturbance of right whales would occur from active acoustic sources when in use. The DEIS concludes that while momentary disturbance from active acoustics is likely, right whales would not "exhibit long-term displacement in the area of the proposed range, nor would the overall migratory pattern be significantly affected." If this alternative were selected, the Navy would initiate ESA Section 7 consultation with NMFS to develop mitigation measures (DoN, 2005a).

In summary, the cumulative effects of the three primary sources of anthropogenic noise mentioned in this section in addition to other natural and anthropogenic threats to right whales might result in long-term adverse impacts on right whale health. Cumulative impacts are difficult to analyze without greater understanding of the effects of noise on right whale hearing and behavior.

The need for NMFS to take action on noise pollution and acoustic impacts was first identified in 1987, when it was determined that the intense sounds from an acoustic source could potentially harass marine mammals and was therefore subject to the take provisions of the MMPA. In 1995, the agency formed the NMFS Acoustics Program. Today, the program is:

- Working with acoustic expert panels to develop Noise Exposure Criteria for marine mammals, fish and sea turtles.
- Funding research to address critical data needed to improve and expand Noise Exposure Criteria.
- Developing acoustic exposure policy guidelines for NOAA.
- Hosting a national educational lecture series on marine mammal acoustic communication and the potential impacts of natural and manmade sources underwater.

[42] A transducer is an instrument that converts one form of energy to another.

- Leading efforts to develop a global passive acoustic noise-monitoring network in key marine environments.
- Continuing to work cooperatively with the shipping industry to address the emerging issue of shipping noise and marine mammals, which was the subject of the May 2004 international symposium.
- Providing technical analysis for NOAA's Incidental Take Authorizations involving human sound sources.

Information on the NMFS Acoustics Program may be found at:
http://www.nmfs.noaa.gov/pr/acoustics/

4.7.1.3 Water Quality

As described in Sections 3.3.2, "Water Quality," research suggests that water pollution in the marine environment adversely affects marine mammals. While not directly killing cetaceans, pollutants are believed to cause sub-lethal direct effects that may alter cetacean physiology, including reproduction, immune defense, endocrine system functions, and possibly neural systems that control social and migratory behavior. Indirectly, water pollutants can affect the numbers and diversity of cetacean prey species and lead to bioaccumulation in whales from eating contaminated prey. Whales are particularly vulnerable to chemical pollutants because they are long-lived, have extensive fat stores (where chemicals accumulate), and are often at the top of the food chain. Although little direct evidence of the link between chemical pollution and cetaceans is available, evidence of the adverse effects of pollution on terrestrial species and noncetacean marine mammals is sufficient to warrant concern about similar impacts on cetacean species.

As the human population along the East Coast continues to expand in coming decades, the amount of sewage and industrial waste that reaches ocean waters, particularly in the shallow coastal waters favored by right whales, could also continue to grow. Any increase in pollutants in coastal waters could magnify negative effects on right whales, impairing their health and impairing recovery of their population.

Working to control water pollution are an array of laws as follows:

- **Clean Water Act –** Controls pollution in the nation's waterways by controlling point and nonpoint discharges.
- **Coastal Zone Management Act –** Encourages environmentally sound development in coastal areas.
- **Marine Protection, Research, and Sanctuaries Act of 1972 –** Regulates ocean disposal of materials.
- **Oil Pollution Act of 1990 –** Ensures that parties responsible for spills or releases of oil or other hazardous substances, are liable for damages and cleanup.
- **MARPOL Conventions –** International conventions that control pollution of the marine environment by ships.

Agencies responsible for administering these laws are continuously seeking better enforcement tools and funding to reduce sources of pollution, such as by upgrading and building new sewage treatment plants. Continuing enforcement will serve to contain existing and future water pollution, but to the extent that ocean waters continue to be polluted, pollutants will have negative effects on cetaceans.

4.7.2 Cumulative Effects on the Biological Environment

4.7.2.1 Commercial Whaling

Commercial whaling may have started as early as 800 A.D. in Scandinavia, and is known to have been practiced by the Basques off the coast of France and Spain as early as the 12th century. Early whaling, utilizing hand-held harpoons, targeted slow-swimming species like right whales and bowhead whales. With the development of steam driven vessels and, in 1868, the invention of the explosive harpoon gun, the age of modern whaling began. These innovations in whaling technology allowed whalers to target faster swimming species such as blue, fin, and sei whales (NMFS, 2005a).

The International Whaling Commission (IWC) was established in 1946 to regulate whaling and thus ensure the sustainability of the whaling industry (Cooke, 1995; Holt, 1999). The IWC originally negotiated harvest quotas with member nations based on estimates of whale populations. These quotas were set too high, however, and the system eventually proved incapable of preventing overexploitation (Gambell, 1999). By the early 1980s, the organization had shifted its focus from whaling regulation to whale conservation. The result was the 1982 approval of a temporary, voluntary ban on commercial whaling, which came into effect in 1986 and remains in effect to this day. As a result of this ban, most IWC members have ceased whaling entirely; only Denmark, Iceland, and Norway continue any form of whaling in the North Atlantic, and the number of whales taken by these nations has been greatly reduced (NMFS, 2005a).

North Atlantic right whales were the first target of commercial whaling and, consequently, the first large whale species to be hunted to near extinction by such efforts. Whalers targeted this species for several reasons, including the presence of right whales in near coastal waters, the relatively slow speed at which they swim, their tendency to float when dead, and the high yield of commercially valuable products (e.g., oil and baleen) they provided. These factors also contributed to the whale’s common name, which is said to have originated from the English whalers who designated this species of whale as the “right” (i.e., correct) whale to hunt. More than 800 years of uncontrolled and intense commercial whaling is the primary reason that the population of right whales has declined to its present-day critical level (NMFS, 2005a).

The commercial harvest of right whales in substantial numbers began in the 1500s with Basque whalers in the Strait of Belle Isle region off Newfoundland (Aguilar, 1986). As the stocks in these waters became depleted, hunting efforts shifted to the Labrador and New England coasts. In total, between the 11th and 17th centuries, an estimated 25,000 to 40,000 North Atlantic right whales are believed to have been taken. This intense period of early whaling may have resulted in a significant reduction in the stock of right whales by the time colonists in the Plymouth area began hunting them in the 1600s. Nonetheless, a modest but persistent whaling effort along the coast of what is now the eastern United States continued. One record from January 1700, for example, reports 29 right whales killed in Cape Cod Bay in a single day (Reeves, 1987) (NMFS, 2005a).

The League of Nations adopted a resolution banning all harvesting of right whales in 1935. At that time, it was thought that fewer than 100 right whales survived in the western Atlantic (NMFS, 2001a *in* NMFS, 2005a).

4.7.2.2 The Atlantic Large Whale Take Reduction Plan (ALWTRP)

Fishing gear entanglement is another primary cause of anthropogenic mortality to large whales, including right whales, as discussed in Section 1.1. Whales and other marine species may become entangled in fishing gear such as nets, traps, and pots that are left in the water from hours to days. They may become so entangled that they are unable to swim to the surface to breathe, or entanglements may result in long-term effects, such as starvation in cases where lines are wrapped around the mouth. Studying entanglements from 1997 to 2001, Waring *et al.* (2003) found that the species suffering serious injury most frequently, in descending order, were humpback, right, minke, and fin whales. Fatal entanglements most frequently involved, in descending order, minke, humpback, right, and fin whales. The annual right whale mortality resulting from entanglements was 1.2 in 2003. As this number exceeds the PBR levels for right whales, NMFS took action to reduce mortality from entanglements.

The Atlantic Large Whale Take Reduction Team (ALWTRT) is one of several take reduction teams established by NMFS in the 1996 to help develop plans to mitigate the risk to marine mammals posed by fishing gear along the Atlantic coast. TRTs were established as advisory teams under the MMPA. The ALWTRT is composed of fishermen, scientists, conservationists, and state and federal officials.

The MMPA requires Take Reduction Plans for strategic marine mammals stocks that interact with Category I or II fisheries. The right whale is considered a strategic stock because its human-caused mortality exceeds the PBR level and it is listed as endangered under the ESA. Therefore, the large whale TRT helped NMFS develop the ALWTRP that was published in November 1997 as an interim final rule. A final rule was published in February 1999. The plan addresses right whales, humpbacks, fin, and minke whales. The plan described in the final rule was intended to be an evolving plan that would change as whale researchers learn more about the status of whale stocks and gain a clearer understanding of how and where entanglements occur. NMFS retained the ALWTRT as a feature of the plan, to help the agency monitor progress and advise on needed improvements. NMFS proposed broad-based gear modifications to the ALWTRP in June 2005 (Section 1.8.2) to further reduce entanglements. NMFS is considering various alternatives to meet this objective and thus is preparing an EIS on the proposed amendments to the ALWTRP (Section 1.9.2).

The ALWTRP and proposed amendments would have a beneficial cumulative effect on the right whale population. Reducing both the primary causes of human-induced mortality, entanglement, and ship strikes, will have significant beneficial effects on the population. These two conservation measures should have a measurable impact on the population status by reducing the mortality rate, and allowing the population to recover and eventually reach sustainable population levels.

4.7.2.3 Whale Watching

The popularity of whale watching is growing, and with it the number of vessels that seek out whales for viewing, thus, there are concerns about their short-term and long-term effects on whale behavior and populations (IFAW *et al.*, 1995). It is estimated that the industry attracts more than 9 million participants a year in 87 countries, generating revenue of one billion US dollars (Hoyt, 2001). Whale watching tends to concentrate in habitat areas critical to whales, such as feeding areas. When large numbers of vessels descend on one area and "when some approach too closely, move too quickly, operate too noisily, or pursue animals, performance of life processes in wild cetaceans may be interrupted" (Lien, 2001). A number of studies have shown that whale watching has short-term impacts on whales by, for example, startling them and temporarily driving them away from feeding patches or distracting them from socializing, but studies of long term effects are lacking (Amaral and Carlson, 2005).

Amaral and Carlson (2005) reviewed the literature (204 articles) on whale watching impacts worldwide. They note that whale watching may enhance environmental tourism, regional economics, environmental education and research but that it is critical to avoid negative impacts on whales being watched, which can include acoustic disturbance, increased energy expenditure, exclusion from habitats, and vessel strikes. The articles reviewed the impact of whale watching on many types of whale behavior, such as time feeding, time diving, tale slaps, group cohesion, respiration, time spent traveling, etc. Whale responses were elicited most often by the speed and direction of the whale watching boats. None of the studies specifically looked at impacts on Northern right whales with the exception of a 1986 study by W.A. Watkins.

Watkins (1986 *in* Amaral and Carson, 2005) studied the impact of whale watching in Cape Cod Bay on four species of baleen whales, including Northern right, minke, humpback and fin whales. Watkins reviewed cruise and experiment logs prior to 1976, the advent of whale watching in the area, and after 1976, to document any changes in whale behavior. He found that; minkes changed from frequent positive interest in vessels to generally uninterested reactions; finbacks changed from mostly negative to uninterested reactions; humpbacks dramatically changed from mixed responses that were often negative to often strongly positive reactions; but right whales continued their responses with little change. He noted that the whales studied seemed to react primarily to underwater sound, but also to light reflectivity and tactile sensations. Watkins theorized that the type of activities in which right whales engage influences their sensitivity to and tendency to avoid noise disturbance and vessel activity (Watkins, 1986 *in* Amaral and Carlson, 2005).

Most studies of the impact of whale watching on whales focus on short-term disruptions to their behavior. Studies of long-term impacts are needed in order to determine whether whale-watching activities could create long-term negative changes to whale behavior and biology, such as by driving them from productive feeding grounds or by causing them to exert energy needed for migration and reproduction to avoid whale-watching vessels (IFAW *et al.*, 1995). As more research is undertaken on the long-term impacts of whale watching on whale behavior and biology, the cumulative effects will become clearer. Meanwhile, many regions and countries have developed whale-watching guidelines to reduce the pressure on whales and avoid negative effects based on existing science; Carlson (2003) compiled whale watching guidelines and regulations around the world for the International Fund for Animal Welfare.

4.7.2.4 Habitat Destruction

Several human activities that may adversely affect right whale habitat have already been discussed, including, fishing, anthropogenic noise, contaminants, oil and gas exploration and development, and other energy-related development. There are few data regarding the possible indirect adverse effects of these types of human activities on right whales. However, it is possible that certain activities that degrade right whale habitat may be slowing population recovery. Studies are needed to determine if various activities are affecting right whales and right whale productivity (NMFS, 2005b). This section describes several of these topics in a different context and also introduces coastal development as a possible cause of habitat destruction.

A continued threat to the coastal habitat of the right whale in the western North Atlantic is the undersea exploration and development of mineral deposits, as well as the dredging of major shipping channels. Section 4.7.1.2 describes offshore drilling and exploration specifically with respect to noise, and this section describes the general effects. Although exploration has occurred in the past, NMFS is not aware of any current plans to explore or develop oil resources in this region. If these activities occur, there may be consequent adverse effects to the right whale population by vessel movements, noise, spills, or effluents. These activities may possibly result in disturbance of the whales or their prey, and/or disruption of the habitat and should be subject to ESA Section 7 consultations (NMFS, 2005b).

Right whales also frequent coastal waters where dredging and its associated disposal operations occur on a regular basis, such as along the southeastern US coast. The USACE has responsibility/oversight for many of these dredging and disposal operations and has consulted with NMFS under Section 7 of the ESA on these activities (Appendix A). As a result, engaging in dredging operations and related activities requires protective measures such as posting lookouts on dredge vessels and adherence to recommended precautionary guidelines for operations to reduce the risk of collision (NMFS, 2005b).

Coastal development in the form of waterfront property, marinas, and other recreational facilities presents an real threat to the habitat of this coastal species. Coastal development in the future will increasingly add vessel traffic to coastal waters and will potentially interfere with marine species and their habitat.

It is unknown to what extent these activities may disturb or otherwise affect right whales. It appears that whale behavior and the type of activity in which they are engaged influence right whale sensitivity to, and tendency to avoid, noise disturbance and vessel activity (Watkins 1986; NMFS 1991 *in* NMFS, 2005b), but more studies are needed.

In the Right Whale Recovery Plan, NMFS identified the need to conduct studies to determine the direct and indirect effects of activities and impacts associated with coastal development on the distribution, behavior, and productivity of right whales. The activities and impacts studied should include, but not be limited to, sewage outfall, dredging activities (and associated plumes), dredge spoils, dumping, habitat alteration, noise, oil and gas exploration and development, and aquaculture activities, including effects on prey species as well as on right whales directly. As the impacts are identified, NMFS will then take steps to minimize identified adverse effects from coastal development (NMFS, 2005b).

Cape Wind Project

Cape Wind Associates is proposing an offshore wind energy project that consists of the installation and operation of 130 Wind Turbine Generators (WTGs) on Horshoe Shoal in Nantucket Sound. The wind-generated energy produced by the WTGs will be transmitted via a submarine transmission cable system to the electric service platform, which will transform and transmit the electric power to the shore via alternating current submarine cable circuits (USACE, 2004a). The USACE published a DEIS on this project in November 2004, and a marine biological assessment in May 2004, assessing the impacts of the project on threatened and endangered marine species. The Wind Park is expected to be operational in 2009.

The Cape Wind project has the potential to disturb right whales and their habitat. The project will introduce vessel traffic during the construction of the project and then regularly thereafter for operation and maintenance. Increased vessel traffic may disrupt right whale behavior, increase the probability of vessel strikes, and result in acoustic harassment. However, there have been very few whale sightings in Nantucket Sound, and the bathymetric and oceanographic features that are conducive to dense aggregations of prey are not as prevalent in Nantucket Sound as in other feeding grounds such as Stellwagen Bank, Jeffrey's Ledge, Browns and Bacaro Banks, and in the Great South Channel (Kenney and Winn, 1986 *in* USACE, 2004a). Only seven instances of right whales have been documented in Nantucket Sound since the early 1900s. Whales are more common offshore to the east of Nantucket Island than in the Sound (USACE, 2004a). Given the rare occurrence of right whales in the Nantucket Sound, the probability of cumulative, adverse effects on right whales is low.

4.7.2.5 Nonregulatory Measures of NOAA's Right Whale Ship Strike Reduction Strategy

The other four nonregulatory measures of the Strategy will also have a long-term, positive cumulative impact on right whale recovery through various means to reduce the threat of ship strikes. These measures include the following elements, (1) Continue ongoing conservation and research activities to reduce the threat of ship strikes, (2) develop and implement additional mariner education and outreach programs, (3) conduct Section 7 consultations, as appropriate, with Federal agencies that operate or authorize the use of vessels in waters inhabited by right whales, and (4) develop a Right Whale Conservation Agreement with the Government of Canada.

Continuing ongoing research and conservation activities, described in Section 1.2.1, in addition to the Strategy will increase the level of right whale protective measures. The grant programs will continue to research new technologies and other right whale biology and habitat parameters in order to identify new and expanded ship strike mitigation measures. The MSRS will continue to log vessel traffic information and compliance data. The northeastern and southeastern right whale recovery plan implementation teams will continue to educate mariners about the threat of ship strikes, and when the Strategy is implemented, the teams may help disseminate information on the operational measures of the Strategy. Current outreach and education efforts, including updating navigational charts, brochures, placards and other publications to educate mariners about the vulnerability of right whales to ship strikes will further the objectives of the Strategy while a new program is being developed under element 2.

Mariner awareness is a key component to reducing the threat of ship strikes. While feedback from current efforts indicates that the maritime community is increasingly aware of the problem, NMFS intends to develop and implement a comprehensive education and outreach program for mariners and the general boating public which highlights the severity of the ship strike problem and provides steps that be taken the reduce the threat. This program is underway. NMFS has developed a comprehensive list of tasks to raise mariner awareness that targets all segments of the recreational and commercial shipping industries, other agencies, and the general public. Tasks include developing curricula for maritime training academies, providing training modules for captain re-licensing, providing advice on voyage planning for domestic and foreign-flagged vessels, and ensuring all east coast pilots have material to distribute to inbound ships. Key groups such as the implementation teams and others are assisting in reviewing, prioritizing, and performing the tasks.

The third element, conducting ESA Section 7 consultations (Section 1.8.3), would establish separate agency-specific ship strike mitigation measures to cover the vessels owned or operated by, or under contract to, Federal agencies, that are exempt from the operational measures of the Strategy. This element ensures that the mitigation measures undertaken by the nonsovereign vessels are not [negated] by the Federal agency's exemption. These vessels are exempted because national security, navigational, and human safety missions of some agencies may be compromised by mandatory vessel speed restrictions. NMFS will use Section 7 consultations to analyze and mitigate impacts of vessel activities authorized, funded or carried out by Federal agencies. NMFS will review actions (including those subject to the conditions of existing Biological Opinions [Appendix A]) involving vessel operations of federal agencies (e.g. the USACE, EPA, MARAD, MMS, NOAA Corps, USCG, and US Navy) and determine whether to recommend initiation or re-initiation of Section 7 consultation to ensure those activities are not jeopardizing the continued existence of right whales or destroying or adversely modifying their critical habitat.

The forth element, developing a Right Whale Conservation Agreement with the government of Canada, would aim to extend mitigation measures into Canadian right whale habitat, therefore strengthening the overall effectiveness of the Strategy to the population. As North Atlantic right whales are transnational in distribution, NOAA intends, with the appropriate federal agency or agencies, to initiate the negotiation of a bilateral Conservation Agreement with Canada to ensure that, to the extent possible, protection measures are consistent across the border and as rigorous as possible in their protection of right whales. Although specific language of such an agreement has not been identified, NOAA has already communicated the need for an agreement and cooperative efforts to Canadian officials.

4.7.2.6 Other Navy Training Exercises

There are various training exercises conducted by the Navy in the Atlantic ocean aside from the sonar-related activities mention in Section 4.7.1.2. Some of these programs occur offshore, away from right whale habitat and other activities overlap spatially with right whales. In addition to these activities, the Navy has a suite of regularly occurring activities within the Boston Complex in the Gulf of Maine. The Navy has initiated information consultation under Section 7 of the ESA on these activities, and the Navy has implemented interim mitigation measures for ongoing activities in coordination with NMFS to minimize the impacts on protected species. These activities are coordinated by the Brunswick Naval Base, and are not discussed in detail in this section as the Brunswick Naval Base is on the Base Realignment and Closure list for closure, and when this occurs, these exercises will be relocated.

Sinking Exercises (SINKEX)

The Navy proposes to conduct Sinking Exercises (SINKEX) in the western North Atlantic Ocean, specifically off the coasts of Virginia, North Carolina, and South Carolina. During a SINKEX, a vessel is used as a target or test platform against which the Navy fires live and inert ordnance in order to sink the vessel. The primary purpose of this program is to train Fleet personnel in the use of live weapons against a representative target. In accordance with the

Navy's permit under the Marine Protection, Research, and Sanctuaries Act, the SINKEX must be conducted at a distance of greater than 50 nm (92.6 km) from shore and in waters deeper than 6000 feet (1828.8 m). The SINKEX location follows the EEZ contours, and is generally greater than 200 nm (370 km) offshore (DoN, 2005b).

Right whales are a coastal species and very few sightings occur beyond the continental shelf. The Navy's Biological Assessment assessed the seasonal occurrence of right whales in the proposed site and found a possible occurrence in the spring and fall, unknown in the winter, and absent in the summer. The Navy selected the proposed SINKEX location based on several factors, including areas with a low likelihood of encountering an endangered species. However, transiting from port to the SINKEX location crosses the right whale migratory corridor, which increases the potential for vessel collisions. To this end, the Navy adopted mitigation measures to reduce the potential for collisions. Appendix A describes these measures in detail. In addition to these mitigation measures the Navy developed a monitoring plan to minimize the probability of sighting any protected species or shipping vessels in the vicinity of an exercise (DoN, 2005b). This action would take place in the reasonably foreseeable future, although given the information above, the SINKEX program should not have significant effects on right whales.

Previous informal Section 7 consultations under the ESA with the NMFS' NERO and SERO have determined that the SINKEX was not likely to adversely affect listed species. The Navy is also planning to undergo Section 7 consultation for this SINKEX program. Until the consultation is completed it has yet to be determined whether NMFS concurs with the Navy's findings in this BA.

Virtual At-Sea Training/Integrated Maritime Portable Acoustic Scoring & Simulator (VAST/IMPASS) System

The Virtual At-Sea Training/Integrated Maritime Portable Acoustic Scoring & Simulator (VAST/IMPASS) System for firing exercises is a portable gunnery scoring system to be used within and seaward of already established Navy Operating Areas (OPAREAs) off the East Coast and Gulf of Mexico. The proposed action will take place in waters greater than 12 nm (22.2 km) from shore. The Virginia Capes Operating Area (VACAPES OPAREA) is located in the coastal and offshore waters of the Atlantic, adjacent to Delaware, Maryland, Virginia, and North Carolina. The western boundary of the VACAPES OPAREA is located approximately 3 nm (5.6 km) off the coastline in the territorial waters of the US, and the remainder of the OPAREA to the east is located in the US EEZ (DoN, 2001a in DoN, 2004). The Cherry Point (CHPT) OPAREA is located in the nearshore and offshore waters of North Carolina. The western boundary of the OPAREA is located approximately 3 nm (5.6 km) off the coast at the boundary between North Carolina State waters and US territorial waters. The Jacksonville and Charleston (JAX/CHASN) OPAREA is located in the South Atlantic Bight, off the coasts of North Carolina, South Carolina, Georgia, and northeastern Florida. The majority of the western boundary of the JAX/CHASN OPAREA is located approximately 3 nm (5.6 km) off the Southeast coast, except for the area off southern Georgia and northern Florida where the boundary lies from 3 to 7 nm (5.6 to 13 km) from shore (DoN, 2004).

From fall through spring, North Atlantic right whales are expected to occur in continental shelf waters throughout the East Coast OPAREAs (DoN 2001a; 2002a; 2002b *in* DoN, 2004). Estimated densities of right whales are highest in winter (0.9 to 1.7 whales/1,000 km^2 [386 mi^2]) in the three East Coast OPAREAs. Right whale occurrences are concentrated in nearshore waters of JAX/CHASN OPAREA during the fall and winter (DoN, 2002b). During the summer, right whales occur further north on their feeding grounds (density of 0 whales/1,000 km^2 [386 mi^2]); however, there are sightings in the JAX/CHASN during summer (DoN, 2004). Right whale sightings in very deep offshore waters of the western North Atlantic are infrequent. There is limited evidence, however, suggesting that there may be a regular offshore component of their distributional and migratory cycle (DoN, 2004).

Potential impacts to right whales and other endangered species resulting from the proposed use of the VAST/IMPASS system include collisions with Navy vessels, acoustic and explosive impacts from detonation of explosive ordnance, and acoustic impacts of gun blasts. Based on analysis in the BA, the Navy determined that the proposed action would either have no effects (muzzle blast noise from air to water and noise from sonic boom of the shell) on endangered species or negligible effects (gun noise transmitted through ship hull and physical injury from the exploding shell and debris). Based on the mitigation measures listed below, collisions with right whales are not expected (DoN, 2004).

The Navy developed a marine mammal and sea turtle mitigation plan to minimize the risk of impacts to these animals. The mitigation plan includes the following measures:

1. Pre-exercise monitoring of the target area using high-power binoculars prior to the event during deployment of the sonobuoy array, and during return to the firing position.
2. Ships would not fire on the target if any marine mammals or sea turtles are detected within or approaching the impact area. Operations would be suspended until the impact area is clear of marine mammals or sea turtles.
3. Post-exercise monitoring of the entire impact range for the presence of marine mammals and sea turtles would take place using high-power binoculars and the naked eye during the retrieval or the sonobuoy array following each firing exercise.
4. The visibility must be such that the fall of the shot is visible from the firing ship during the exercise.
5. The VAST/IMPASS system would be used only during daylight hours and only in Beaufort Sea State 3 or less. Calm sea states and good lighting conditions contribute to high visibility conditions, making it easier to spot any marine mammal or sea turtle in the area.
6. If marine mammals or sea turtles are detected in the vicinity of the Navy vessel, personnel would increase vigilance and take reasonable and practicable actions to avoid collisions and activities that might result in close interaction of Navy assets and protected species. Actions may include changing speed and/or direction and are dictated by environmental and other conditions. No firing will occur if marine mammals are detected with 66 yards (60 m) of the vessel
7. The exercise will not be conducted in an area of biological significance and the exercise will not be conducted if sargassum is detected in the impact area (DoN, 2004).

The Navy determines that the proposed action may affect but is not likely to adversely affect right whales. The proposed action is not likely to result in the destruction or adverse modification of North Atlantic right whale critical habitat, as the action will be conducted in a manner consistent with the restrictions in the existing BO issued by NMFS in May 1997 (Appendix A). The Navy is planning to undergo Section 7 consultations for the VAST/IMPASS System. Until the consultation is completed it has yet to be determined whether NMFS concurs with the Navy's findings in this BA.

4.7.2.7 Liquefied Natural Gas Vessels and Deepwater Ports

Section 4.7.3.1 describes the three existing (including two applications to expand existing terminals), one approved, and seven new proposed (at the time of publication of the DEIS) LNG terminals on the East Coast. While all the proposed facilities would increase vessel traffic on the East Coast, if approved, only two of these proposals are for offshore deepwater ports that would be located in right whale habitat. Five proposals are inshore and would affect vessel traffic if approved, although as these projects are in various stages of the application and environmental processes, vessel traffic information is not available for all of the proposals. Although there are nine active proposals, it is possible that only a few of these proposals will be licensed by the Federal Government. Out of the 40 LNG proposals in North America, industry analysts predict that only 12 will ever be built (FERC, 2006).

The two offshore proposals addressed in detail in this section that would have potential impacts on right whales are the Northeast Gateway and Neptune Deepwater Ports. Both applications for a Deepwater Port license were determined to be complete in 2005 and thus both projects have commenced the NEPA process. The USCG and MARAD are also expected to initiate Section 7 consultations under the ESA with NMFS (Section 1.8.3). This section addresses the cumulative impacts of constructing these facilities and the increase in vessel traffic generated by the proposed LNG terminals on right whales in the reasonably foreseeable future.

Neptune LNG

The Neptune LNG terminal would be located approximately 22 miles northeast of Boston, Massachusetts, in a water depth of approximately 260 ft (79.2 m). One unloading buoy system at the deepwater port would moor up to two shuttle regasification vessels (SRVs). There would be an initial increase in vessel traffic in Massachusetts Bay during the construction of the terminal and installation of a 10.9 mile pipeline that would connect to the existing Algoquin HubLine™ natural gas pipeline (Neptune LNG, LLC, 2005). The Deepwater Port license application includes estimates of the vessel traffic from operations (including construction); support vessels are estimated to take 61 round trips per year, SRVs would take approximately 50 round trips, and pilot vessels would also take 50 round trips per year, accompanying the SRVs (Neptune LNG, LLC, 2005). Therefore, this facility would increase vessel traffic by approximately 161 round trips (322 one-way trips) per year.

The USCG and MARAD are preparing an EIS to assess the impacts of the facility on the environment, and the Biological Opinion resulting from the Section 7 consultation will determine if the action is likely to jeopardize the continued existence of any endangered or threatened species and or adversely modify or destroy critical habitat. Further, NOAA specifically requested that the EIS considers the potential impacts of the construction and operation of the terminal on endangered species, including right whales, in their scoping comments on the NOI to prepare an EIS for the Neptune LNG Deepwater Port. However, at this time there is no information available on the potential impacts of this vessel traffic and construction on right whales.

Northeast Gateway

The Northeast Gateway LNG terminal would be located offshore in Massachusetts Bay, approximately 13 miles south-southeast of the city of Gloucester, Massachusetts, in federal waters approximately 270 to 290 feet in depth. The natural gas would be delivered to shore by building a new 16.4 mile pipeline from the proposed deepwater port to the existing Algoquin HubLine™ pipeline (Northeast Gateway Energy Bridge, LLC, 2005). As with the Neptune project, the construction and operation of this terminal would increase vessel traffic. The Deepwater Port license application states that there would be an estimated 55 to 62 Energy Bridge™ regasification vessels (EBRV) arrivals per year. In addition, support vessels would take on trip per week or 52 trips per year. Therefore, this facility would increase vessel traffic by 162 to 176 round trips (324 to 352 one-way trips) per year (Northeast Gateway Energy Bridge, LLC, 2005).

The USGC and MARAD are preparing an EIS to assess the impacts of the facility on the environment, and the Biological Opinion resulting from the Section 7 consultation will determine if the action is likely to jeopardize the continued existence of any endangered or threatened species and or adversely modify or destroy critical habitat. NOAA also provided comments to assist the USCG with their completeness determination and recommended the collection of additional data for further analyses that will be necessary to evaluate the impacts on NOAA’s trust resources. These comments include NOAA’s concern that the Northeast Gateway project would negatively impact conservation within SBNMS, specifically with respect to NOAA’s plans to reconfigure the Boston TSS to reduce the risks of collisions between ships and endangered whales. The proposed port location is just due north of the existing TSS, and if the NOAA – proposed northern rotation of the TSS is approved by the IMO, then portions of the safety zones and navigation areas around the Northeast port would occur within the TSS. This would reduce the potential for interaction with baleen whales from 69 to 33 percent.

Northeast Gateway did include some mitigation measures in the application. The applicant expressly states that, “EBRV speed while transiting outer Massachusetts Bay will be less than the sea speed of the vessel because the vessel will be slowing down in preparation for docking at the Northeast Port. In addition, Northeast Gateway will observe seasonal speed restrictions wile transiting through or in the TSS adjacent to the Great South Channel and Off Race Point to minimize potential ship strikes on whales (Northeast Gateway Energy Bridge, LLC, 2005).” NOAA’s letter reiterated that while speed may reduce the number of strikes, speed reduction alone will not reduce the risk of ship strike to zero, and the additional vessel traffic is expected to increase the risk of ship strike mortalities in SBNMS.

Another topic addressed with respect to right whales is the planned construction period of late summer to early spring, which overlaps with the high use period of right whales in the area, primarily from January through April. Also, noise during construction and the entanglement potential by fishing gear displaced by LNG sites pose additional threats to right whales. These topics are expected to be analyzed in the EIS and Section 7 consultations.

4.7.3 Cumulative Effects on the Human Environment

4.7.3.1 Liquefied Natural Gas Vessels

When LNG vessels approach offshore platforms and ports, they impose restrictions on other vessels. Pursuant to the regulations of the Deepwater Port Act, the USCG is authorized to establish a safety zone around deepwater ports. Therefore, there is a 1,640 ft (500 m) safety zone around LNG terminals in which unauthorized vessels are prohibited from anchoring or transiting within the safety zone at any time (33 CFR 147). There is also a 2.2 mi (3.5 km) radius precautionary area from the center of the terminal to alert prudent vessel operators of the possible presence of maneuvering LNG carriers in the safety zone around the port.

There are several existing and proposed LNG terminals along the US East Coast. There are four proposed LNG sites (two offshore and two inshore) in the northeast that are in the process of applying for Deepwater Port licenses, one inshore site approved by FERC, and one existing. If approved by MARAD/USCG, the Northeast Gateway proposal would be located approximately ten miles offshore of Gloucester, Massachusetts. The Suez-Neptune proposal would be located approximately 22 miles northeast of Boston. In northern Maine, an inshore Quoddy Bay terminal at Pleasant Point and a Downeast terminal in Robbinston have been identified by project sponsors. Weaver’s Cove in the Taunton River, near Fall River, Massachusetts has been approved. Due to recent changes in plans, Weaver’s Cove proposed changing the number of anticipated ship deliveries from 50-70 to 120 a year by smaller vessels that would fit through the opening of the Brightman Street Bridge (FERC, 2006). The existing LNG site is in Everette, Massachusetts.

In the mid-Atlantic, there is only one existing terminal in Cove Point, which is located in Calvert County, MD. In April 2005, Dominion CP LNG submitted an application to expand the terminal. Several new terminals have been proposed to the Federal Energy Regulatory Commission (FERC), including a proposal for Long Island Sound, NY, by Broadwater Energy, the Delaware River in NJ, by Crown Landing LNG, and Sparrows Point in Baltimore, by AES Corp.

In the Southeast, there is one existing terminal on Elba Island, in Chatham County, Georgia, 5 miles downstream from Savannah, Georgia. The area around this LNG terminal in the Savannah River is designated a Regulated Navigation Area by the USCG (33 CFR 165.756). This prohibits all vessels 1600 GRT or greater, except those that are moored, from approaching within 2 nm (3.7 km) of a LNG tankship that is underway within the RNA without the permission of the Captain of the Port. This closes the port down to other vessels for an hour or more during the arrival and departure of a tankship (Penberty, November 15, 2005). However, it does take an LNG vessel up to 24 hours to unload, so it is unlikely that other commercial shipping vessels would be affected by delays from both the arrival and departure of LNG tankships.

There is potential for cumulative effects in the form of additional delays into ports if vessels are delayed by speed restrictions or other operational measures included in the alternatives, and by LNG restrictions associated with the aforementioned safety zones. The additive effects of these delays could result in an increase in the economic cost to the commercial shipping industry and/or the port. However, these existing and proposed deepwater ports would be located outside of shipping fairways and navigation channels. The proposed LNG terminals would increase vessel traffic around the site and/or port if it is an inshore terminal. Given that the proposed sites are not yet approved, there is no way to analyze the potential impacts of the occurrence of ship strikes. This may be possible in the future if the sites are approved, and if specific vessel routes and arrival data becomes available.

4.7.3.2 United States Coast Guard Restrictions

The Coast Guard has one of the lead roles of providing homeland security in US harbors, ports and along the coastlines. Commercial, tanker, passenger, and merchant vessels have all been subject to increased security measures enforced by the USCG. The Coast Guard is the primary law enforcement agency of the US. As part of their missions for both national security and law enforcement, the Coast Guard may board vessels at any given time. The agency is authorized to board to vessels subject to the jurisdiction of the US, anytime upon the high seas and upon waters over which the US has jurisdiction, to make inquires, examinations, inspections, searches, seizures, and arrests (14 U.S.C. § 89) (USCG, 2005).

Potential cumulative effects could result from a vessel that is operating under speed restrictions or other operational measures in the alternatives and is boarded by the USCG. The vessel would have to reduce its speed further or come to a complete stop while the Coast Guard officers board and inspect the vessel, crew, cargo, and documentation. This would result in additional delays in arriving at a port.

4.7.3.3 Vessels Restricted to Daylight Only and Tidal Windows

Certain vessels are restricted to entering ports during daylight hours only, and other deep draft vessels may also be restricted by tidal windows in parts of the East Coast that have extreme changes in water depth due to tides. LNG vessels are subject to tidal restrictions coming into Boston, and nighttime transit restrictions in Boston Harbor. There are similar nighttime transit restrictions approaching the Cove Point LNG site in Maryland, and vessels are required to arrive at the Cape Henry Pilot Station (mouth of Chesapeake Bay) at least 8 hours prior to dusk or wait until the following day.

The port of Savannah is in the process of a harbor deepening project that will be completed around 2013, and until then vessels need to hit tidal windows to call at the port. LNG vessels are affecting the schedule of port traffic into Savannah as well. Port traffic is restricted 1 hour before LNG vessels enter the harbor and up to 2 hours after. Southern LNG reactivated in 2001, and LNG vessel calls have increased from one in 2001 to 41 in 2004. This increase is expected to continue in upcoming years to the point where there could be over 100 vessel calls as early as 2008, resulting in additional delays (Penberthy, November 15, 2005).

LNG vessels may have additional delays if DMAs are implemented in or around the approaches to these ports; however, the actual number of DMAs that could be triggered each year is minimal, the restrictions are temporary, and the vessels may chose to route around the precautionary area to save time instead of slowing down through the area. If LNG vessels are transiting in areas with SMAs or shipping lanes with speed restrictions, the times and areas would be known well ahead of time to allow the company to plan ahead or avoid or these delays.

4.7.3.4 Other Federal Actions Resulting in an Economic Impact to the Industries Affected by the Proposed Action and Alternatives

There are several other current and reasonably foreseeable actions by Federal agencies which may have economic impacts on similar groups of stakeholders that are affected by the operational measures of the Strategy. If these actions are implemented in the future, then there would be a cumulative economic burden on specific industries.

Cape Wind Project

The Cape Wind project (described in Section 4.7.2.4) may have minimal temporary adverse effects on marine navigation in the immediate vicinity of construction operations. Temporary restrictions during construction would be implemented to protect public safety. Once operational, the large spaces (minimum 0.34 nm [629 m] by 0.54 nm [1,00m] spacing) would allow vessels not restricted by depth to navigate between the WTGs. Once installed, the submarine cables would not affect navigation as the cables would be buried at a minimum depth of 6 feet (1.8 m) below the seabed. Although there may be temporary adverse effects during construction, it is not expected that the operation of the Wind Park and the installation of the inner-array and submarine cable systems would substantially adversely impact general commercial/recreational vessel navigation or ferry operations in this area of the Nantucket Sound in the long term (USACE, 2004b).

Economic Effects of ALWTRP on the Fishing Industry

As mentioned in Section 4.7.2.2, the proposed modifications to the ALWTRP regulations would have a positive effect on the recovery of the right whale. However, these proposed modifications would also have an economic impact on the fishing industry in the northeastern and mid-Atlantic US.

The following information is an excerpt from the DEIS for amending the ALWTRP.

Table 4-9 summarizes estimated industry compliance costs for each of the regulatory alternatives, breaking the results down by fishing sector (lobster, other trap/pot, and gillnet). As shown, the incremental costs imposed on the fishing industry would equal approximately $14.2 million per year under Alternatives 2, 3 (Preferred), 4, and 6 (Preferred). The impact of the new standards on lobster vessels would account for over 90 percent of these costs.

Aside from Alternative 1 (No Action), the only regulatory alternative that differs significantly from the others with respect to estimated economic impacts is Alternative 5. The analysis suggests that this alternative would impose incremental regulatory costs of approximately $1.0 million annually. The costs are lower because Alternative 5 would not impose as broad a set of gear modification requirements, but would instead modify the SAM zone and focus primarily upon the regulation of vessels fishing in that zone (NMFS, 2005a).

The cumulative effects analysis chapter of this DEIS also includes a detailed description of the major fisheries affected by the regulatory alternatives, including current and past regulations. Please refer to Section 9.4.3 for additional cumulative effects on the fishing industry.

Table 4-9
Estimated Increase in Annual ALWTRP Compliance Costs

Economic Impact	Regulatory Alternative	Lobster Trap/Pot Vessels	Other Trap/Pot Vessels	Gillnet Vessels	Total
Average Increase in Annual Compliance Costs For Vessels Affected by Changes in ALWTRP Regulations	Alternative 1 (No Action)	$0	$0	$0	N.A.
	Alternative 2	$3,484	$1,055	$917	N.A.
	Alternative 3 (Preferred)	$3,483	$1,060	$925	N.A.
	Alternative 4	$3,484	$1,055	$923	N.A.
	Alternative 5	$210	$184	$163	N.A.
	Alternative 6 (Preferred)	$3,482	$947	$925	N.A.
Number of Vessels Affected by Changes in ALWTRP Regulations	Alternative 1 (No Action)	$0	$0	$0	$0
	Alternative 2	$3,686	$418	$1,044	$5,148
	Alternative 3 (Preferred)	$3,684	$413	$1,024	$5,121
	Alternative 4	$3,686	$418	$1,035	$5,139
	Alternative 5	$3,684	$416	$1,024	$5,124
	Alternative 6 (Preferred)	$3,684	$416	$1,024	$5,124
Total Increase in Annual Compliance Costs for Vessels Affected by Changes in ALWTRP Regulations	Alternative 1 (No Action)	$0	$0	$0	$0
	Alternative 2	$12,844,000	$440,900	$957,300	$14,242,200
	Alternative 3 (Preferred)	$12,830,500	$438,100	$946,700	$14,215,300
	Alternative 4	$12,844,000	$440,900	$955,600	$14,240,500
	Alternative 5	$773,800	$76,500	$168,000	$1,018,400
	Alternative 6 (Preferred)	$12,826,700	$394,000	$947,300	$14,168,100

Note: Totals may not sum due to rounding.

The proposed operational measures contained in the Strategy would have no impact on the fishing industry at a 12-knot speed restriction; however, there are minor adverse economic impacts at a 10-knot speed restriction. See Section 4.4.4 for a detailed description of economic impacts on the fishing industry. Although only fishing vessels 65 feet and greater are affected by the Strategy, therefore only a small subset would be affected by both sets of regulations. If a 10-knot speed restriction is implemented for the operational measures, then there would be minor direct, cumulative, adverse economic impacts on this subset of the fishing industry.

Marine Diesel Engine Emission Standards

The EPA published a Final Rule in the Federal Register on February 28, 2003 (40 CFR 9745) to adopt emission standards for new marine diesel engines installed on vessels flagged or registered in the US with displacement at or greater than 30 liters per cylinder, also known as a Category 3 marine diesel engine. The current Tier one standards implemented in these regulations will apply until the EPA adopts a second Tier of standards in a future rulemaking, which will be completed by April 27, 2007. The Tier two standards will consider the state of technology that may permit deeper emission reductions and the status of international action for more stringent standards. Similar emission standards for marine engines with per cylinder displacement less than 30 liters, also known as Category 1 and 2 marine diesel engines, were published in an ANPR in the Federal Register on June 29, 2004. These standards would result in significant reductions of nitrogen oxides (NOx) and particulate matter (PM), and would benefit public health. Refer to Section 3.3.3 for a description of the effects of these emissions on air quality. However, these standards also have compliance costs for the industry as there are requirements for engine design, maintenance, and repair. Six categories of potentially affected industries were identified in the Final Rule. One of these categories is also affected by the operational measures of the Strategy – the Water Transportation, freight and passenger. As the more stringent standards will be adopted in 2007, information is not currently available on the economic impacts of this reasonably foreseeable action. Therefore, it is difficult to evaluate the cumulative economic impacts on the commercial shipping industry.

Anti-Fouling System Regulations

The IMO adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships on the 5th of October 2001, and it has not yet entered into force. Anti-fouling paints are used to coat the bottoms of ships to prevent marine organisms, including algae and mollusks (barnacles) from attaching themselves to the hull, which slows down the ship and increases fuel consumption. The paint kills these organisms, and also leaches into the water, harming other marine organisms and affecting the environment. One type of anti-fouling paint contains the organotin tributylin (TBT), has been proven extremely harmful to the environment, and the IMO adopted a resolution in 1990 to recommend that Governments adopt measures to eliminate the use of anti-fouling paint containing TBT. This convention takes it a step further and prohibits the use of any harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential use of other harmful substances in anti-fouling systems by 1 January 2008. Although there are no Federal regulations implementing this convention, the EPA issued notices of availability for water quality and aquatic life criteria for TBT, to provide recommendations to States their water quality standards or regulations. Therefore, TBT is regulated at the state level. This action would result in minimal economic impacts on the affected maritime industries as the old, harmful paints will be phased out, and new vessels and those requiring a new coat of anti-fouling paint would be required to apply paint that is in compliance with their state laws and regulations.

Ballast Water Regulations

The IMO adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments on the 13th of February 2004, and it has not yet entered into force. The USCG is drafting regulations to develop ballast water discharge standards, which would require vessels to have treatment systems to treat ballast water with before discharge. This action has potential economic impacts on the shipping industry, although data will not be available until the regulatory analysis is complete.

4.7.3.5 Summary of the Cumulative Impacts with Respect to Right Whale Population Recovery

Despite the cumulative impacts of the natural and anthropogenic actions previously mentioned, the operational measures to reduce the occurrence and severity of ship strikes are expected to have a positive effect on the right whale population. Ship strikes are the leading anthropogenic cause of mortality of right whales, followed by fishing gear entanglement. When the ship strike measures are coupled with the fisheries regulations of the ALWTRP (the second leading cause of mortality), as well as other conservation measures, the mortality rate should decrease. As mentioned in Section 4.1, the efficiency of these measures is based on current levels of shipping. Should shipping increase as expected in the future, then the measures would be reconsidered to account for the higher risk of ship strikes resulting from a larger global fleet of vessels.

4.8 Comparison of the Impacts of the Alternatives

This Section provides a textual comparison of the impacts for each alternative by the resource area. A summary of this comparison is also provided in table format in Table 4-10.

Alternative 1, the no action alternative, would have negative impacts on the right whale population and other marine species as ship strikes would continue to occur at current levels or even increase in the future as waterborne commerce increases (as it has been shown that the status quo is not providing sufficient protection). Alternatives 2, 3, and 4 each propose one operational measure aimed at reducing ship strikes – DMAs, speed restrictions, and recommended shipping routes, respectively. These alternatives offer more protection to right whales than alternative one, and less than alternatives 5 and 6, which propose more than one operational measure. Alternative 2 does not specifically benefit other marine species, whereas alternatives 3 and 4 provide minor benefits.

Alternative 6 provides a higher level of protection to right whales and other marine species. This alternative includes multiple ship strike reduction measures, including DMAs, speed restrictions in the NEUS and SEUS management areas and critical habitat, speed restrictions in the MAUS in SMAs, and instead of proposing recommended routes only, (as in Alternative 4) these routes would also have speed restrictions. Alternative 5 provides the highest level of protection to right whales and other marine species as it combines the measures from alternatives 1 – 4, and accounts for all available ship strike reduction measures, an ATBA, shifting the Boston TSS, expanded areas with speed restrictions, and year round speed restrictions in the NEUS, verses seasonal, as proposed in Alternative 6.

Alternative 1 would have no effects on the physical environment. None of the alternatives affect bathymetry and substrate as all proposed actions occur on the ocean surface. Alternatives 2, 3 (in all areas), and 4 and 5 (in the NEUS) would have negligible impacts on water quality, whereas Alternative 4 and 6 have minor adverse effects on water quality in the SEUS. This is a result of concentrating vessel traffic in shipping lanes outside of 12 to 24 nm (22.2 to 46.3 km), where water quality regulations are less stringent. Alternative 5 has negligible to minor adverse effects on water quality; negligible for speed restrictions (including speed restrictions proposed within DMAs) and minor for the same reason mentioned above for the shipping lanes in the SEUS. Alternative 4 has no overall effect on air quality, Alternative 2, 5, and 6 only have minor, positive impacts on air quality due to reduced emissions, and Alternatives 3 has a direct, positive effect on air quality. Alternatives 2, 4, 5, and 6 would potentially have minor positive impacts on the levels of ocean noise, and Alternative 3 potentially has slightly more of a positive effect on ocean noise levels due to larger scale speed restrictions that reduce vessel noise.

Alternative 1 would not affect port areas and commercial shipping vessel operations. Refer to Section 4.4 for a further breakdown of the direct and indirect impacts. All numbers listed in this paragraph refer to the most recent estimates in 2004 at a speed restriction of 10, 12, and 14 knots, respectively. Alternative 4 had the smallest economic impact in 2004 at $1.1 million for all speeds. Alternative 2 follows with $17.0 million, $10.8 million, and $6.5 million. Alternative 6 falls in the middle at $107.4 million, $56.4 million, and $30.2 million. Alternative 3 has the second highest impact at $237 million, $143.3 million, and $77.3 million. Alternative 5 has the highest economic impact at $260.4 million, $155.2 million, and $88.7 million.

Table 4-10
Summary Matrix of Impacts

Impact Area	Alternative 1: No Action	Alternative 2: Dynamic Management Areas	Alternative 3: Speed Restrictions in Designated Areas	Alternative 4: Recommended Shipping Routes	Alternative 5: Combination of Alternatives 1-4	Alternative 6: NOAA's Ship Strike Reduction Strategy
North Atlantic Right Whale	There would be significant, direct, long-term, negative effects on the right whale population and recovery status. Ship strikes would continue and possibly even increase with the predicted rise in shipping in the future.	There would be minor, direct, long-term, positive effects on the right whale population by implementing DMAs.	**10 Knots** There would be major, direct, long-term, positive effects on right whale recovery with a speed limit of 10 knots. **12 knots** There would be direct, long-term, positive effects on right whale recovery with a speed limit of 12 knots. **14 Knots** There would only be minor, direct, long term, positive effects on right whale recovery because a speed limit of 14 knots would not provide sufficient protection against ship strikes.	**NEUS** There would be direct, long-term, positive effects on right whale recovery due to the proposed shipping lanes in the NEUS. **MAUS** There would be direct, long-term, adverse effects on right whale recovery in the MAUS because there are no proposed shipping lanes in this region. **SEUS** There would be direct, long-term, positive effects on right whale recovery due to the proposed shipping lanes in the SEUS.	There would be significant, direct, long-term, positive effects on right whale population recovery in all three regions by combining alternatives 1-4, as the additive effects of current conservation measures, DMAs, speed restrictions and shipping lanes would significantly reduce the probability of ship strike. Generally, the level of positive effects increase as the speed limit decreases, i.e., major benefits at 10 knots to minor benefits at 14 knots.	There would be major, direct, long-term, positive effects on right whale population recovery in all three regions from implementing the operational measures contained in Alternative 6. Generally, the level of positive effects increase as the speed limit decreases, i.e., major benefits at 10 knots to minor benefits at 14 knots.
Other Marine Species	**Other Marine Mammals** There would be indirect, long-term, adverse effects on other marine mammals from implementing the No Action Alternative. **Sea Turtles** There would be indirect, long-term, negative effects on sea turtles from implementing the No Action Alternative. None of the alternatives are expected to affect seabirds or protected anadromous and marine fish, therefore they are not mentioned in this table.	**Other Marine Mammals** There would be no significant effects on other marine mammals from the use of DMAs because they are based on right whale sightings. **Sea Turtles** There would be no significant effects on sea turtles from a DMA implementation because it is based on right whale sightings.	**Other Marine Mammals** There would be minor, indirect, long-term beneficial effects on other marine mammals from speed restrictions if they occur in the designated areas. **Sea Turtles** There would be minor, indirect, long-term, beneficial effects on sea turtles from speed restrictions if they occur in the designated areas.	**Other Marine Mammals** There would be a minor, indirect, long-term positive effect on other marine mammals if their range overlaps with the recommended shipping routes, the ATBA, or TSS. **Sea Turtles** There would be a minor, indirect, long-term, positive effect on sea turtles that occur within the shipping lanes, ATBA, or TSS.	**Other Marine Mammals** There would be major, indirect, long-term, positive effects on other marine mammals from implementing broad spatial and temporal speed restrictions and recommended shipping routes. Only marine mammals that occur in the restricted areas and routes would benefit from these operational measures. **Sea Turtles** There would be an indirect, long-term, positive effect on sea turtles from implementing broad spatial and temporal speed restrictions and recommended shipping routes. Only sea turtles that occur in the restricted areas and routes would benefit from these operational measures.	**Other Marine Mammals** There would be indirect, long-term, positive effects on other marine mammals from implementing the operational measures contained in Alternative 6. Only marine mammals that occur in the restricted areas and routes would benefit from these operational measures. **Sea Turtles** There would be indirect, long-term, positive effects on sea turtles from implementing the operational measures in Alternative 6. Only sea turtles that occur in the restricted areas and routes would benefit from these operational measures.
Physical Environment	**Bathymetry and Substrate** There would be no effects on Bathymetry and substrate from the No Action Alternative. **Water Quality** There would be no effects on ocean water quality from the No Action Alternative. **Air Quality** There would be no effects on air quality from the No Action Alternative. **Ocean Noise** There would be no effects on ocean noise from the No Action Alternative.	**Bathymetry and Substrate** There would be no effects on bathymetry and substrate from implementing DMAs. **Water Quality** There would be negligible effects on ocean water quality from implementing DMAs. **Air Quality** There would be minor, direct, short-term, positive impacts on air quality at sea from implementing DMAs if vessels transit through DMAs at a reduced speed. **Ocean Noise** There would potentially be minor, direct, short-term, positive effects on	**Bathymetry and Substrate** There would be no effects on bathymetry and substrate from implementing speed restrictions in designated areas **Water Quality** There would be a negligible amount of effects on ocean water quality from implementing speed restrictions. **Air Quality** There would be a direct, short-term, positive impact on air quality in the designated areas where vessels transit through at reduced speeds. **Ocean Noise** There would potentially be direct, short- and long-term, positive impacts	**Bathymetry and Substrate** There would be no effects on bathymetry and substrate from implementing recommended shipping routes. **Water Quality** There would be negligible impacts on water quality in the NEUS, and potentially minor, adverse impacts in the SEUS region due to the concentration of vessel traffic in the shipping lanes. **Air Quality** There would be no significant, long-term impacts on air quality as a result of shipping lanes. While vessel emissions may be concentrated in	**Bathymetry and Substrate** There would be no effects on bathymetry and substrate as a result of combining alternatives 1-4. **Water Quality** There would have negligible to minor adverse effects on water quality as a result of combining DMAs, speed restrictions and recommended shipping routes. See Alternative 4. **Air Quality** By combining the positive effects on air quality from alternatives 2 and 3, and the overall neutral effects of Alternative 4; implementing Alternative 5 would have minor, direct, long-term, positive effects on air quality.	**Bathymetry and Substrate** There would be no effects on bathymetry and substrate as a result of implementing the operational measures contained in Alternative 6. **Water Quality** There would be negligible impacts on water quality in the NEUS, and potentially minor, adverse impacts on the SEUS region due to the concentration of vessel traffic in the shipping lanes. **Air Quality** There would be minor, direct, long-term, positive effects on air quality as a result of speed restrictions in SMAs, DMAs, critical habitat, and shipping

Table 4-10
Summary Matrix of Impacts

Impact Area	Alternative 1: No Action	Alternative 2: Dynamic Management Areas	Alternative 3: Speed Restrictions in Designated Areas	Alternative 4: Recommended Shipping Routes	Alternative 5: Combination of Alternatives 1-4	Alternative 6: NOAA's Ship Strike Reduction Strategy
		ocean noise levels from implementing DMAs. Noise would be temporarily reduced if the vessel reduces speed through the DMA.	on the levels of ocean noise by reducing noise levels in the immediate areas where restrictions are proposed. There would be long-term impacts in the NEUS, where speed restrictions are proposed year-round, and short-term elsewhere.	these lanes, there would be no change in the overall amount of emissions. **Ocean Noise** There would potentially be minimal, direct, short-term, adverse effects on ambient noise levels in the ocean as a result of routing vessels into recommended shipping routes.	**Ocean Noise** Combining the positive effects on ocean noise from alternatives 2 and 3, and the adverse effects of Alternative 4, would potentially have minimal, direct, long-term, slightly positive effects on ocean noise.	lanes. **Ocean Noise** There would potentially be a minor, direct, long-term, positive impact on ocean noise as a result of speed restrictions in the shipping lanes and SMAs that would lower noise levels in the ocean.
Port Areas and Vessel Operations	There would no impacts on port areas and vessel operations from the No Action Alternative.	**10 knots** The total **direct** economic impact of Alternative 2 in 2004 was $17.0 million. **12 knots** There would be a **direct** adverse economic impact on port areas and vessel operations, estimated around $10.8 million in 2004. The speed restrictions through a DMA or routing around a DMA results in additional time spent at sea, which translates to higher costs. **14 knots** The total **direct** economic impact of Alternative 2 in 2004 was $6.5 million. There are no **additional direct** or **indirect** costs estimated under Alternative 2.	**10 knots** The **direct** economic impact of Alternative 3 in 2004 was $86.8 million. **Additional direct** costs were estimated at $11.0 million. **Indirect** costs were estimated at $139.4 million. **Total:** $237 million. **12 knots** There would be a **direct** adverse economic impact on port areas and vessel operations in the amount of $53.9 million in 2004. Speed restrictions throughout the East Coast affect vessel arrival times affect vessel costs. **Additional direct** costs under Alternative 3 were estimated at $9.8 million in 2004. **Indirect** costs under Alternative 3 were estimated around $79.6 million in 2004. **Total:** $143.3 million **14 knots** The **direct** economic impact of Alternative 3 in 2004 was $31.2. **Additional** direct costs were $8.8 million. **Indirect** costs were $37.3 million. **Total:** $77.3 million.	**10 knots** The total **direct** economic impact of Alternative 4 in 2004 was $1.1 million. **12 knots** There would be a **direct** economic impact on port areas and vessel operations in the amount of $1.1 million in 2004. Vessels traveling in the recommended shipping routes would deviate from their original route, which adds extra mileage to a voyage. **14 knots** The total **direct** economic impact of Alternative 4 in 2004 was $1.1 million. There are no **additional direct** or **indirect** costs estimated under Alternative 4.	**10 knots** The **direct** economic impact of Alternative 5 in 2004 was $89.7 million The **additional direct** costs were estimated at $11.0 million. **Indirect costs** were estimated at $159.6. **Total:** $260.4 million **12 knots** There would be a **direct** economic impact on port areas and vessel operations from implementing Alternatives 5. This impact was estimated at $56.1 million in 2004. **Additional direct** costs under Alternative 5 were estimated at $9.8 million in 2004. **Indirect** costs under Alternative 5 were estimated around $89.3 million in 2004. **Total:** $155.2 million **14 knots** The **direct** economic impact of Alternative 5 in 2004 was $32.9 million. The **additional direct** costs were estimated at $8.8 million. **Indirect** costs were estimated at $47.0 million. **Total:** $88.7	**10 knots** The **direct** economic impact of Alternative 6 in 2004 was $49.4. The **additional direct** costs were estimated at $8.3 million. The **indirect** costs were estimated at $49.7 million. **Total:** $107.4 **12 knots** There would be a **direct** economic impact on port areas and vessel operations as a result of implementing Alternative 6. The impact was estimated at $30.9 million in 2004. **Additional direct** costs under Alternative 6 were estimated at $7.3 million in 2004. **Indirect** costs under Alternative 6 were estimated around $18.3 in 2004. **Total:** $56.4 million **14 knots** The **direct** economic impact of Alternative 6 in 2004 was $18.4 million. The **additional direct** costs were estimated at $6.6 million. **Indirect** costs were estimated at $5.3 million. **Total:** $30.2 million
Commercial Fishing Vessels	There would be no impacts on commercial fishing vessels under the No Action Alternative.	There would be negligible impacts on commercial fishing vessels under Alternative 2 at a 10, 12, or 14-knot speed restriction.	There would be no adverse effects on commercial fishing vessels at 12- and 14-knot speed restrictions under Alternative 3. However, the economic impact at 10 knots is estimated at $0.9 million.	There would be negligible impacts on commercial fishing vessels under Alternative 4 at all three speed restrictions.	There would be no adverse effects on commercial fishing vessels at a speed restriction of 12 or 14 knots. However, the economic impact at 10 knots is estimated at $0.9 million.	There would be no adverse effects on commercial fishing vessels at a speed restriction of 12 or 14 knots. However, the economic impact at 10 knots is estimated at $1.0 million.
Ferry Vessels	There would be no impacts on ferry vessels under the No Action Alternative.	There would be a direct, long-term, adverse impact on ferry vessels under Alternative 2. In 2004, the impacts were estimated at $5.1 million at 10 knots, $4.1 million at 12 knots, and $3.2 million at 14 knots.	There would be a direct, long-term, adverse impact on ferry vessels under Alternative 3. In 2004, the impacts were estimated around $6.5 million at 10 knots, $5.5 million at 12 knots, and $4.1 at 14 knots.	There would be no impacts on ferry vessels under Alternative 4.	There would be a direct, long-term, adverse impact on ferry vessels under Alternative 5. In 2004, the impacts were estimated around $6.5 million at 10 knots, $5.5 million at 12 knots, and $4.1 at 14 knots.	There would be a direct, long-term, adverse impact on ferry vessels under Alternative 6. In 2004, the impacts were estimated around $5.6 million at 10 knots, $4.6 million at 12 knots, and $3.6 million at 14 knots.

Table 4-10
Summary Matrix of Impacts

Impact Area	Alternative 1: No Action	Alternative 2: Dynamic Management Areas	Alternative 3: Speed Restrictions in Designated Areas	Alternative 4: Recommended Shipping Routes	Alternative 5: Combination of Alternatives 1-4	Alternative 6: NOAA's Ship Strike Reduction Strategy
Whale Watching Vessels	There would be no impacts on whale watching vessel operations under the No Action Alternative.	There would be minor, direct, long-term, adverse effects on whale watching vessels under Alternative 2. In 2004, the impacts were estimated at $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.5 million at 14 knots.	There would be direct, long-term, adverse effects on whale watching vessels under Alternative 3. In 2004 the impacts were estimated at $2.8 million at 10 knots, $1.6 million at 12 knots, and $0.9 million at 14 knots.	There would be no effects on whale watching vessel operations under Alternative 4.	There would be direct, long-term, adverse effects on whale watching vessels under Alternative 5. In 2004, the impacts were estimated at $2.8 million at 10 knots, $1.6 million at 12 knots, and $0.9 million at 14 knots.	There would be direct, long-term, adverse effects on whale watching vessels under Alternative 6. In 2004, the impacts were estimated at $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.5 million at 14 knots.
Charter Vessels	There would be no impacts on charter vessel operations under the No Action Alternative.	There would be no impacts on charter vessel operations under Alternative 2.	There would be minor, direct, long-term, adverse economic impacts on charter vessels, estimated at $1.1 million at 10 knots, $600,000 at 12 knots, and $200,000 at 14 knots in 2004.	There would be no impacts on charter vessel operations under Alternative 2.	There would be minor, direct, long-term, adverse economic impacts on charter vessels, estimated at $1.1 million at 10 knots, $600,000 at 12 knots, and $200,000 at 14 knots in 2004.	There would be minor, direct, long-term, adverse economic impacts on charter vessels, estimated at $1.2 million at 10 knots, $720,000 at 12 knots, and $240,000 at 14 knots in 2004.
Environmental Justice	There would be no impacts on environmental justice communities.	Under Alternative 2, no low-income or minority populations would be disproportionately affected. Alternative 2 does not raise environmental justice concerns under EO 12898.	Under Alternative 3, no low-income or minority populations would be disproportionately affected. Alternative 3 does not raise environmental justice concerns under EO 12898.	Under Alternative 4, no low-income or minority populations would be disproportionately affected. Alternative 4 does not raise environmental justice concerns under EO 12898.	Under Alternative 5, no low-income or minority populations would be disproportionately affected. Alternative 5 does not raise environmental justice concerns under EO 12898.	Under Alternative 6, no low-income or minority populations would be disproportionately affected. Alternative 6 does not raise environmental justice concerns under EO 12898.
Cultural Resources	There would be no impacts on cultural resources.	There would be no impacts on cultural resources.	There would be no impacts on cultural resources.	There would be no impacts on cultural resources.	There would be no impacts on cultural resources.	There would be no impacts on cultural resources.

This page intentionally left blank.

Alternative 1 would not affect commercial fishing vessels. At a speed restriction of 12 or 14 knots, there would not be any economic effects on commercial fishing vessels for any of the alternatives. If, however, the speed restriction were 10 knots, alternatives 3, 5, and 6 would have minor, adverse economic effects on this industry. Alternatives 3 and 5 would cost the industry $0.9 million, and Alternative 6 would cost $1.0 million at a 10-knot speed restriction.

Alternatives 1 and 4 would not affect ferry vessels. The impacts in this paragraph are the most recent 2004 estimates, at a speed restriction of 10, 12, and 14 knots, respectively. Alternative 2 has the smallest economic impact on ferries, $5.1 million, $4.1 million, and $3.2 million. Alternative 6 follows with $5.6 million, $4.6 million, and $3.6 million. Alternatives 3 and 5 have the highest economic impact, $6.5 million, $5.5 million, and $4.1 million each.

Alternatives 1 and 4 would not affect whale watching vessels. Alternatives 2 and 6 have the smallest economic impact on whale watching vessels, $0.9 million at 10 knots, $0.7 million at 12 knots, and $0.6 million at 14 knots in 2004. Alternatives 3 and 5 have a higher economic impact at $2.8 million at 10 knots, $1.6 million at 12 knots, and $0.9 million at 14 knots.

Alternatives 1, 2, and 4 would not affect Charter vessels. Alternatives 3 and 5 would have the smallest economic impact on charter vessels, $1.1 million at 10 knots, $0.6 million at a 12 knots, and $0.2 million at 14 knots. Alternative 6 has a slightly larger economic impact at $1.2 million at 10 knots, $0.7 million at 12 knots, and $0.2 million at 14 knots. These numbers are 2004 estimates.

None of the alternatives have disproportionate effects on environmental justice communities. None of the alternatives have an effect on cultural resources.

4.9 Mitigation Measures

Mitigation measures are not addressed separately in this EIS as the objective of the proposed action and alternatives is to have a long-term, positive effect on the environment by reducing the likelihood of death and serious injury to right whales as a result of ship strikes, thereby contributing positively to the recovery of the population. In essence, the operational measures contained in the proposed action and alternatives are mitigation measures in themselves. The preferred alternative balances the biological benefit to right whales and the economic impact that results from the measures. The success of the operational measures is vital to the recovery of the species. NMFS will evaluate the effectiveness of the ship strike reduction measures through monitoring and enforcement (which will be addressed in the final rule). If right whale ship strikes continue, NMFS will modify these measures as appropriate.

This page intentionally left blank.

5 REGULATORY IMPACT REVIEW

5.1 Introduction and Background

The Regulatory Impact Review/Regulatory Impact Assessment (RIR/RIA) provides an assessment of the costs and benefits of this proposed action and other alternatives in accordance with Executive Order (EO) 12866 and its guidelines established in OMB Circular A-4. EO 12866 states:

> Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

The statement of purpose and need for the proposed action is as follows:

The purpose of the proposed action is to reduce the number and severity of vessel collisions with North Atlantic right whales, thereby contributing to the recovery and sustainability of the species while minimizing the effects on the shipping industry and maritime commerce.

National Marine Fisheries Service (NMFS) has jurisdiction under both the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), to protect the endangered North Atlantic right whale. Although various measures to reduce ship strikes (described in Section 1.2.1 of the Draft Environmental Impact Statement (DEIS)) have been in place for several years, these measures have not significantly reduced the number of vessel collisions with right whales. A continued lack of recovery, and possible extinction, will occur if deaths from ship strikes are not reduced. Therefore, additional measures are needed for NMFS to fulfill its responsibility. As mentioned earlier, ship strikes represent the majority of anthropogenic serious injuries and deaths to right whales. Therefore, NMFS is proposing to reduce this threat by taking the regulatory approach that is expected to be the most effective at helping the population recover. The operational measures of the proposed Strategy would impose regulatory speed restrictions and nonregulatory routing measures on specific vessel classes to reduce the ship strike threat to right whales without imposing undue economic burdens on the shipping industry. The combination of speed restrictions and reducing the co-occurrence of right whales and vessel traffic is expected to be an effective means of reducing the number and severity of ship strikes and promoting population growth and recovery.

The RIR/RIA also serves as a basis for determining whether a proposed action is a “significant regulatory action” under the criteria provided in EO 12866. This RIR/RIA summarizes the effects of a proposed action and other alternative actions that NMFS considered to reduce right whale ship strikes and to aid in the recovery of the right whale population. This document and the accompanying DEIS and economic analysis contain all the elements of the RIR/RIA, and the relevant sections are referenced.

5.2 List of Alternatives Considered

The proposed operational measures are described in Section 1.4 of the DEIS. Alternatives to the proposed measures are described in Section 2.2 of the DEIS. The alternatives are listed here for reference throughout the remainder of this RIR/RIA.

- Alternative 1: No action
- Alternative 2: Dynamic Management Areas (DMAs) only
- Alternative 3: Speed Restrictions in Designated Areas
- Alternative 4: Recommended Shipping Routes
- Alternative 5: Combination of Alternatives 1, 2, 3, and 4
- Alternative 6: (preferred) Right Whale Ship Strike Reduction Strategy

Alternatives 5 and 6 differ in that the designated areas included in Alternative 5 are generally greater in size and length of time than those in Alternative 6.

5.3 Benefits and Impacts of Management Alternatives

5.3.1 Description of Benefits

The benefits of reducing the risk of right whale mortality caused by ship strikes are expected to be considerable. Because ship strikes appear to be the leading anthropogenic cause of right whale mortalities (Section 1.1.2 of the DEIS), adopting measures to reduce the incidences of ship strikes will aid in the recovery of this highly endangered species. However, monetary estimates of these benefits are currently unavailable; therefore, the discussion of these benefits specific to right whales is descriptive.

The full range of values of right whale recovery includes use values and nonuse values. Use values include those values associated with whale watching trips, or other viewing opportunities. Nonuse values include those values placed on knowing that right whales remain for future generations (bequest value) and values placed on knowing that right whales will continue to survive (existence value).

While each of the action alternatives—Alternatives 2, 3, 4, 5, and 6—would result in a reduction in the number of North Atlantic right whale "takes" under the ESA and the MMPA, the positive, long-term effects on the right whale population vary depending upon the alternative. The benefits will be described briefly in this RIR/RIA; Section 4.1 of the DEIS describes the benefits of adopting each of these alternatives in greater detail.

The no-action alternative, Alternative 1 would have significant, direct, long-term, negative effects on the right whale population because no additional measures would be taken to reduce the incidences of ship strikes. Alternative 2 would have a positive effect on right whale population since it would lower the potential for ship strikes. However, it provides only a temporary measure triggered when right whales are sighted in aggregations of three or more whales, residing or feeding in close proximity to shipping lanes, or as a mother/calf pair. Furthermore, the ability to detect the presence of right whales for trigging a DMA is limited. This measure as a stand-alone measure may not be enough to prevent the significant number of deaths per year that would help the right whale population to recover. Alternative 3 would also lower the potential for ship strikes resulting in injury and death, by requiring vessels 65 feet and greater in length overall (LOA) to slow down to 10 knots in predetermined, designated areas that are chosen based on the right whale behavioral and migratory patterns. Alternative 4 would lower the potential for ship strikes through the use of recommended shipping lanes to reduce the likelihood of overlap of ships and right whales, but does not call for a reduction of vessel speed. The benefits to right whales will only be seen in the Northeast and Southeast, since the mid-Atlantic ports would not contain proposed shipping lanes. Therefore, Alternative 4 appears to be the measure which would contribute the least to the goal of right whale recovery among the action alternatives. Alternative 5 would be the most beneficial to the goal of right whale recovery among the action alternatives. As Alternative 5 contains measures which call for the establishment of DMAs in response to particular right whale sightings, a slowdown of vessel traffic in designated areas, and recommended shipping routes (a combination of Alternatives 2, 3, and 4), this alternative is designed to address a wider variety of scenarios in which ship strikes may occur than would each of the alternatives as a stand-alone measure. Alternative 6 (preferred alternative) would also be highly beneficial to the recovery of the right whale population as it also is designed to address the various ship strike scenarios that might occur, but as the designated areas would be in place for a shorter span of time, it would result in a higher probability of a ship strike event when compared with Alternative 5. Therefore, Alternative 6 is not as beneficial to the recovery of the right whale population as Alternative 5. However, it is more beneficial to the recovery goal than adopting Alternatives 2, 3, or 4 as stand-alone measures.

5.3.2 Description of Affected Parties and Types of Impacts

The RIR/RIA reports the results of the economic analysis performed in support of this proposed action. The economic analysis, which will be publicly available online at http://www.nmfs.noaa.gov/pr/ and through other channels, provides greater detail on the methodology used to produce the estimates. The analysis uses the most recently available data on vessel activities to predict impacts to commercial shipping vessels, commercial fishing vessels, charter fishing vessels, passenger ferries, and whale watching vessels traveling in the North Atlantic that are 65 feet or greater in LOA.

Commercial shipping vessels arriving at one or more of 26 East Coast port areas were further categorized into eleven vessel types: bulk carriers, combination carriers, containerships, freight barges, general cargo vessels, passenger vessels, refrigerated cargo vessels, ro-ro cargo vessels, tank barges, tank ships, and towing vessels. The economic impacts to the commercial shipping industry include direct and indirect impacts.[1] The direct impacts include costs due to vessels slowing down or rerouting in compliance with the proposed actions as well as additional costs borne by vessels making multi-port calls along the Eastern seaboard and/or participating in coastwise cabotage service. The indirect economic impacts include port-specific impacts due ship traffic diverting to other ports.

5.3.2.1 Direct Impacts to Commercial Shipping Industry

The direct impacts from multi-port calls were also evaluated in response to concerns raised by shipping industry representatives and port officials during stakeholder meetings regarding the aggregate effects of the proposed operational measures of the Right Whale Ship Strike Reduction Strategy and alternative actions on vessels calling at multiple US East Coast ports during restricted periods. The economic analysis addresses these costs by identifying which vessel arrivals at each port area were part of a multi-port string during proposed restricted periods and estimating the additional direct economic impact on the shipping industry.

Other direct costs to the shipping industry are expected due to the rerouting of coastwise shipping, in particular, southbound shipping. In recent years, attention has been focused on the further development of coastwise shipping (also referred to as short-sea shipping) as a means of reducing highway congestion on the Eastern Seaboard. However, for commercial and navigational purposes, it appears unlikely that the speed restriction would significantly affect coastwise shipping. Northbound vessels prefer to use the Gulf Stream further offshore. Southbound traffic travels closer to the US East Coast; generally within 7–10 nautical miles of the shoreline. However, during the proposed seasonal management periods, southbound vessels are likely to route outside of seasonal speed restricted areas incurring an overall increase in distance (and costs). This affects southbound vessels between the entrance to the Chesapeake Bay and Port Canaveral.

5.3.2.2 Indirect Impacts to Commercial Shipping Industry

Indirect economic impacts of the proposed operational measures include costs from diverting ship traffic to other ports. Many of these potential costs were identified by port authorities, shipping industry representatives, and community leaders during the public stakeholder meetings. Potential indirect economic impacts include diversion of traffic to other ports, increased intermodal costs due to missed rail and truck connections, and the impact on local

[1] Data from various sources were used to best capture current vessels' arrival activities at various East Coast ports. These included US Coast Guard (USCG)'s vessel arrivals database, US Department of Transportation's National Ferry Database, NMFS' data on commercial fishery landings, and Hoyt, Erich, Whale Watching 2000: Worldwide Tourism Numbers, Expenditures and Expanding Socioeconomic Benefits, 2000.

economies of decreased income from port-specific jobs losses that may occur due to ship traffic diverting to other ports.

5.3.2.3 Impacts to Other Commercial Operations

While the commercial shipping industry is predicted to incur the greatest impact from the proposed action and the alternatives, other industries are expected to be affected as well. The following paragraphs briefly describe ways in which these other operations may also be affected by the proposed action and its alternatives.

Commercial fishing vessels may be affected depending on normal operating speed. Many commercial fishing vessels steam to/from fishing areas at speeds of 10 knots or below and will not be affected by the proposed measures. Those that steam out at speeds exceeding 10 knots would be affected by the proposed speed restriction of 10 knots.[2]

In terms of the charter fishing industry, only a small segment of the industry referred to as headboats is expected to be affected.[3] This segment of the charter fishing industry often uses vessels measuring in length of 80 feet or greater that can accommodate 60 to 100 passengers. These vessels go up to 50 miles offshore, then stop and anchor in locations that attract a particular species of fish. An increase in roundtrip steaming time of about 1.5 hours would reduce the competitiveness of the larger headboats relative to smaller vessels, but it is expected that vessels less than 65 feet in overall length would increase their share of the market.

Passenger ferries operating along the Atlantic coast generally sail landward of the COLREGS demarcation lines described in Section 2.1.2.2 in the DEIS and as such will not be affected by the proposed operational measures of any of the alternatives considered in this RIR/RIA. However, in the southern New England area, there is a well-developed passenger ferry sector that operates seaward of the COLREGS line and hence is subject to the proposed operational measures. Passenger ferry operations in southern New England generally fall into two categories—fast ferry service with vessel speeds ranging from 24–39 knots and regular ferry service with vessel speeds from 12–16 knots.

The whale watching industry also can be categorized into operations that deploy high-speed vessels with speeds ranging from 25–38 knots; and operations that deploy regular speed vessels with speeds from 16–20 knots. A survey of whale watching operators in New England indicated that the majority of whale watching vessels are 65 feet and greater, therefore the majority of operators would be affected by the operational measures.

Table 5-1 on page 5-17 lists the estimated economic impacts by industry for each action alternative; it includes economic impacts at the proposed 10-knot speed restriction as well as the impacts of 12 knot and 14-knot speed restrictions, as NMFS is inviting comments on a 12-knot and 14-knot speed restriction. The following summarizes the estimated economic impacts of the proposed action and alternatives to the proposed action.

---

[2] The economic analysis, which will be publicly available, suggests that this industry bears little economic costs at the 12-knot speed restriction.
[3] The vast majority consists of modern and well-equipped fishing boats of less than 65 feet length overall (LOA) and thus would not be subject to the speed restrictions and other operational measures.

5.3.3 Alternative 1: No Action/Status Quo

Under this alternative, NMFS would continue to implement existing measures and programs, largely nonregulatory, to reduce the likelihood of mortality from ship strikes. Alternative 1 does not include any new operational measures that would affect the shipping industry and hence there is no direct or indirect economic impact associated with this alternative.

5.3.4 Alternative 2: DMAs only

Alternative 2 would directly affect the commercial shipping industry, passenger ferries and whale watching industries. The estimated impacts are described as follows.

5.3.4.1 Estimated Direct Economic Impact

Shipping Industry

In all regions, mariners would have the option of either routing around the DMA or proceeding through it at a restricted speed. The direct impact of a DMA on vessel operations is the increased time required to transit through the DMA at the restricted speed. For a vessel with an average operating speed of 10 knots, it would normally be able to cover the 39.6 nautical miles of a DMA in 238 minutes, or nearly four hours. With a speed restriction of 12 knots, covering the distance would take 198 minutes. In addition, the vessel will need time to slow to the restricted speed prior to entering the DMA and to speed up again after leaving the DMA. Some faster-moving vessels may opt to save time by routing around the DMA to continue traveling at the higher speed.

The total direct economic impact to the shipping industry of DMAs implemented at a 10-knot speed restriction under Alternative 2 (estimated using 2004 data on vessel arrivals and departures) is estimated at $17 million. Among the various port areas, the port area of Savannah is estimated as experiencing the highest impact ($4.3 million), followed by the port areas of Port Canaveral ($2.9 million), New York/New Jersey ($1.9 million), and Jacksonville ($2.2 million). The direct economic impact for these four port areas is expected to be $11.3 million or 66.5 percent of the total impacts among all ports for this alternative. No additional direct impacts from multi-port strings or rerouting of southbound coastwise shipping are expected, nor are indirect impacts expected.

Passenger Ferries

Interviews with passenger ferry operators identified their particular concern of the situation where a DMA would be implemented in a ferry’s customary route in New England waters during the peak summer season. For fast ferry operators, a DMA implemented directly along their route would result in the suspension of service for the entire period the DMA is in effect. There are several reasons for this conclusion. First, the demand for fast ferries that normally operate between 24–39 knots would virtually disappear if the ferries were restricted to 10 knots (this results also holds for the 12 and 14-knot speed restrictions). Second, any remaining demand would not be sufficient to cover vessel operating costs, and third, many handling and comfort characteristics of fast ferries would suffer at reduced speeds.

The net economic loss of the implementation of a single DMA is estimated to be $2.2 million for these eleven fast ferry operators.[4] This is based on a daily operating cost of a fast ferry vessel of $13,320 excluding fuel costs. Some operators have stated that the loss of income and profits from a single 15-day DMA during peak season would cause them to go out of business. However, many of the fast ferry operators who also operate regular ferries would be able to remain in business with the increase in demand for regular ferries from passengers that would have otherwise used the fast ferry service.[5]

DMAs would also potentially affect operators of regular ferry services if the DMAs were implemented along their customary route. For these operators it is assumed that a speed restriction of 10 knots would cause an average delay of 30 minutes for each ferry trip. The 118 daily trips of regular ferry services would incur additional costs of $3.0 million for the duration of a single DMA.

Whale Watching Vessels

Under Alternative 2, the high-speed vessels are likely to suspend operations during periods when DMAs are implemented along their route. The estimated economic impact of the suspension of five high-speed vessels for a single 15-day DMA is $0.4 million.[6] For regular speed vessels the estimated economic impact at 10 knots is $0.5 million for 13 vessels facing delays in both directions for two daily trips.

5.3.5 Alternative 3: Speed Restrictions in Designated Areas

Alternative 3 is expected to impact all industries at the 10-knot speed restriction.

5.3.5.1 Estimated Direct Economic Impact

Shipping Industry

The total direct economic impact to the shipping industry due to speed restrictions in designated areas for all vessels 65 feet and greater in LOA is estimated to be $86.8 million. The port area of New York/New Jersey is expected to experience the largest impact of $23.6 million, followed by the port area of Hampton Roads at $15.1 million.

[4] This same estimate applies to alternative restricted speeds of 10, 12 and 14 knots as it is assumed that the fast ferry service would be temporarily suspended under any of those speeds.
[5] It is very difficult to estimate the portion of passenger demand that would cancel their travel by ferry entirely during a DMA. Relevant factors include the purpose of the trip, the availability of alternative ferry origins that may not be affected by the DMA, availability of other economically viable transport modes and competing entertainment options.
[6] Calculated at $13,320 daily operating costs excluding fuel times 15 days for five vessels.

Multi-Port Calls

As described in Section 5.3.2, vessels calling in at least two ports with speed restrictions bear additional impacts for a variety of reasons spelled out in the economic analysis provided along with the DEIS. Designated areas under Alternative 3 are much larger in size and encompass multiple ports simultaneously compared with single DMAs implemented under Alternative 2. Therefore, vessels making multi-port calls will be affected under Alternative 3, whereas they would not under Alternative 2. Seasonal speed restrictions under Alternative 3 include speed restrictions year–round in the Northeastern US, from October 1 through April 30 for the mid-Atlantic region and from December 1 through March 31 for the Southeastern US.

The analysis assumes an average additional delay of 30 minutes for each vessel arrival as part of a multi-port string to account for the various additional impacts that may occur. The economic value of this additional time has been calculated for each port area based on 2005 vessel operating costs by type and size of vessel. Additional direct economic impact of multi-port strings on the shipping industry is estimated at $7.2 million for the proposed 10-knot speed restriction using 2004 vessel traffic data.

Rerouting of Southbound Coastwise Shipping

For Alternative 3, the proposed speed restrictions are expected to result in rerouting of southbound coastwise shipping. Speed restrictions would be in effect for a distance of 25 nautical miles from the entire mid-Atlantic coastline. Containerships and ro-ro cargo ships are the vessel types that would be most affected by proposed speed restrictions. In 2003, there were 4,142 containership and ro-ro cargo ship arrivals into US East Coast port areas from Baltimore through Port Canaveral during the time when seasonal speed restrictions would be in place. Assuming half of these calls were in the southbound direction and that the typical vessel made calls at three US East Coast ports per service, there would be about 690 southbound vessels that may choose to route outside of the seasonal speed restricted areas rather than proceeding through the restricted areas at a slower speed. Based on an increase in routing of 108 nautical miles[7] and an average operating speed of 20 knots, the containership would have increased sailing time of 5.4 hours. Using an average hourly operating cost at sea of $1,000, the estimated economic impact for each southbound vessel would be $5,400. For 2003, the additional economic impact for containerships for coastwise shipping under Alternative 3 is estimated at $3.7 million. In 2004, the same assumptions result in an estimated economic impact of $3.8 million.

Commercial Fishing Vessels

Had the proposed seasonal speed restrictions under Alternative 3 been in place in 2003, the impact on commercial fishing vessels is estimated to be $572 thousand for the Northeast Region and $290 thousand for the Southeast Region of the US.

[7] The vessels are assumed to sail at a distance of 25 nautical miles offshore instead of eight nautical miles. Based on a diagonal routing to the further offshore sailing route an additional distance of 27 nautical miles is assumed per arrival and departure at the intermediate port calls.

Charter Fishing Vessels

For Alternatives 3 with a 10-knot speed restriction over 25 nautical miles, the annual economic impact is estimated at $1.1 million.

Passenger Ferries

Under Alternative 3, speed restrictions would be in place year round in Cape Cod Bay and for the months of October—April for Block Island Sound.[8] The two fast ferry operations from Boston to Provincetown would cease and be replaced by regular ferry service. However, overall ferry demand would diminish as passengers curtail day trips or seek alternative transport modes. It is assumed that the fast ferry operators would either sell their vessels or deploy them in other routes. While a loss for the distressed sale of the vessels may be incurred, this would not represent a recurring annual economic impact and is not included in this assessment.

The proposed speed restrictions for Block Island Sound are outside the peak summer season. Hence, it is assumed that the nine fast ferry operators in this area would lose an average of 30 business days per year. The economic impact of suspending fast ferry operations for these 30 days for these nine operators is estimated to be $3.6 million annually.

Regular ferries will incur average delays of approximately 30 minutes per trip with a speed restriction of 10 knots. As the restrictions are during the off-peak season for Block Island Sound, these delays can be absorbed in the more open ferry schedule without losing any round-trip daily service. The estimated incremental delay costs for regular speed ferries are estimated at less than $3.0 million annually at 10 knots.

Whale Watching Vessels

Under Alternative 3, the year-round speed restrictions in the Northeast region and Cape Cod Bay would likely render the operation of high-speed whale watching vessels unprofitable, causing these vessels to cease operation. As this would not be a recurring economic cost, any loss associated with the sale of the vessel is not included in this economic assessment. It is very likely that regular-speed whale watching vessels would be put into service in their place. However, demand for whale watching from locations such as Boston would diminish as the additional time required to reach whale feeding areas will discourage some passengers. It is possible some of this demand would divert to other whale watching operations located closer to the feeding areas.

Regular-speed whale watching vessels would be subject to the year-round speed restrictions extending 25 nautical miles form the Northeast region coastline and in Cape Cod Bay. It is assumed that at 10 knots, the 13 regular-speed vessels would incur greater than a 30-minute delay each way for two round-trips daily during a 90-day summer whale-watching period. Annual economic impacts to the whale watching industry are estimated to be $2.8 million under the 10-knot speed restriction.

[8] The analysis in this section for Alternative 3 also applies to Alternative 5.

5.3.5.2 Indirect Economic Impacts of Port Diversions

Under Alternative 3, year-round speed restrictions would be established for a large area east of Massachusetts Bay and would extend through the Great South Channel critical habitat area. This speed restricted area would significantly affect vessel traffic in the Northeast region. The delay for a containership arrival into Boston would average 100 minutes and an additional 100 minutes delay for departure. A recurring delay of 3.3 hours per call year-round would be sufficient for shippers and vessel operators to consider alternative ports such as Halifax or Montreal that would not be affected by this alternative action. This option becomes more attractive if port areas with speed restrictions are serving as gateways to northern population centers and industrial areas located further inland, such as western New York, western Pennsylvania, Ohio, Indiana, Illinois, and Michigan. The indirect economic impact of port diversions is estimated to be $139.4 million at the 10-knot speed restriction.

5.3.6 Alternative 4: Recommended Shipping Routes

Alternative 4 is anticipated to impact only the commercial shipping industry.

5.3.6.1 Estimated Direct Economic Impact

The direct economic impact of use of recommended routes implemented under Alternative 4 on the shipping industry in 2004 is estimated to be about $1.1 million annually. The port area of Jacksonville is expected to experience the largest impact at $0.7 million, followed by the port area of Boston at $0.4 million. The three other port areas affected under this alternative, Brunswick, Fernandina and Salem, each experienced an economic impact of under $61,000.

5.3.6.2 Indirect Economic Impacts of Port Diversions

Under Alternative 4, the port areas of Brunswick and Fernandina will experience delays due to the increased distance associated with the use of recommended routes. Because of these delays, it is assumed that 3 percent of the containership and ro-ro cargo ship calls at these two port areas would divert to the port area of Savannah where no operational measures have been proposed. Some passenger cruise vessels are likely to divert to Port Canaveral for that same reason. While Alternative 4 will result in port-specific impacts, the economic impacts to the nation as a whole are expected to be negligible since the diverted vessel calls at the Southeastern port areas of Brunswick, Fernandina and Jacksonville are offset by the gains in vessels calling at the port areas of Savannah and Port Canaveral.

5.3.7 Alternative 5: Combination of Alternatives 1, 2, 3, and 4

Alternative 5 is expected to impact all of the industries described above. Because this alternative incorporates elements of alternatives 1, 2, 3, and 4, discussion of the impacts are provided in greater detail earlier will not be repeated in this section.

5.3.7.1 Estimated Direct Economic Impact

Shipping Industry

The total direct economic impact of Alternative 5 to the shipping industry at the 10-knot speed restriction is estimated to be $89.7 million using 2004 vessel traffic data.

Multi-Port Calls

Vessels coming into at least two ports containing seasonal speed restrictions face an additional source of impacts as part of Alternative 5. These impacts were described more fully in Alternative 3. The additional direct economic impact of multi-port strings on the shipping industry in 2004 is estimated to be $7.2 million for the proposed 10-knot speed restriction.

Rerouting of Southbound Coastwise Shipping

As is the case for multi-port calls, the speed restriction in designated areas as part of Alternative 5 is the chief source of impacts to rerouting coastwise shipping and was described in greater detail in Alternative 3. This annual impact is estimated to be $3.8 million for the 10-knot speed restriction.

Commercial Fishing Vessels

As with Alternative 3, a speed restriction of 10 knots has an estimated impact on commercial fishing vessels of approximately $572,000 for the Northeast Region and $290,000 for the Southeast Region.

Charter Fishing Vessels

As with Alternative 3, a seasonal speed restriction is estimated to have an annual economic impact of $1.1 million on charter fishing vessels.

Passenger Ferries

The economic impacts to passenger ferries are comparable to those of Alternative 3 and are estimated to be approximately $6.5 million.

Whale Watching Vessels

As is the case for Alternative 3, regular-speed whale watching vessels would be subject to the year-round speed restrictions extending 25 nautical miles from the Northeast region coastline and in Cape Cod Bay. It is assumed that at 10 knots, the 13 regular-speed vessels would incur greater than a 30-minute delay each way for two round-trips daily during a 90-day summer whale-watching period. The estimated economic impact to regular-speed whale watching vessels is $2.8 million annually under a 10-knot speed restriction.

5.3.7.2 Indirect Economic Impacts of Port Diversions

Under Alternative 5, the rates of diversion for the affected port areas in the Northeast and mid-Atlantic regions are similar to Alternative 3, except that the additional impact of DMAs and use of recommended routes are assumed to increase the rate of diversion slightly. The indirect economic impact of port diversions is expected to be $159.6 million.

5.3.8 Alternative 6 (preferred): Operational Measures of the Right Whale Ship Strike Reduction Strategy

The DEIS and the RIR/RIA address the proposed operational measures of the Right Whale Ship Strike Reduction Strategy for commercial and recreational mariners. Alternative 6 is expected to impact all of the industries described in Section 5.3.2. Because this alternative incorporates elements of alternatives 1, 2, and 4, discussion of the impacts that were provided in greater detail earlier will not be repeated in this section. The designated areas proposed under Alternative 6 are generally of shorter duration than those proposed under Alternative 3 and 5, with the exception of the port areas located in the Southeast (Brunswick, GA, Fernandina, FL, Jacksonville, FL, and Port Canaveral, FL).

5.3.8.1 Estimated Direct Economic Impact

Shipping Industry

Direct annual economic impact to commercial shipping is estimated at $49.4 million at the 10-knot speed restriction.[9] The following port areas may expect the greatest impact: New York/New Jersey ($11.2 million), Hampton Roads, VA ($7.5 million), Savannah, GA ($5.3 million), and Charleston, SC ($5.2 million).

Multi-port Calls

The speed restriction in designated areas as part of Alternative 5 leads to additional impacts to vessels coming into at least two restricted ports. The sources of impacts were described more fully in Alternative 3. However, under Alternative 6, the extent of the impact is lower given that speed restrictions are in place for a smaller portion of the year in most port areas, relative to Alternatives 3 and 5. The 2004 vessel arrival database indicates that the total number of multi-port string restricted arrivals to be 5,147. The additional direct economic impact of multi-port strings on the shipping industry due to the 10-knot speed restriction in 2004 is estimated at $5.8 million.

[9] The total direct economic impact is estimated at $30.9 million at the 12-knot speed restriction with the port area of New York/New Jersey having the largest impact of $7.3 million. The port area of Hampton Roads is second at $5.0 million, followed by the port areas of Savannah at $3.5 million, Charleston at $3.5 million, Jacksonville at $2.8 million, Philadelphia at $2.5 million, and Baltimore at $2.3 million. The direct economic impact for these seven port areas totals $26.9 million or 87.1 percent of the total for this alternative.

Rerouting of Southbound Coastwise Shipping

For Alternative 6, the proposed speed restrictions in the mid-Atlantic region would be implemented for a 30 nautical mile buffer zone radiating out from each port area. Hence the additional distance incurred by southbound vessels would be 80 nautical miles (20 nautical miles per arrival and departure at intermediate port calls). The 2003 vessel traffic database indicated that 3,688 containership and ro-ro cargo ship would have traveled through speed restricted US East Coast port areas ranging from Baltimore through Port Canaveral had the restrictions been in place. Assuming half of these calls were in the southbound direction and that the typical vessel made calls at three US East Coast ports per service, there would be about 615 southbound vessels that are likely to route outside of the seasonal speed restricted areas rather than proceed through the restricted areas at a lower speed. Based on an increase in routing of 80 nautical miles[10] and an average operating speed of 20 knots, the containership would have increased sailing time of four hours. Using an average hourly operating cost at sea of $1,000, the estimated economic impact for each southbound vessel would be $4,000. For 2003 and 2004, the additional economic impact for containerships for coastwise shipping under Alternative 6 is estimated at $2.5 million.

Commercial Fishing Vessels

Using 2003 data, the estimated impact at 10 knots on commercial fishing vessels under Alternative 6 is estimated to be $686,000 for the Northeast Region and $348,000 for the Southeast Region. The combined Northeast and Southeast regional economic impact of slightly more than $1 million is approximately two-tenths of one percent of the US East Coast commercial fishery landings of $628.2 million in 2003.

Charter Fishing Vessels

It is estimated that annual economic impact of a speed restriction of 10 knots for these vessels over 30 nautical miles for Alternative 6 would be approximately $1.2 million. This calculation assumes 40 headboat vessels with 60 roundtrips per year and an hourly steaming operating cost of $200.

Passenger Ferries

Under Alternative 6, speed restrictions for Cape Cod Bay are implemented from January 1 through May 15. As such, the fast ferry service from Boston to Provincetown would remain in operation. Speed restrictions for Block Island Sound would be from November 1 through April 30. However, the speed restricted area for Block Island Sound under Alternative 6 would not extend to the shoreline and hence would not impact fast ferry operations.[11] DMAs would also be implemented under Alternative 6 and the economic impact of those are estimated the same as under Alternative 2 above. The estimated economic impact for fast ferry service under

[10] The vessels are assumed to sail at a distance of 25 nautical miles offshore instead of eight nautical miles. Based on a diagonal routing to the further offshore sailing route an additional distance of 27 nautical miles is assumed per arrival and departure at the intermediate port calls.

[11] The rectangular area proposed has its northern limits running approximately in a line from Montauk to the southwestern coast of Block Island.

Alternative 6 is thus similar to Alternative 2 with an increment for speed restrictions on the Boston-Provincetown route during January through May 15. The resulting estimated annual economic impact to high-speed ferries is $2.6 million.

For regular ferries, the economic impact for Alternative 6 is again similar to Alternative 2 with an increment for speed restrictions on the Boston-Provincetown route during January through May 15. The estimated economic impact is $3.0 million for 10-knot speed restrictions. The combined impacts to the high-speed and regular-speed passenger ferries bring the total estimated economic impacts to $5.6 million.

Whale Watching Vessels

Under Alternative 6, speed restrictions for Cape Cod Bay are implemented from January 1 through May 15. Hence, the peak summer whale watching season would not be affected for high-speed or regular speed vessels. Similarly, the speed restrictions for the Off Race Point area are proposed for March through April would not impact the whale watching season. Accordingly, the economic impact of Alterative 6 is assumed to be the same as Alternative 2 due to the implementation of DMAs for a total impact of $0.9 million.

5.3.8.2 Indirect Economic Impacts of Port Diversions

Under Alternative 6, speed restrictions for both Off Race Point area and the Great South Channel in the Northeast are in effect during the month of April causing many ships to route around this large area during that time.[12] The diversion is assumed at 10 percent for containerships and ro-ro cargo ships during the restricted period.[13] For port areas in Block Island Sound, two percent of containerships and ro-ro cargo ships are assumed to divert to other port areas to avoid speed restricted areas. For the affected mid-Atlantic ports, 0.5 percent of restricted period containership and ro-ro cargo ship vessel calls are assumed to divert to other port areas.

Additional diversions away from the port area of Providence may also occur under Alternative 6. This port area has speed restrictions in effect for 181 days as compared to 61 days for the port area of Boston. Therefore, 15 percent of the containership and ro-ro cargo ship restricted period calls at Providence are assumed to divert to the nearby port area of Boston.

The Southeastern region ports of Brunswick and Fernandina are assumed to have two percent of their restricted period arrivals of containerships and ro-ro cargo ships diverted to Savannah as the effect of the use of recommended routes creates additional delays relative to Savannah. Finally, 30 percent of the restricted period cruise vessel calls at Jacksonville are assumed to divert to Port Canaveral as that port is not affected by speed restrictions or the use of recommended routes.

[12] Speed restrictions will be in effect for other months in the Northeast region but not the large combined area encompassing Massachusetts Bay and the Great South Channel critical habitat area.
[13] For Alternative 6, speed restrictions are only in place for the months of March and April thus the 10 percent diversion only applies to vessel calls during those months.

The indirect economic impact of port diversions is estimated to be $49.7 million for the 10-knot speed restriction. The largest negative indirect impacts are generated in the port areas of New York/New Jersey ($21.2 million), Jacksonville, FL ($15.5 million) and Hampton Roads, VA ($12.4 million). The following port areas are expected to experience a positive indirect economic impact: Port Canaveral, FL ($2.2 million) and Savannah ($1.7 million).

5.4 Summary of Alternatives

This section summarizes the findings regarding the economic impact of the proposed operational measures of the right whale ship strike reduction strategy and alternatives on US East Coast maritime activity. A tabulation of economic impacts by industry is provided in Table 5-1. Impacts for the 10-, 12-, and 14-knot speed restrictions are included in this table as NMFS is accepting comments on the 12- and 14-knot speed restrictions.

- Alternative 5 has the largest estimated economic impact in terms of direct economic impact, indirect economic impact, and total economic impact. Based upon the most recent available data, the estimated total economic impact of Alternative 5 at a speed restriction of 10 knots for 2004 was estimated to be $272 million annually. The operational measure of speed restrictions year-round under Alternative 5 (and Alternative 3) will have substantial repercussions through the Northeast region port areas and the northern mid-Atlantic port areas. The combination of DMAs, recommended route designations, and speed restrictions also contributes to substantial total economic impact for Alternative 5.
- Alternative 3 has the second largest annual economic impact of $249 million with a speed restriction of 10 knots. The direct economic impact is estimated at $109 million while the indirect economic impact is estimated at $139 million.
- Alternative 6 (preferred) has the third largest total economic impact of $116 million with a speed restriction of 10 knots. This is comprised of $66 million in direct economic impact and $50 million in indirect economic impact.
- Alternative 2 ranks fourth in terms of the largest total economic impact with an annual impact of $23 million for a speed restriction of 10 knots. This alternative did not have any estimated indirect economic impact as vessel calls were assumed not to be diverted to Canadian ports.
- Alternative 4 has the lowest total economic impact at $1.1 million annually. This alternative consists only of use of recommended routes and port areas that may incur negative indirect economic impacts were offset by port areas with gains.

5.5 Determination of Significant Regulatory Action

EO 12866 defines a “significant regulatory action” as one that is likely to result in a rule that may:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency.

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the EO.

Based upon the most recently available data, the annual direct and indirect economic impacts are estimated to be $116 million for the preferred alternative at the 10-knot speed restriction. This estimate is based on the following direct economic impacts: shipping industry vessels ($49.4 million), cumulative effect of multi-port strings ($5.8 million), rerouting of southbound coastwise shipping ($2.5 million), commercial fishing vessels ($1.0 million), charter fishing vessels ($1.2 million), passenger ferries ($5.6 million), and whale watching vessels ($0.9 million); it also includes the indirect economic impact of port diversions ($49.7 million). The estimated annual economic impact exceeds $100 million. Therefore, the proposed rule would be considered an economically significant regulatory action for the purposes of EO 12866.

Prior classification of this proposed rule as a nonsignificant regulatory action for the purposes of EO 12866 was based on previous listing of this proposed rule as containing the 12-knot speed restriction. If the 12-knot speed restriction were applied instead of the proposed 10-knot speed restriction, then the total direct and indirect economic impact are estimated to be $62.4 million which would allow this regulatory action to be considered not economically significant for the purposes of EO 12866.

Table 5-1
Total Direct and Indirect Economic Costs by Alternative and Restriction Speed, 2004 ($000s)

	Alternative 2 Speed Restriction (in knots)			Alternative 3 Speed Restriction			Alternative 4 Speed Restriction	Alternative 5 Speed Restriction			Alternative 6 Speed Restriction		
	10	**12**	**14**	**10**	**12**	**14**	**10, 12, or 14**	**10**	**12**	**14**	**10**	**12**	**14**
Direct Economic Impact													
Shipping industry vessels	16,989.3	10,815.9	6,509.1	86,822.9	53,895.7	31,237.0	1,145.2	89,745.6	56,114.6	32,889.4	49,406.8	30,863.9	18,355.3
Cumulative effect of multi-port strings				7,227.8	6,023.2	5,059.5		7,227.8	6,023.2	5,059.5	5,805.5	4,837.9	4,063.8
Rerouting of southbound Coastwise shipping				3,800.0	3,800.0	3,800.0		3,800.0	3,800.0	3,800.0	2,500.0	2,500.0	2,500.0
Commercial fishing vessels				862.0				862.0			1,034.4		
Charter fishing vessels				1,100.0	600.0	200.0		1,100.0	600.0	200.0	1,200.0	720.0	240.0
Passenger ferries	5,128.0	4,145.7	3,161.3	6,514.0	5,530.7	4,154.0		6,514.0	5,530.7	4,154.0	5,593.2	4,572.4	3,570.3
Whale watching vessels	867.6	659.6	555.6	2,808.0	1,560.0	936.0		2,808.0	1,560.0	936.0	867.6	659.6	555.6
Subtotal Direct Economic Impact	**22,984.9**	**15,621.2**	**10,226.0**	**109,134.7**	**71,409.6**	**45,386.5**	**1,145.2**	**112,057.5**	**73,628.5**	**47,038.9**	**66,407.5**	**44,153.8**	**29,285.0**
Indirect Economic Impact of Port Diversions				**139,406.0**	**79,603.0**	**37,251.0**		**159,582.0**	**89,308.0**	**46,956.0**	**49,695.0**	**18,280.0**	**5,355.0**
Total Economic Impact	**22,984.9**	**15,621.2**	**10,226.0**	**248,540.7**	**151,012.6**	**82,637.5**	**1,145.2**	**271,639.5**	**162,936.9**	**93,995.3**	**116,102.5**	**62,433.8**	**34,640.0**

Source: Prepared by Nathan Associates as described in the DEIS

This Page Intentionally Left Blank

6 REFERENCES

Amaral, K. A. and C. A. Carlson. 2005. Scientific basis for whale watching guidelines: a review of current research. Presented at Scientific Committee Meeting SC-57, International Whaling Commission. Website accessed December 2005. [www.iwcoffice.org/_documents/ sci_com/SC57docs/SC-57-WW1.pdf]

Bartlett, F. 2003. Right Whales Eating Contaminated Zooplankton. Website accessed July 2004. [http://new-brunswick.net/new-brunswick/whales/updates28.html]

Baumgartner, M.F. and B.R. Mate. 2003. Summertime foraging ecology of North Atlantic right whales. *Marine Ecology Progress Series* 264:123-135.

Baumgartner, M.F. and B.R. Mate. 2005. Summer and fall habitat of North Atlantic right whales inferred from satellite telemetry. *Canadian Journal of Fisheries and Aquatic Science* 62:527-543.

Baumgartner, M.F., T.V.N. Cole, R.G. Campbell, G.J. Teegarden, and E.G. Durbin. 2003. Associations between North Atlantic right whales and their prey, *Calanus Finmarchicus*, over diel and tidal time scales. *Marine Ecology Progress Series* 264:155-166.

Best, P.B, A. Brandao, and D.S. Butterworth. 2001. Demographic parameters of southern right whales off South Africa. *Journal of Cetacean Research and Management* (*Special Issue*) 2:161-9.

Bisack, Kathryn D. May 2003. A discussion of using contingent valuation to measure right whale protection. NMFS, Northeast Fisheries Science Center, Protected Species Branch. Woods Hole, MA.

Brault, S., H. Caswell, P. Clapham, M. Fujiwara, S. Kraus, R. Pace and P. Wade. 2002. Report of the Working Group on Survival Estimation for North Atlantic Right Whales. Woods Hole, Massachusetts.

Busbee, D., I. Tizard, J. Stott, D. Ferrck, and E. Ott-Reeves. 1999. Environmental pollutants and marine mammal health: the potential impact of hydrocarbons and halogenated hydrocarbons on immune system dysfunction. *Journal of Cetacean Research and Management (Special Issue)* 1:223-248.

Carlson, C. 2003. A review of whale watching guidelines and regulations around the world. Report to the International Fund for Animal Welfare. 126 pp.

Caswell, H., M. Fujiwara and S. Brault. 1999. Declining survival probability threatens the North Atlantic right whale. *Proceedings of the National Academy of Sciences of the United States of America* (96):3308-3313.

Cole, T.V.N., D.L. Hartley, and R.L. Merrick. 2005. Mortality and serious injury determinations for large whale stocks along the eastern seaboard of the United States, 1999-2003. *U.S. Department of Commerce, Northeast Fisheries Science Center Reference Document* 05-08; 20p.

Cole, T., D. Hartley, and M. Garron. 2006. Mortality and Serious Injury Determinations for Baleen Whale Stocks Along the Eastern Seaboard of the United States, 2000-2004. *U.S. Department of Commerce, Northeast Fisheries Science Center Reference Document* 06-04; 18p.

Clapham, P., and R. Pace. 2001. Defining Triggers for Temporary Area Closures to Protect Right Whales from Entanglements: Issues and Options. NMFS, NEFSC Reference Document 01-0.

Corbett, J.J. and H.W. Koehler. 2003. Updated emissions from ocean shipping. *Journal of Geophysical Research*, 108 (D20), 4650.

Council on Environmental Quality (CEQ), Environmental Justice: Guidance Under the National Environmental Policy Act, Washington, D.C., December 1997.

CEQ, Considering Cumulative Effects Under the National Environmental Policy Act, Washington, D.C., January 1997.

Cruise Industry News. Winter 2005-2006. Marine Operations: A Full Plate. Website accessed January 23 2006. [http://www.cruiseindustrynews.com]

Department of the Navy (DoN). October 2001. Marine Resource Assessment for the VACAPES Operating Area. Final Report. Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA.

DoN. June 2002a. Marine Resource Assessment for the Cherry Point Operating Area. Final Report. Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA.

DoN. August 2002b. Marine Resource Assessment for the Charleston/Jacksonville Operating Area. Final Report. Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA.

DoN. February 2004. Biological Assessment for Virtual At-Sea Training/Integrated Maritime Portable Acoustic Scoring & Simulator (VAST/IMPASS) System. Commander U.S. Fleet Forces Command, Norfolk, VA.

DoN. 2005a. Draft Overseas Environmental Impact Statement/Environmental Impact Statement: Undersea Warfare Training Range. Website accessed December 2005. [http://projects.earthtech.com/uswtr/EIS/DEIS.htm]

DoN. December 2005b. Biological Assessment for Sinking Exercises (SINKEXs) in the Western North Atlantic Ocean. Commander Fleet Forces Command. Prepared by Naval Undersea Warfare Center Division, Newport, RI.

Durbin, E., G. Teegarden, R. Campbell, A. Cembella, M.F. Baumgartner, and B.R. Mate. 2002. North Atlantic right whales, *Eubalaena glacialis*, exposed to paralytic shellfish poisoning (PSP) toxins via a zooplankton Vector, *Calanus finmarchicus. Harmful Algae* 1:243-251.

Endresen, O., E. Sorgard, J.K. Sundet, S.B. Dalsoren, I.S.A. Isaksen, T.F. Berglen, and G. Gravir. 2003. *Journal of Geophysical Research*, 108 (D17), 4560.

Environmental Protection Agency (EPA). 1999. Commercial Marine Activity for Deep Sea Ports in the United States. Prepared for: EPA, Ann Arbor, Michigan.

EPA. 2002 National Assessment Database. Website accessed July 2005. [http://www.epa.gov/waters/305b/index.html]

EPA. 2005a. Control Emission Technologies: Transport and Dispersion of Air Pollutants. Website accessed October 2005. [http://www.epa.gov/apti/course422/ce1.html]

EPA. 2005b. Global warming – emissions and actions. Website accessed December 2005. [http://yosemite.epa.gov/oar/globalwarming.nsf/content/emissions.html]

Federal Energy Regulatory Commission (FERC). Industries: Liquefied Natural Gas (LNG). Website accessed March 2006. [www.ferc.gov/industries/lng.asp]

FERC. 2006. Order Denying Motions to Reopen Record in Proceeding. 115 FERC 61,058, issued April 17, 2006. Weaver's Cove Energy, LLC, Docket No. CP04-36-002.

Filadelfo, R.J. 2001. Navy vs. Commercial Ship Traffic- Unclassified Version, Memorandum. Prepared by the Center for Naval Analyses, Alexandria, VA.

Fujiwara, M. and H. Caswell. 2001. Demography of the endangered North Atlantic right whale. *Nature*, 414:537-541.

Garrison, L.P. 2005. Applying a spatial model to evaluate the risk of interactions between vessels and Right Whales in the southeast United States critical habitat. NMFS, Southeast Fisheries Science Center, Miami, FL.

Gentner, B., M. Price and S. Steinback. 2001. Marine Angler Expenditures in the Southeast Region, 1999. NOAA Technical Memorandum. NMFS-F/SPO-48, 57 pp.

Georgakaki, A., R.A. Coffey, G. Lock, and S.C. Sorenson. 2005. Transport and Environment Database System (TRENDS): Maritime Air Pollutant Emission Modeling. *Atmospheric Environment*, 39:2357-2365.

Georgia Ports Authority. Port of Savannah. Website accessed February 2005. [http://www.gaports.com]

Goodyear, J.D. 1996. Significance of feeding habitats of North Atlantic right whales based on studies of diel behavior, diving, food ingestion rates, and prey. Thesis presented to the Faculty of Graduate Studies of the University of Guelph in partial fulfillment of requirements for the degree of Doctor of Philosophy, 1996.

Greene, C.H., and A.J. Pershing. 2004. Climate and the conservation biology of North Atlantic right whales: the right whale at the wrong time? *Frontiers in Ecology and the Environment*, 2 (1):29-34.

Green, C.H., A.J. Pershing, R.D. Kenney, and J.W. Jossi. 2003. Impact of Climate Variability on the Recovery of Endangered North Atlantic Right Whales. *Oceanography*, 16:98-103.

Gulf of Maine Ocean Observing System (GoMOOS). Environmental Prediction in the Gulf of Maine: Forecast of North Atlantic right whale births. Website accessed March 31, 2006. [http://www.gomoos.org/environmentalprediction/index.html]

Hamilton, P.K., M.K. Marx, and S.D. Kraus. 1998. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*) as a method of assessing human impacts. Final Report to the Northeast Fisheries Science Center, Contract No. 4EANF-6-004.

Hampton Roads Maritime Association. 2005. Port of Hampton Roads Annual 2005. Norfolk, VA.

Harrison, P. 1983. *Seabirds, an Identification Guide*. Houghton Mifflin: New York, NY.

Heitmeyer, R.M., S.C Wales, L.A. Pflug. 2004. Shipping Noise Predictions: Capabilities and Limitations. *Marine Technology Society Journal*, 37 (4):54-65.

Hoagland, P., and A.E. Meeks. 2000. The Demand for Whalewatching at Stellwagen Bank National Marine Sanctuary. In: *The Economic Contribution of Whalewatching to Regional Economies: Perspectives From Two National Marine Sanctuaries*. Marine Sanctuaries Conservation Series MSD-00-2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Marine Sanctuaries Division, Silver Spring, MD.

Hoyt, E. 2001. Whale Watching 2001: Worldwide tourism numbers, expenditures, and expanding socioeconomic benefits. A Special Report for the International Fund for Animal Welfare. 158 pp.

International Council for the Exploration of the Sea (ICES). 2005. Report of the Ad-hoc Group on the Impacts of Sonar on Cetaceans and Fish (AGISC). CM 2006/ACE: 25 pp.

International Fund for Animal Welfare (IFAW), Tethys Research Institute, and Europe Conservation. 1995. Report of the Workshop on the Scientific Aspects of Managing Whale Watching, Montecastello de Vibio, Italy. 40 pp.

International Maritime Organization (IMO). Convention on the International Regulations for Preventing Collisions at Sea (1972). Website accessed December 2004a. [http://www.imo.org/Conventions/contents.asp?doc_id=649&topic_id=257]

IMO. Maritime Safety. Website accessed December 2004b. [http://www.imo.org/Safety/]

IMO. Port State Control. Website accessed January 2005. [http://www.imo.org/Facilitation/mainframe.asp?topic_id=159]

Jacksonville Port Authority. About JAXPORT. Website accessed February 2005. [http://www.jaxport.com/about/about.cfm]

Jasny, M., J. Reynolds, C.Horowitz, and A. Wetzler. 2005. Sounding the Depths II: The Rising Toll of Sonar, Shipping and Industrial Ocean Noise on Marine Life. Natural Resources Defense Council.

Jensen, A. and G. Silber. 2003. *Large Whale Ship Strike Database*. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/OPR-25, 37 pp.

Johnson M.P. and P.L. Tyack. 2003. Digital Acoustic Recording Tag for Measuring the Response of Wild Marine Mammals to Sound. IEEE *Journal of Oceanic Engineering*, 28(1): 3-12.

Kastak, D., B.L. Southall, R.J. Schusterman, and C.L. Kastak. 2005. Underwater temporary threshold shift in pinnipeds: Effects of noise level and duration. *Acoustical Society of America,* 118 (5):3154-3163.

Keller, C.A., L.I. Ward-Geiger, W.B. Brooks, C.K. Slay, C.R. Taylor, and B.J. Zoodsma. 2006. North Atlantic Right Whale Distribution in Relation to Sea-Surface Temperature in the Southeastern United States Calving Ground. *Marine Mammal Science*, 22(2):426-445.

Ketten, D. 1998. Marine mammal auditory systems: a summary of audiometric and anatomical data and its implications for underwater acoustic impacts. Contract (40JBNF600312) report. Boston, MA.

Knowlton, A.R., F.T. Korsemeyer, and B. Hynes. 1998. The Hydrodynamic Effects of Large Vessels on Right Whales: Phase Two. Final Report – NMFS-NEFSC contract No. 46ANF60004. New England Aquarium and Massachusetts Institute of Technology.

Knowlton, A.R., J. B. Ring and B. Russell. 2002. Right whale sightings and survey effort in the mid-Atlantic region: migratory corridor, time-frame, and proximity to port entrances. A Report Submitted to the NMFS Ship Strike Working Group.

Knowlton, A.R., M.K. Marx, H.M. Pettis, P.K. Hamilton and S.D Kraus. 2001. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*): monitoring rates of entanglement interaction. Report to NMFS. Available From: New England Aquarium, Central Wharf, Boston, MA 02110.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. *Journal of Cetacean Research and Management*, *(Special Issue)* 2:193-208.

Knowlton, A.R., S.D. Kraus, and R.D. Kenney. 1994. Reproduction of North Atlantic right whales (*Eubalaena glacialis*). *Canadian Journal of Zoology*, 72:1297-1305.

Koschinski, S. 2002. Ship collisions with whales. Informational document presented at the eleventh meeting of the CMS scientific council. 14-17 September 2002, Bonn/Germany. UNEP/ScC11/Inf.7. 19 pp.

Kraus, S.D. and J.J. Hatch. 2001. Mating strategies in the North Atlantic right whale (*Eubalena glacialis*). *Journal of Cetacean Research and Management (Special Issue)* 2:237-244.

Kraus, S.D., M.W. Brown, H. Caswell, C.W. Clark, M. Fujiwara, P.K. Hamilton, R.D. Kenney, A.R. Knowlton, S. Landry, C.A. Mayo, W.A. McLellan, M.J. Moore, D.P. Nowacek, D.A. Pabst, A.J. Read, R.M. Rolland. 2005. North Atlantic Right Whales in Crisis. *Science*, 309:561-562.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A.R. Knowlton, and C.K. Slay. 2001. Reproductive parameters of the North Atlantic right whale. *Journal of Cetacean Research and Management, (Special Issue 2)*:231-236.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, and M. Podesta. 2001. Collisions Between Ships and Whales. *Marine Mammal Science*, 17 (1):35-75.

Laist, D.W. and C. Shaw. 2006. Preliminary Evidence that Boat Speed Restrictions Reduce Deaths of Florida Manatees. *Marine Mammal Science*, 22(2):472-479.

Lien, J. 2001. The conservation basis for the regulation of whale watching in Canada by the Department of Fisheries and Oceans: a precautionary approach. Submitted to the Department of Fisheries and Oceans, Ottawa, March 31, 2000.

Maine Department of Marine Resources. 2005. Proceeding from a workshop on Right Whale Foraging in the Nearshore Waters of the Northern Gulf of Maine, Saco, Maine. Eds. L.T. Singer and L. Ludwig.

Maritime Administration (MARAD). Short Sea Shipping. Website accessed January 2005. [http://www.marad.dot.gov/Programs/shortseashipping.html]

MASSPORT. Port of Boston. Website accessed February 2005. [http://www.massport.com/ports/]

Matthews, J.N., S. Brown, D. Gillespie, M. Johnson, R. McLanaghan, A. Moscrop, D. Nowacek, R. Leaper, T. Lewis, and P. Tyack. 2001. Vocalisation rates of the North Atlantic right whale (*Eubalaena glacialis*). *Journal of Cetacean Research and Management*, 3(3):271-282.

Mayo, C.A, O.C. Nichols, M.K. Bessinger, M.K. Marx, C.L. Browning, and M.W. Brown. 2004. Surveillance, Monitoring and Management of North Atlantic Right Whales in Cape Cod Bay and Adjacent Waters – 2004, Final Report. Center for Coastal Studies, Provincetown, Massachusetts.

Mellinger, D.K. 2004. A comparison of methods for detecting right whale calls. *Canadian Acoustics*, 32:55-65.

Merrick, R.M. 2005. Seasonal Management Areas for the Reduction of Northern Right Whale Shipping Interactions in the Gulf of Maine. Northeast Fisheries Science Center, NOAA Fisheries Service. Woods Hole, Massachusetts.

Miller, C.B., T.J. Cowles, P.H. Wiebe, N.J. Copley, and H. Grigg. 1991. Phenology in *Calanus finmarchicus*; hypotheses about control mechanisms. *Marine Ecology Progress Series*, 72:79-91.

Milliman, J.D. and E. Imamura. 1992. The Physical Oceanography of the U.S. Atlantic and Eastern Gulf of Mexico. Final Report, supported by U.S. Department of Interior and Minerals Management Service.

Minerals Management Service (MMS). Atlantic Outer Continental Shelf Area. Website accessed October 2005. [http://www.gomr.mms.gov/homepg/offshore/atlocs/atlocs.html

Moore M.J., A.R. Knowlton, S.D. Kraus, W.A. McLellan, and R.K. Bonde. 2005. Morphometry, gross morphology and available histopathology in North Atlantic right whale mortalities (1970-2002). *Journal of Cetacean Research and Management*, 6(3):199-214.

National Marine Fisheries Service (NMFS). June 1995. *Environmental Assessment of Proposed Regulations to Govern Interactions between Marine Mammals and Commercial Fishing Operations, under Section 118 of the Marine Mammal Protection Act*.

National Park Service. 2003. Vessel Quotas and Operating Requirements – Final Environmental Impact Statement. Glacier Bay National Park and Preserve, Alaska.

National Research Council. 2003. *Ocean Noise and Marine Mammals*: Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals. National Academy Press: Washington, D.C.

Neptune LNG, L.L.C. 2005. Deepwater Port License Application, Neptune Project, Massachusetts Bay. Volume II – Environmental Evaluation (Public). Submitted to U.S. Coast Guard.

Nichols, O.C. and H.L. Kite-Powell. 2005. Analysis of Risk to North Atlantic Right Whales from Shipping Traffic in Cape Cod Bay – Final Report. Provincetown Center for Coastal Studies.

NMFS. 1998. *Recovery Plan for the Shortnose Sturgeon* (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for NMFS, Silver Spring, MD.

NMFS. 2002. Commercial Fishery Landings by Port ranked by dollars. Fisheries Statistics and Economics Division. Website accessed January 2005. [http://www.st.nmfs.gov/pls/webpls/MF_LPORT_YEARD.RESULTS]

NMFS, 2003a. *Biological Opinion on issuance of Permit No. 655-1652-00 to Dr. Scott D. Kraus of the New England Aquarium, and No. 775-1600-6 to Dr. Michael P. Sissenwine of the Northeast Fisheries Science Center for research on right whales in the North Atlantic Ocean*. Silver Spring, MD.

NMFS. June 2003b. 2003 Stock Assessment Reports (SAR). Website accessed January 2004. [http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars_draft.html]

NMFS. 2003c. Commercial Fishery Landings by Port Ranked by Dollars. Fisheries Statistics and Economics Division. Website accessed January 2005. [http://www.st.nmfs.gov/pls/webpls/MF_LPORT_YEARD.RESULTS]

NMFS. 2004a. Sea Turtle Protection and Conservation. Website accessed January 2004. [http://www.nmfs.noaa.gov/prot_res/PR3/Turtles/turtles.html]

NMFS. 2004b. Anadromous and Marine Fishes. Website accessed February 2004. [http://www.nmfs.noaa.gov/prot_res/PR3/Fish/fishes.html]

NMFS. 2004c. Status of Marine Mammals Under the Law. Website accessed February 2004. [http://www.nmfs.noaa.gov/prot_res/PR2/Conservation_and_Recovery_Program/listedmms.html]

NMFS. 2004d. Atlantic Large Whale Take Reduction Team. Website accessed March 2004. [http://www.nero.noaa.gov/whaletrp/]

NMFS. June 1, 2004e. Endangered Fish and Wildlife; Advance Notice of Proposed Rulemaking (ANPR) for Right Whale Ship Strike Reduction. *Federal Register*: Vol. 69, No. 105, p. 30857.

NMFS. 2004f. White Paper: *Actions Ongoing or Underway by NOAA Fisheries to Reduce Ship Strikes*. Unpublished Draft Document. Website accessed June 2004. [http://www.nmfs.noaa.gov/pr/shipstrike/]

NMFS. 2004g. White Paper: *Dynamic Management Areas*. Unpublished Draft Document. Website accessed June 2004. [http://www.nmfs.noaa.gov/pr/shipstrike/]

NMFS. 2004h. White Paper: *Large Whale Ship Strikes Relative to Vessel Speed*. Unpublished Draft Document. Website accessed June 2004. [http://www.nmfs.noaa.gov/pr/shipstrike/]

NMFS. 2004i. White Paper: *Vessels to Which Operational Measures Apply*. Unpublished Draft Document. Website accessed June 2004. [http://www.nmfs.noaa.gov/pr/shipstrike/]

NMFS. 2005a. *Draft Environmental Impact Statement (DEIS) for Amending the Atlantic Large Whale Take Reduction Plan*. Department of Commerce, National Oceanic and Atmospheric Administration.

NMFS. 2005b. *Recovery Plan for the North Atlantic Right Whale (Eubalaena glacialis)*. NOAA Office of Protected Resources, Silver Spring, MD.

NMFS. 2005c. Biennial Report to Congress on the Recovery Program for Threatened and Endangered Species, October 1, 2002 – September 20, 2004.

NMFS. 2005d. Shipping Noise and Marine Mammals: A Forum for Science, Management and Technology, 18 – 19 May 2004. Website accessed April 2005. [http://www.nmfs.noaa.gov/pr/acoustics/acoustics_reports.htm]

NMFS. 2005e. Environmental Assessment to implement the operational measures of the North Atlantic Right Whale Ship Strike Reduction Strategy. Department of Commerce, NOAA, NMFS, Office of Protected Resources.

NMFS. 2005f. 2005 Stock Assessment Reports. Website accessed November 2005. [http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars_draft.html]

NMFS and US Fish and Wildlife Service (USFWS). 1991a. *Recovery Plan for U.S. Population of Atlantic Green Turtle*. NMFS, Washington, DC.

NMFS and USFWS. 1991b. *Recovery Plan for U.S. Population of Loggerhead Turtle*. NMFS, Washington, DC.

NMFS and USFWS. 1992a. *Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico*. NMFS, Washington, DC.

NMFS and USFWS. 1992b. *Recovery Plan for the Kemp's Ridley Sea Turtle (Lepidochelys kempii)*. NMFS, St. Petersburg, FL.

NMFS and USFWS. 1993. *Recovery Plan for the Hawksbill Turtles in the U.S. Caribbean Sea, Atlantic Ocean, and Gulf of Mexico*. NMFS, St. Petersburg, FL.

NMFS. Unpublished data. The Spatial Distribution of Northern Right Whales in the Southeast U.S. Critical Habitat. NMFS, Southeast Fisheries Science Center. Miami, FL.

National Oceanic and Atmospheric Administration (NOAA). 1999. NOAA Administrative Order Series 216-6: Environmental Review Procedures for Implementing The National Environmental Policy Act. Website accessed April 2005. [http://www.nepa.noaa.gov/NAO216_6_TOC.pdf]

Northeast Gateway Energy Bridge, L.L.C. 2005. Application to the U.S. Maritime Administration and the U.S. Coast Guard for the Construction of the Northeast Gateway Deepwater Port.

National Ocean Service (NOS)-Stellwagen Bank National Marine Sanctuary. 1993a. 1993 Management Plan Part 2, Sec.2: Human Activities. Website accessed January 2005. [http://www.stellwagen.noaa.gov/management/1993plan/toc/html]

NOS - Stellwagen Bank National Marine Sanctuary. 1993b. 1993 Management Plan Part 2, Sec.2B1: Sanctuary Resources - Environmental Conditions. Website accessed January 2005. [http://stellwagen.noaa.gov/management/1993plan/pt2sc2b1.html]

Nowacek, D.P., M.P. Johnson, P.L. Tyack, K.A. Shorter, W.A. McLellan, and D.A. Pabst. 2001. Buoyant Balaenids: the ups and downs of buoyancy in right whales. *Proceedings of the Royal Society*, 268:1811-1816.

Nowacek, D.P., M.P. Johnson, P.L. Tyack. 2003. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. *Proceedings of the Royal Society of London, Series* B, 271:227-231.

O'Shea, T.J. and R.L. Brownell, Jr. 1994. Organochlorine and metal contaminants in baleen whales: a review and evaluation of conservation implications. *The Science of the Total Environment*, 154:179-200.

Pace, R.M. and G.K. Silber. Simple analyses of ship and large whale collisions: Does Speed Kill? Submitted as an abstract to the 16th Biennial Conference on the Biology of Marine Mammals, 12-16 December, 2005.

Parks, S.E. 2003. Response of North Atlantic Right Whales to Playback of Calls Recorded From Surface Active Groups in Both the North and South Atlantic. *Marine Mammal Science*, 19 (3):563-580.

Penberthy, DaWayne. November 2005. Marine Operations Principal, Southern LNG Elba Island. Personal Communication.

Perry, S., D.P. DeMaster, and G.K. Silber. 1999. The Great Whales: History and Status of Six Species Listed as Endangered Under the U.S. Endangered Species Act of 1973. *Marine Fisheries Review*, 61(1):74 pp.

Philadelphia Regional Port Authority. Facilities. Website accessed February 2005. [http://www.philaport.com/facilities.htm]

Port Authority of New York and New Jersey. Port Facilities. Website accessed February 2005. [http://www.panynj.gov]

Port of Boston. About the Port. Website accessed February 2005. [http://www.massport.com/ports/about.html]

Port of Los Angeles. 2005. Report to Mayor Hahn and Councilwoman Hahn by the No Net Increase Task Force. San Pedro, CA.

Port of Portland. Navigation Details. Website accessed February 2005. [http://www.portofportland.com/navigation.html]

Reeves, R. 2000. A Canadian Recovery Plan for the North Atlantic Right Whale. Canadian Right Whale Recovery Team.

Reeves, R.R., R. Rolland, and P.J. Clapham, Eds. 2001. *Causes of Reproductive Failure in North Atlantic Right Whales: New Avenues of Research*. Report of a Workshop Held 26-28 April 2000, Falmouth, Massachusetts. Northeast Fisheries Science Center Reference Document 01-16.

Richardson, J.W., C.R. Greene, Jr., C.I. Malme, and D.H. Thompson. 1995. *Marine Mammals and Noise*. Academic Press: San Diego.

Rolland, R. M., K.E. Hunt, S.D. Kraus, and S.K. Wasser. 2005. Assessing reproductive status of right whales (*Eubalaena glacialis*) using fecal hormone metabolites. *General and Comparative Endocrinology*, 142:308-317.

Russell, B. 2001. Recommended Measures to Reduce Ship Strikes of North Atlantic Right Whales. NMFS, Northeast and Southeast Implementation Teams for the Recovery of the North Atlantic Right Whale.

Russell, B., A.R. Knowlton, and J.B. Ring. 2003. Vessel Traffic-Management Scenarios Based on Recommended Measures to Reduce Ship Strikes of Northern Right Whales. A Report Submitted to the NMFS Northeast Implementation Team.

Russell, B., A.R. Knowlton, and J.B. Ring. 2005 *(revised)*. Vessel Traffic-Management Scenarios Based on the National Marine Fisheries Service's Strategy to Reduce Ship Strikes of North Atlantic Right Whales. A Report Submitted to the NMFS Northeast Implementation Team.

Russel, P.B., P.V. Hobbs, and L.L. Stowe. 1999. Aerosol properties and radiative effects in the United States haze plum: An overview of the Tropospheric Aerosol Radiative Forcing Observational Experiment (TARFOX). *Journal of Geophysical Research*, 104 (D2):2213-2222.

Sameoto, D.D. and A.W. Herman. 1990. Life cycle and distribution of *Calanus finmarchicus* in deep basins of the Nova Scotia shelf and seasonal changes in *Calanus* spp. *Marine Ecology Progress Series*, 66:225-237.

Schaef, C.M., S.D. Kraus, M.W. Brown, and B.N. White. 1993. Assessment of population structure of western North Atlantic right whales (*Eubalaena glacialis*) based on sighting and mtDNA data. *Canadian Journal of Zoology*, 71:339-345.

Senff, C.J., W.E. Eberhard, R.J. Alvarez II, R.D. Marchbanks, J.L. George, B.J. McCarty, L.S. Darby, A.B. White, W.M. Angevine, E.J. Williams, P.D. Goldan, D.E. Wolfe, S.A. Pezoa, and S.W. Abbott. 2003. *Lidar measurements of ozone and aerosol vertical structure on the Ron Brown.* New England Air Quality Study Science Workshop 28 – 30 May 2003.

South Carolina State Ports Authority. Port of Charleston Terminals and Infrastructure. Website accessed February 2005.
[http://www/port-of-charleston.com/Term_and_Infra/Charleston/whycharleston.asp]

Steinback, S. and B. Gentner. 2001. Marine Angler Expenditures in the Northeast Region, 1998. NOAA Technical Memorandum. NMFS-F/SPO-47, 63pp.

Terhune, J.M. and W.C. Verboom. 1999. Right Whales and Ship Noises. *Marine Mammal Science*, 15(1):256-258.

United States Army Corps of Engineers. 2004. Marine Biological Assessment for the Cape Wind Project. Website accessed February 2006. [http://www.nae.usace.army.mil/projects/ma/ccwf/deis.htm]

United States Coast Guard (USCG). Navigation Center. Website accessed December 2004. [http://www.navcen.uscg.gov/]

USCG. Office of Law Enforcement. Website accessed October 2005. [http://www.uscg.mil/hq/g-o/g-opl/Welcome.htm]

United States Coast Pilot (USCP) 1. 2005. Atlantic Coast: Eastport, ME to Cape Cod, MA, 35th Edition. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

USCP 2. 2005. Atlantic Coast: Cape Cod, MA to Sandy Hook, NJ, 38th Edition. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

USCP 3. 2005. Atlantic Coast: Sandy Hook, NJ to Cape Henry, VA, 38th Edition. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

USFWS. The Endangered Species Program. Website accessed February 2004. [http://endangered.fws.gov/]

Virginia Port Authority. Facilities. Website accessed February 2005. [http://www.vaports.com/FAC-term.htm]

Wade, P.R. and R. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop. NOAA Technical Memorandum. NMFS-OPR-12, 93 pp.

Ward-Geiger, L.I., G.K. Silber, R.D. Baumstark and T.L. Pulfer. 2005. Characterization of Ship Traffic in Right Whale Critical Habitat. *Coastal Management*, 33:263-287.

Waring, G.T., J.M. Quintal, and S.L. Swartz, eds. 2001. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2001. NOAA Technical Memorandum NMFS-NE 168:1-307.

Waring, G.T., R.M. Pace, J.M. Quintal, C.P. Fairfield, and K. Maze-Foley, eds. 2003. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2003. NOAA Technical Memorandum NOAA - NE-182.

Wartzok, D. and D.R. Ketten. 1999. Marine Mammal Sensory Systems. In *Biology of Marine Mammals*, edited by Reynolds, J.E. III and S.A. Rommel, 117-175. Smithsonian Institution Press: Washington.

Weisbrod, A.V., D. Shea, M.J. Moore, and J.J. Stegman. 2000. Organochlorine exposure and bioaccumulation in the endangered northwest Atlantic right whale (*Eubalaena glacialis)* population. *Environmental Toxicology and Chemistry*, 19:654-66.

Westwood, J., B. Parsons, and W. Rowley. 2002. Global Ocean Markets. *The Hydrographic Journal*, 103:11-17.

Wilson, J.D.K. 1999. Fuel and Financial Savings for Operators of Small Fishing Vessels. Food and Agricultural Organization Fisheries Technical Papers – T383, 46pp.

Woodley, T.H., M.W. Brown, S.D. Kraus, and D.E. Gaskin. 1991. Organochlorine levels in North Atlantic right whale (*Eubalaena glacialis)* blubber. *Archives of Environmental Contamination and Toxicology*, 21:141-145.

World Wildlife Federation-Canada. 2003. Newsroom: Shipping Lanes Moved to Protect Endangered Right Whales. Website Accessed January 2005. [http://www.wwf.ca/NewsandFacts/NewsRoom/default.asp?section=archive&page=display&ID=1309&lang=EN

7 DISTRIBUTION LIST

Congressional Representatives	
United States Senate	
The Honorable Olympia J. Snowe Committee on Commerce, Science and Transportation United States Senate Washington DC, 20510	The Honorable Ted Stevens Chairman, Committee on Commerce, Science and Transportation United States Senate Washington, DC 20510
The Honorable Daniel Inouye Co-Chairman, Committee on Commerce, Science and Transportation United States Senate Washington, DC 20510	The Honorable Maria Cantwell Committee on Commerce, Science and Transportation United States Senate Washington, DC 20510
House of Representatives	
The Honorable Richard Pombo Chairman, Committee on Resources House of Representatives Washington, DC 20515	The Honorable Nick J. Rahall, II Ranking Minority Member Committee on Resources House of Representatives Washington, DC 20515
The Honorable Wayne Gilchrest Committee on Resources House of Representatives Washington, DC 20515	The Honorable Frank Pallone Committee on Resources House of Representatives Washington, DC 20515
Congressional Staff & NOAA Office of Legislative Affairs	
Ms. Amy Frankel Room 425 Hart Senate Office Building Senate Committee on Science and Transportation Washington, DC 20510	Ms. Lauren Batte NOAA – Cogressional Affairs 14th and Constitution Avenue, NW Room 5221 Washington, DC 20230
Federal Agencies	
Council on Environmental Quality	
Mr. Horace Greczmiel Director of NEPA Executive Office of the President Council on Environmental Quality Old Executive Office Building, Room 360 Washington, DC 20502	
US Environmental Protection Agency	
US Environmental Protection Agency Office of Federal Activities EIS Filing Section Mail Code 2252-A, Room 7220 Ariel Rios Building (South Oval Lobby) 1200 Pennsylvania Avenue, NW Washington, DC 20460	Ms. Betsy Higgins Director US Environmental Protection Agency, Region I 1 Congress Street Boston, MA 02114

Federal Agencies	
US Environmental Protection Agency (Continued)	
Ms. Grace Musumeci Director US Environmental Protection Agency, Region II 290 Broadway New York, NY 10007	Mr. Bill Arguto Director US Environmental Protection Agency, Region III Office of Environmental Programs 1650 Arch Street Philadelphia, PA 19103
Mr. Heines Mueller Director US Environmental Protection Agency, Region IV Environmental Policy Section 61 Forsyth Street, SW Atlanta, GA 30303	
US Army Corps of Engineers	
Lt. Colonel Brian Green US Army Corps of Engineers New England District 696 Virginia Road Concord, MA 01742	Ms. Cathy Rogers US Army Corps of Engineers New England District 696 Virginia Road Concord, MA 01742
Mr. Daniel Small US Army Corps of Engineers South Atlantic Division 60 Forsyth Street SW Room 9M15 Atlanta, Georgia 30303-8801	Mr. Joseph Wilson US Army Corps of Engineers South Atlantic Division RIT 3162 441 G Street NW Washington, DC 20314
US Coast Guard	
Mr. George Detweiler Commandant (G-MWV) US Coast Guard – Headquarters 2100 Second Street, SW Washington, DC 20593	Ms. Katie Moore US Coast Guard – Fifth District 431 Crawford Street Portsmouth, VA 23704
Lt. Jeff Pearson DHS/USCG/G-OPL4 2100 Second Street, SW Washington, DC 20593-0001	Mr. William Baumgartner US Coast Guard 2100 Second Street, SW Washington, DC 20593
Mr. Ed LaRue Commandant (G-MWV) US Coast Guard Headquarters 2100 Second Street, SW Washington, DC 20593	
Marine Mammal Commission	
Mr. David Cottingham Marine Mammal Commission 4340 East-West Highway, Room 905 Bethesda, MD 20814	Mr. David Laist Marine Mammal Commission 4340 East-West Highway, Room 905 Bethesda, MD 20814
Department of the Interior	
Dr. Willie R. Taylor US Department of Interior Office of Environmental Policy & Compliance 1849 C Street, NW Mailstop 2340 Washington, DC 20240	

Federal Agencies	
Department of Commerce	
Dr. Gary Mayer Acting Director NOAA Fisheries, Office of Habitat Conservation 1315 East-West Highway Silver Spring, MD 20910	Mr. Clement Lewsey Coastal Program Division NOAA 1305 East-West Highway Silver Spring, MD 20910
Ms. Patricia Kurkul Regional Administrator Northeast Region 1 Blackburn Drive Gloucester, MA 01930	Dr. Roy Crabtree Regional Administrator Southeast Region 9721 Executive Center Drive North St. Petersburg, FL 33702
NOAA National Marine Fisheries Service Environmental Assessment Branch National Marine Fisheries Service Duval Building, 9450 Koger Boulevard St. Petersburg, FL 33702-2496	Mr. David Wiley Research Coordinator Stellwagen Bank National Marine Sanctuary 175 Edward Foster Road Scituate, MA 02066
Ms. Kristen Koyama/Mr. David Gouveia NMFS/NERO One Blackburn Drive Gloucester, MA 01930	Ms. Barb Zoodsma NMFS/SERO 2382 Sadler Road, Suite 5 Fernandina Beach, FL 32034
Mr. Lance Garrison NMFS/SEFSC 75 Virginia Beach Drive Miami, FL 33149	Mr. Richard Merrick NMFS/NEFSC 166 Water Street Woods Hole, MA 02543
Ms. Vicki Cornish NMFS/SERO 263 13th Avenue. South St. Petersburg, FL 33701	Mr. Nick Chrobak NOAA/NMAO 166 Water Street Woods Hole, MA 02543
Mr. Wayne McFee National Ocean Service 219 Fort Johnson Road Charleston, SC 29412	Ms. Kathryn Bisack NMFS/NEFSC 166 Water Street Woods Hole, MA 02543
Mr. Reed Bohne Gray's Reef National Marine Sanctuary 10 Ocean Science Circle Savannah, GA 31411	Ms. Lindy Johnson NOAA - General Council International Law 1401 Constitution Avenue, NW HCHB Room 7837 Washington, DC 20230
Mrs. Deborah Ben-David NOAA - General Council for Fisheries 1315 East West-Highway Room 15125 Silver Spring, MD 20910	Mr. Andrew Beaver NOAA, NOS, Office of Coast Survey 28 Tarzwell Drive Narragansett, RI 02882
Mr. Craig MacDonald Superintendent Stellwagen Bank National Marine Sanctuary 175 Edward Foster Road Scituate, MA 02066	Mr. Daniel Basta Director National Marine Sanctuary Program 1305 East-West Highway Silver Spring, MD 20910

Federal Agencies	
US Department of State	
Ms. Claudia McMurray Bureau of Oceans and International Environmental and Scientific Affairs 2201 C Street, NW Room 5805 Washington, DC 20520	
US Department of the Navy	
Mr. Tom Fetherston Biologist / Code 551 NAVSEA Newport 1176 Howell Street Newport, RI 02841	Attn: Mr. William Durig & Ms. Barbara Howe Commander Navy Region Southeast Box 102, Code N45 NAS Jacksonville, FL 32212-0102
Mr. Frank Stone US Department of the Navy Crystal City Plaza 5, Room 680 2211 South Clark Place Arlington, VA 22202-3735	Mr. Kent Pope Environmental Engineer Military Sealift Command 1959 Morris St. Suite 110 Norfolk, VA 23511
US Department of Transportation	
Mr. Richard Corley MARAD 400 7th Street Room 7209 Washington, DC 20590	Mr. Michael Carter MARAD/Office of Environmental Activities 400 7th Street MAR-820 Room 7209 Washington, DC 20590
State Coastal Zone Management – Federal Consistency Contacts	
Mr. Elder Ghigharelli Department of the Environment 1800 Washington Blvd. Baltimore, MD 21230	Mr. Richard Chinnis Director, Regulatory Programs Office of Ocean and Coastal Resource Management Department of Health and Environmental Control 1362 McMillian Avenue, Suite 400 Charleston, SC 29405-2029
Ms. Kim Springer Land Use Regulation Program Department of Environmental Protection PO Box 439 Trenton, NJ 08625	Ms. Susan Love Delaware Coastal Programs Department of Natural Resources & Environmental Control 89 Kings Highway Dover, DE 19901
Mr. Tom Ouellette Office of Long Island Sound Programs Department of Environmental Protection 79 Elm Street, 3rd Floor Hartford, CT 06106-5127	Ms. Kelie Moore Coastal Zone Management Program Department of Natural Resources One Conservation Way, Suite 300 Brunswick, GA 31520 8687
Ms. Jasmin Raffington Florida Coastal Management Program Department of Environmental Protection 3900 Commonwealth Boulevard Douglas Building, Mail Station 47 Tallahassee, FL 32399 3000	Mr. Larry Toth Water Planning Office Department of Environmental Protection 400 Market Street, 15th Floor P.O. Box 2063 Harrisburg, PA 17105 2063

State Coastal Zone Management – Federal Consistency Contacts (Continued)	
Mr. Todd Burrowes State Planning Office State House Station #38 184 State Street Augusta, ME 04333	Mr. Chris Williams New Hampshire Coastal Program Department of Environmental Services 50 International Drive, Suite 200 Pease International Tradeport Portsmouth, NH 03801
Mr. Alex Strysky Project Review Coordinator Office of Coastal Zone Management Executive Office of Environmental Affairs 251 Causeway Street, Suite 900 Boston, MA 02114	Mr. Steven C. Resler Deputy Bureau Chief Division of Coastal Resources and Waterfront Revitalization - Department of State 41 State Street Albany, NY 12231 0001
Mr. Steve Rynas Division of Coastal Management Department of Environment and Natural Resources 400 Commerce Avenue Morehead City, NC 28557-3421	Mr. Jeff Willis Coastal Resources Management Council Stedman Office Building 4808 Tower Hill Road Wakefield, RI 02879-1900
Ms. Ellie Irons Program Manager Virginia Department of Environmental Quality Office of Environmental Impact Review PO Box 10009 Richmond, VA 23240	
State Clearinghouse Review Contacts	
Ms. Linda Janey State Clearinghouse Review 301 W. Preston Street Suite 101 Baltimore, MD 21201	Mr. Jim Taylor Director, New Hampshire Office of Energy and Planning Attn: Intergovernmental Review Process 57 Regional Drive Concord, New Hampshire 03301-8519
Joyce Karger Department of Administration One Capitol Hill Providence, Rhode Island 02908-5870	Florida State Clearinghouse Department of Environmental Protection 3900 Commonwealth Blvd, M.S. 47 Tallahassee, Florida 32399-3000
Mr. Ken Koschek Office of Permit Coordination and Environmental Review PO Box 418 Trenton, NJ 08625-0418	Pennsylvania Department of Environmental Protection Policy Office Attention: John Dernbach Rachel Carson State Office Building, 15th Floor 400 Market Street Harrisburg, PA 17105-2063
Ms. Chrys Baggett State Environmental Policy Act Coordinator North Carolina State Clearinghouse 1301 Mail Service Center Raleigh, NC 27699-1301	Ms. Bonny Anderson State Clearinghouse Office of State Budget 1201 Main Street, Suite 950 Columbia, SC 29201
Ms. Barbara Jackson Georgia State Clearinghouse 270 Washington Street, SW, 8th Floor Atlanta, GA 30334	

Other State Environmental Agency Contacts	
Mr. George Lapointe Maine Department of Marine Resources 21 State House Station Augusta, ME 04333	Mr. Clay George Georgia Department of Natural Resources 1 Conservation Way Brunswick, GA 31523
Ms. Elsa Haubold Florida Fish and Wildlife Conservation Commission 100 Eigth Avenue, SE St. Petersberg, FL 33701	Mr. Eric Smith Connecticut Department of Environmental Protection 79 Elm Street Hartford, CT 06106
Mr. Tom Pitchford Florida Fish and Wildlife Conservation Comission 100 Eigth Avenue, SE St. Petersberg, FL 33701	Mr. Brad Winn GA Department of Natural Resources 1 Conservation Way Brunswick, GA 31523
Ms. Leslie Ward-Geiger Florida Fish and Wildlife Conservation Comission 100 Eigth Avenue, SE St. Petersberg, FL 33701	Ms. Susan Snow-Cotter Coastal Zone Management Program Executive Office of Environmental Affairs 251 Causeway Street, Suite 900 Boston, MA 02114
Mr. David Cupka South Carolina Department of Natural Resources Marine Resources Division 217 Ft. Johnson Road Charleston, SC 29422	Mr. Joe Pelzarski The Commonwealth of Massachusetts EOEA/ Office of Coastal Zone Management 251 Causeway Street, Suite 900 Boston, MA 02114
Non-Governmental Organizations	
Mr. Mark Stevens National Environmental Trust 1200 18th Street, Suite 500 Washington, DC 20036	Ms. Teri Shore Blue Water Network 311 California Street, Suite 510 San Francisco, CA 94104
Mr. Bradford Sewell Natural Resources Defense Council 40 West 20th Street New York, NY 10011	Mr. Mason Weinrich Whale Center of New England PO Box 159 Gloucester, MA 01931
Mr. Charles Shaw Senior Regional Executive Director National Wildlife Federation PO Box 12081 Raleigh, NC 27605	Mr. William Rossiter Cetacean Society International PO Box 953 Georgetown, CT 06829
Ms. Kyla Bennett New England Public Employees for Environmental Responsibility (PEER) PO Box 574 Northeaston, MA 02356	Ms. Sierra Weaver The Ocean Conservancy 2029 K Street Washington, DC 20006
Mr. Brendan Cummings Center for Biological Diversity PO Box 549 Joshua Tree, CA 92252	American Cetacean Society PO Box 1391 San Pedro, CA 90733-1391
Mr. Frederick O'Regan International Fund for Animal Welfare 411 Main Street Yarmouth Port, MA 02675	Mr. Andrew Hawley Defenders of Wildlife National Headquarters 1130 17th Street, NW Washington, DC 20036

Non-Governmental Organizations (Continued)	
Ms. Regina Asmutis-Silva Whale and Dolphin Conservation Society International Wildlife Coalition 70 East Falmouth Highway East Falmouth, MA 02536	Ms. Sharon Young The Humane Society of the United States 2100 L Street, NW Washington, DC 20037
Mr. Scott Kraus New England Aquarium Central Wharf Boston, MA 02110	Ms. Marilyn Marx New England Aquarium Central Wharf Boston, MA 02110
Mr. Jonathan R. Lovvorn Vice President, Animal Protection Litigation The Humane Society of the United States 2100 L Street, NW Washington, DC 20037	Ms. Amy Knowlton New England Aquarium Central Wharf Boston, MA 02110
Mr. Dan Morast Executive Director International Wildlife Coalition 70 East Falmouth Highway East Falmouth, MA 02536	Mr. Mike Senatore Vice President, Conservation Litigation Defenders of Wildlife 1130 17th Street, NW Washington, DC 20036
Ms. Cara Horowitz Project Attorney Natural Resources Defense Council 40 West 20th Street New York, NY 10011	Mr. Gerry Leape Vice President for Marine Conservation National Environmental Trust 1200 18th Street, Suite 500 Washington, DC 20036
Ms. Nina M. Young Director of Wildlife Conservation The Ocean Conservancy 2029 K Street Washington, DC 20006	Dr. Michael Hirshfield Vice President for North American Oceans – Oceana 2501 M Street, NW, Suite 300 Washington, DC 20037
Mr. Charles Mayo Provincetown Center for Coastal Studies 59 Commercial Street PO Box 1036 Provincetown, MA 02657	Mr. Chris Butler-Stroud Chief Executive Whale and Dolphin Conservation Society 70 East Falmouth Highway East Falmouth, MA 02536
Industry	
Mr. Edmund Welch Passenger Vessel Association 801 N. Quincy Street, Suite 200 Arlington, VA 22203	Mr. Don O'Hare/Doug Schneider World Shipping Council 1015 15th Street, NW Washington, DC 20005
Mr. Kurt Nagle Massachusetts Port Authority 1 Harborside Drive, Suite 200 East Boston, MA 02128	Mr. J.J. Keever Virginia Port Authority 600 World Trade Center Norfolk, VA 23510
Mr. Scott McNeil Suez LNG 1 Liberty Square, 10th Floor Boston, MA 02109	Mr. R.M. Larrabee / Mr. Joseph Monaco Port Authority of New York and New Jersey 225 Park Avenue South New York, NY 10003
Ms. Hope Moorer Georgia Ports Authority PO Box 2406 Savannah, GA 31402	Ms. Cindy Squires / Ms. Monita Fotaine National Marine Manufacturers Association 444 North Capitol Street, NW Washington, DC 20001

Industry (Continued)	
Mr. Arthur Moye Hampton Roads Maritime Association PO Box 3487 Norfolk, VA 23514	Mr. David Slocum Captain John Boats, Inc. Standish Avenue Plymouth, MA 02360
Mr. Thomas Eagar North Carolina State Ports Authority PO Box 9002 Wilmington, NC 28402	Mr. Bill Weisenborn Sea Star Line, LLC 8710 Longshore Way Jacksonville, FL 32226
Mr. Richard Meyer Boston Shipping Association, Inc. Charleston Navy Yard 197 8th Street, Suite 775 Charlestown, MA 02129	Ms. Meredith Martino American Association of Port Authorities 1010 Duke Street Alexandria, VA 22314
Ms. Holly Fergusson Tractaebel LNG NA LLC One Liberty Square Boston, MA 02109	Mr. Ross Pope Moran Shipping 88 Black Falcon Avenue, Suite 275 Boston, MA 02210
Ms. Mevelyn Fernandes Independent Container Line Ltd. 4801 Audobon Drive Richmond, VA 23231	Captain Bill Cofer Virginia Pilot Association 3329 Shore Drive Virginia Beach, VA 23451
Mr. Jeff Price Jacksonville Port Authority PO Box 3005 2831 Tallyrand Avenue Jacksonville, FL 32206	Captain Andrew Midgett Morehead Pilots Association 13 Raendell Street, Room 112 Morehead City, NC 28557
Mr. Charles E. Sultive Savannah Maritime Association 33 Bull Street, Suite 550 Savannah, GA 31401	Captain Joseph S. Murphy Massachusetts Maritime Academy 101 Academy Drive Buzzards Bay, MA 02532
Mr. Pat White Maine Lobstermen's Association 1 Pine Island York, ME 03909	Mr. Eric Neilsen Association of Maryland Pilots 3720 Dillion Street Baltimore, MD 21224
Mr. Walter Ege P&O Ports/Boston Shipping Association 1 Black Falcon Terminal PO Box 65 Boston, MA 02127	Captain Brad Wellock MASSPORT Maritime Division Fish Pier East II Northern Ave Boston, MA 02210
Mr. Tom Valleau North Atlantic Ports Association 65 Rockland Avenue Portland, ME 04102	Mr. Randy Weitman, PE Georgia Ports Authority PO Box 2406 Savannah, GA 31402
Ms. Heather Wood VA Port Authority 600 World Trade Center Norfolk, VA 23510	Ms. Jeannie Adame Port Canaveral PO Box 267 Cape Canaveral, FL 32920
Mr. Michael Getchell Marine Ops Manager Crowley Liner Services 9487 Regency Square Boulevard Jacksonville, Florida 32225	Mr. T.E. Thompson International Council of Cruise Lines 2111 Wilson Boulevard, 8th Floor Arlington, VA 22201

Industry (Continued)	
Ms. Angelia Walsh Port of Fernandina – Nassau Terminal PO Drawer 1543 Fernandina Beach, FL 32035	Mr. Kurt Nagle American Association of Port Authorities 1010 Duke Street Alexandria, VA 22314
Mr. Val Schwec Port of Fernandina – Nassau Terminals PO Drawer 1543 Fernandina Beach, FL 32035	Captain Jeffrey W. Monroe The City of Portland Department of Ports and Transportation Facility 40 Commercial Street, Suite 100 Portland, ME 04101
Mr. Joe Fannon South Atlantic and Caribbean Ports Association 545 Misthaven Court Suwanee, GA 30024	Captain Jeffrey W. Monroe North Atlantic Ports Association Inc. 65 Rockland Avenue Portland, ME 04102
Mr. Martin Moynihan Port of Richmond 5000 Deepwater Terminal Road Richmond, VA 23234	Mr. Malcolm E. McLouth Canaveral Port Authority PO Box 267 200 George King Boulevard Cape Canaveral, FL 32920
Mr. Earl B. Walker Shipping Services, Inc. PO Box 104 W. Southport, ME 04578	Mr. Whitemarsh S. Smith Charleston Branch Pilots' Association PO Box 179 Charleston, SC 29402
Captain David Callan Canaveral Pilots Association PO Box 816 Cape Canaveral, FL 32920	Mr. Joseph McKechnie Tractebel LNG North America One Liberty Square Boston, MA 02109
Ms. Bonnie Spinazzola Atlantic Offshore Lobstermen's Association 114 Adams Road Candia, NH 03034	Captain Steven Fox Admanthos Shipping Agency Inc. 3 Stamford Landing 46 Southfield Avenue, Suite 320 Stamford, CT 06902
Ms. Carol Lambos (on behalf of NYSA and USMX) 29 Broadway, 9th Floor New York, NY 10006	Ms. Kathryn Chambers FastShip, Inc. 1700 Market Street, Suite 2720 Philadelphia, PA 19103
Mr. Michael Leone Massachusetts Port Authority One Harborside Drive Suite 200 East Boston, MA 02128	Captain William Sherwood United NY and NJ Sandy Hook Pilots Benevolent Association 201 Edgewater Street Staten Island, NY 10305
Ms. Jennifer A. Carpenter The American Waterways Operators 801 North Quincy Street, Suite 200 Arlington, VA 22203	Captain Richard Schoelank United NY and NJ Sandy Hook Pilots Benevolent Association 201 Edgewater Street Staten Island, NY 10305
Mr. Edwin Fendig Brunswick Bar Pilot's Association 8 Glynn Avenue Brunswick, GA 31520	Mr. William C. Eldrige Peabody and Lane Corporation 100 Terminal Street Boston, MA 02129
Mr. Paul Kirchner American Pilots' Association 499 South Capitol Street, SW Suite 409 Washington, DC 20003	Captain Greg Farmer Boston Pilot Association Pier One S. Bremen Street East Boston, MA 02128

Industry (Continued)	
Ms. Kathy Metcalf Chamber of shipping of America 1730 M Street, NW, Suite 407 Washington, DC 20036	Mr. Andrew McGovern The Harbor Safety, Operations, and Navigation Committee of the Port of New York / New Jersey 201 Edgewater St. Staten Island, NY 10305
Mr. Chip Briscoe Cross Sound Ferry 2 Ferry Street New London, CT 06320	Mr. Doug Schneider World Shipping Council 1015 15th Street, NW Washington, DC 20005
Individuals	
Mr. Doug Nowacek Florida State University 1015 West Call Street Tallahassee, FL 32306	Mr. James Corbett University of Delaware 212 Robinson Hall Newark, DE 19716
Mr. Jeremy Firestone Graduate College of Marine Studies University of Delaware 212 Robinson Hall Newark, DE 19716	Mr. Hans Neuhauser 380 Meigs Street Athens, GA 30601
Media	
Ms. Connie Barclay 1315 East-West Highway Room 14501 Silver Spring, MD 20910	Ms. Teri Frady NMFS/NEFSC 166 Water Street Woods Hole, MA 02543

8 LIST OF PREPARERS

This Environmental Impact Statement was prepared by:

Earth Tech, Inc.
675 N. Washington Street, Suite 300
Alexandria, Virginia 22314

Key personnel included:

Laurent Cartayrade, Environmental Planner: 7 years of experience in environmental planning. University of Paris IV-Sorbonne, 1984, BA; University of Maryland-College Park, 1991, MA, History; 1997, PhD, History.

Karen M. Coghlan, Public Affairs Specialist/Senior Editor: 40 years of experience in communication and in managing communication-oriented projects. Douglas College, Rutgers, the State University of New Jersey, 1965, BA, English.

Penelope Douglas, Environmental Planner: 35 years of experience in environmental and natural resources planning, and environmental impact assessment. University of Michigan, 1970, BS, Natural Resources Planning; University of Maryland, 1985, MA, Geography/Environmental Analysis.

Mark A. Ethridge, Senior Policy Analyst: 28 years of experience in energy and environmental policy analysis. University of Arizona, 1974, BA, Political Science; George Washington University, 1982, MA, Energy Policy; George Washington University, 1992, MS, Environmental Science.

Jessica A. Gribbon, Project Manager, Environmental Planner: 2 years of experience in environmental planning with an emphasis on marine and endangered species policy, and previous working experience with NMFS Office of Protected Resources. University of Miami, 2003, BA, Marine Affairs and Policy, UM/Rosenstiel School of Marine and Atmospheric Science, 2004, MA, Marine Affairs and Policy.

Gary Moore, Senior Environmental Scientist: 30 years of experience in air quality modeling including preparation of emissions data, meteorological modeling, air chemistry modeling, and statistical analyses of aerometric and model outputs. Massachusetts Institute of Technology, Cambridge MA, 1977, MS in Meteorology.

Harriet Nash, Environmental Planner, Marine Biologist: 5 years of experience in fishery biology, coastal management, and preparing environmental impact documentation. Georgetown University, 1995, BS, Biology; Duke University, 2001, MEM, Coastal Environmental Management.

J. Lane Willson, Project Director: 25 years of active military duty in the U.S. Navy, afloat as a Surface Line Officer and ashore in environmental compliance, program and budgeting, and policy. Post Navy, 5 years as senior program manager, environmental planning and preparation of environmental impact documentation. Auburn University, 1974, BS, Transportation; Marymount University, 1988, MBA, Finance.

Kari E. Wilson, Technical Editor: More than 4 years of professional experience as a scientific and technical writer and editor in various business and publishing fields such as law codification; information technology; facilities; and major academic, reference, and science publications. Southern Illinois University, 2001, BA, English.

National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, MD 20910

NOAA Coordinators:

Greg Silber, Coordinator, Large Whale Recovery Activities: National Marine Fisheries Service (NMFS), Office of Protected Resources, Silver Spring, MD.

Michael Payne, [Former] Division Chief, Marine Mammal and Sea Turtle Conservation Division, NMFS, Office of Protected Resources, Silver Spring, MD.

Donna Wieting, Deputy Director, Office of Protected Resources, NMFS, Silver Spring, MD.

Michelle McGregor, Economist, Office of Protected Resources, NMFS, Silver Spring, MD.

Deborah Ben-David, General Counsel for Fisheries, NMFS, Silver Spring, MD.

Shannon Bettridge, Fishery Biologist, Office of Protected Resources, NMFS, Silver Spring, MD.

Other NOAA participants:

Barb Zoodsma, Southeast Right Whale Recovery Program Coordinator: NMFS, Southeast Region, Protected Resources Division, FL.

Lance Garrison, Research Fishery Biologist, Acting Marine Mammal Team Leader: NMFS, Southeast Fisheries Science Center, Protected Resources Division, Miami, FL.

Richard Merrick Ph.D., Chief, Protected Species Branch: NMFS, Northeast Fisheries Science Center, Wood's Hole, MA.

David Gouveia, Marine Mammal Coordinator: NMFS, Northeast Region, Protected Resources Division, Gloucester, MA.

Kristen Koyama, Northeast Ship Strike Coordinator: NMFS, Northeast Region, Protected Resources Division, Gloucester, MA.

Kathryn Bisack, Operations Research Analyst: NMFS, Northeast Fisheries Science Center, Wood's Hole, MA.

Nathan Associates, Inc.
2101 Wilson Boulevard
Suite 1200
Arlington, VA 22201

Key personnel included:

Richard B. Blankfeld, Economist: 27 years of experience in conducting studies of maritime and other transportation policies and investments. Boston University, 1978, MA, Economics; Boston University, 1978, BA, Economics and Mathematics.

Paul E. Kent, Economist: 25 years experience in the field of ports and maritime transportation. Central Scientific Institute for Water Transport Economics and Operations, Moscow, Russia, 1999, Ph.D.; University of New Orleans, Master of Science in Urban Studies (M.S.U.S.), 1984; West Virginia University, 1977, Master of Public Administration (M.P.A.); West Virginia University Political Science, 1976, BA.

John S. Ramirez, Economist: 4 years experience in the field of quantitative economics and statistics. The Johns Hopkins University, May 2005, MS, Applied and Computational Mathematics; George Mason University, 2000, BS, Economics; George Mason University, 2000, BA, History.

APPENDIX A

Sovereign Vessels

This Page Intentionally Left Blank

Sovereign Vessels

Sovereign vessels, which are owned and operated by the US Federal government, include, but are not limited to, Navy, United States Coast Guard (USCG), and United States Army Corps of Engineers (USACE) vessels. These vessels would be exempt from the measures contained in the Strategy due to operational necessity and the respective agencies' ongoing efforts to reduce ship strikes. Any Federal agency or service that operates vessels 65 feet (ft) (19.8 m) and greater within right whale habitat (and is exempt from the Strategy) would be expected to consult under Section 7 of the Endangered Species Act. As Section 7 consultations are not an operational measure of the Strategy, they are not included in the main text of the draft environmental impact statement (DEIS). However, this appendix gives a brief summary of current mitigation measures and previous Section 7 consultations for the exempted entities. This appendix does not go into detail on the current and future impacts of sovereign vessels on right whales, nor any current or future Section 7 consultation details as this measure is not an operational measure within of the scope of the DEIS.

U.S. Navy Mitigation Measures

The Navy completed Section 7 consultations with the National Marine Fisheries Service (NMFS) in 1997 for vessel operations in the southeastern US. NMFS issued a biological opinion (BO) following this consultation and the Navy has since implemented recommended measures from this BO along the entire US East Coast. These measures include the following:

- Annual message prior to calving season (December 1–March 30).
- Limit east-west transiting through right whale critical habitat and areas of concern where practical.
- Vessel speed limitations within critical habitat and areas of concern. (Captains are advised to "use extreme caution and use slow safe speed," that is the slowest speed consistent with essential mission, training, and operations.
- Operations in critical habitat and areas of concern are limited to daylight and periods of good visibility, to the extent practicable and consistent with mission, training, and operation.
- Posting two lookouts (one trained in marine mammal identification) while operating in critical habitat and other areas of concern.

In addition to the mitigation measures from the Section 7 consultations, the Navy implemented the following regional protective measures:

Northeast (Fleet message in June 2002)

- Ships transiting Great South Channel and Cape Cod Bay critical habitats check into the mandatory ship reporting system (MSRS) for latest sighting data.
- Ships approaching these areas of high concentration "shall use extreme caution and operate at a safe speed."

- Additional speed restrictions are required when a whale is sighted within 5 nm of a reported location, if the sighting is less than one week old.
- The same lookout requirements as the Southeast.

Mid-Atlantic (Fleet message in December 2004)

- Utilizes the mid-Atlantic ports and dates proposed by the National Oceanic and Atmospheric Administration (NOAA) as seasonal management areas (SMAs).
  - South and east of Block Island (Sept–Oct/Mar–Apr)
  - New York/New Jersey (Sept–Oct/Feb–Apr)
  - Delaware Bay (Oct–Dec/Feb–Mar)
  - Chesapeake Bay [Hampton Roads] (Nov–Dec/Feb–Apr)
  - North Carolina (Dec–Apr)
  - South Carolina (Oct–Apr)
- Ships operating within 20 nautical miles (nm) arcs of these ports "shall use extreme caution and operate at a slow safe speed that is consistent with mission and safety."
- Increased vigilance with regard to avoiding vessel/whale interactions along mid-Atlantic coast including ports not specified.
- The same lookout requirements as the Southeast.

The Navy is also involved with the Early Warning System (EWS) and contributes funding to the EWS survey flights. The Navy's communication and reporting network is coordinated through the Fleet Area Control and Surveillance Facility (FACSFAC). They distribute right whale sighting information to the Department of Defense (DoD) and the civilian shipping industry.

Naval Vessels

The major Navy homeports on the US East Coast include, but are not limited to, Charlestown, Massachusetts, with 1 vessel; Portsmouth, New Hampshire, with 2 vessels; a submarine base in Groton, Connecticut, homeport to 15 vessels; Little Creek amphibious base in Virginia, with 15 vessels; Norfolk, Virginia, with 59 vessels; Kings Bay, Georgia, with 8 vessels; and Mayport, Florida, with 19 vessels.[1] In addition, the US Military Sealift Command operates 28 vessels in the Atlantic (Russell, 2001).

Navy Vessel Traffic

Navy vessels account for about 3.0 percent of vessel traffic out to 200 nm (Filadelfo, 2001). A study was conducted from February 2000 to January 2001 comparing levels of Navy and commercial ship traffic. Commercial shipping data was obtained from the Historical Temporal Shipping (HITS) Database and Navy ship traffic on the East Coast was obtained from the CINCLANTFLT operations center through reviewing daily snapshots of the locations of all LANTFLEET ships. Both fleets were sampled every five

[1] 'List of Homeports' (As of August 19, 2005)
http://www.chinfo.navy.mil/navpalib/ships/lists/homeport.html

days. Commercial traffic density along the East Coast averaged about 202 ships within 50 nm of the coast, and the average steadily increased to 266 within 100 nm, and 358 within 200 nm. The total number of Navy ships on the east coast within 200 nm was 12 at any given time (Filadelfo, 2001).

In terms of spatial distribution, commercial ship traffic is relatively uniform along the coast, with certain concentrations around major port areas. Navy ships however have very non-uniform distribution, depending on exercises (Filadelfo, 2001).

Noise

Quieter Navy warships radiate significantly less noise than fishing vessels (~160 dB), and the loudest Navy ships are close to the range for supertankers (~173 dB) (Filadelfo, 2001).[2] Using the results from the Navy traffic density analysis, the 12 ships present on average from Maine to Florida out to 200 nm, would radiate approximately 1–2 watts of acoustic power to the ocean.[3] In contrast, the estimated 358 commercial ships present in the same area would, on average, radiate about 40 times that of the Navy ships. Therefore, the Navy contributes a small percentage of noise to the ocean at around 2.5 percent. While large concentrations of Navy ships may occasionally increase traffic density and radiate higher levels of acoustic energy during large-scale fleet exercises, in general, the Navy is not a major contributor to traffic or noise (Filadelfo, 2001).

U.S. Coast Guard Mitigation Measures

These mitigation measures are contained in the BOs from the Section 7 consultation process with NMFS (see Section 1.8.3 for an overview of the three BOs). Mitigation measures contained in the 1995 BO include the following:

- Establishing a marine mammal and endangered species program in the First District (Maine to Tom's River, New Jersey), Fifth District (Tom's River through North Carolina), and Seventh District (South Carolina through Florida).
- Developing a Memorandum of Agreement and Memorandum of Understanding with NMFS.
- Developing and providing protected species training for USCG personnel.
- Continuing notices/broadcasts to mariners in right whale critical habitat areas.
- Supporting NMFS emergency efforts in responding to strandings.
- Implementing the protocol/guidelines recommended by the Right Whale Recovery Plan Implementation Teams.
- Participating in the Right Whale EWS; current guidelines in the protocol for the EWS are as follows:

[2] These noise estimates exclude submarines and any noise from sonar.
[3] These comparisons refer only to broadband noise in the 500 Hz center frequency.

1. In Florida and Georgia, a designated lookout must be posted on USCG vessels at all time between December 1 and March 31 when these vessels are operating in the vicinity of channels, near shore areas where humpback and right whales occur, and in other areas of the southeastern US that have been designated as critical habitat for right whales. USCG vessel operators must take the following precautions to avoid whales: All USCG vessels within a 15 nm or greater radius of a right whale sighting must operate at the slowest safe speed possible (except when the nature of the mission, such as emergency response, precludes slow speeds), exercise caution, and keep watch for right and humpback whales. During evening/nighttime hours or when there is limited visibility due to fog or sea states of greater than Beaufort 3, vessels must operate at the slowest safe speed possible (except as previously noted) when transiting between areas that whales have been spotted within 15 nm within the previous 24 hours.

2. Between March 1 and May 30, when right whales are concentrated in the vicinity of right whale critical habitat in the Great South Channel and Cape Cod Bay, a dedicated lookout must be posted on USCG vessels to watch for whales during all vessel operations. This includes reducing the speed of all vessels transiting these areas during this period in response to all non-emergency operations.

Additional conservation recommendations requested by NMFS are included in this BO. These recommendations and the USCG's implementation status are detailed in the following section.

USCG implementation of Conservation Recommendations identified in the 1996 BO includes the following:

1. Between January 1 and March 31, all USCG vessels operating in waters between Cape Henry and Cape Hatteras (Fifth District) have lookouts posted that are tasked with watching for whales at all times and use notice to mariners, broadcasts, and NAVTEX as appropriate. This tasking is specified in the Marine Mammal and Endangered Species Program which was provided in the original BO and is implemented in the Fifth District.

2. In addition to posting dedicated observers on vessels in the southeastern critical habitat area over the calving season, NMFS recommended that dedicated observers also be posted on all USCG vessels operating in the general area between Savannah, Georgia, and Palm Beach, Florida, to watch for whales during critical months. This recommendation was fully implemented by the Seventh District.

3. The terms "maximum safe speed" for emergency operations and "proportional to the mission" for standard operations currently convey that the mission goals supersede the safety of protected species. NMFS recommended that the USCG's standard operating procedures should be revised to incorporate protection for endangered and threatened species where they occur in conjunction with USCG

operations. The current guidance contained in the standard operating procedures for all three Districts did provide specific information regarding speed in critical habitat areas. The guidance document in the First District was revised in April 1996 and will be followed by the Fifth and Seventh Districts. The USCG standard operating procedures now implement the measures in Conservation Recommendation three by placing the safety of protected species on par with mission requirements during emergency operations and make the safety of protected species a primary factor during non-emergency operations.

4. NMFS recommended that the USCG should ensure that its lookouts are trained in techniques required to spot marine mammals and sea turtles. The First District has formally developed a course curriculum on marine mammal protection that is used at the Northeast Regional Fisheries Training Center. The Fifth district units invited NMFS personnel and local stranding network organizations to participate in local training sessions.

5. NMFS recommended that the USCG transmit broadcasts reporting right whale sightings by the EWS as quickly as possible over NAVTEX or other means in Georgia and Florida from mid-December through March. The message should advise mariners within 15 nm of the sighting to operate at the slowest safe speed, exercise caution, and keep watch for right whales. In response, the Fifth District began aerial surveys over critical habitats in Cape Cod Bay and the Great South Channel in 1996 and includes a notification to mariners. The Seventh District conducted surveys and broadcasts during the calving season in the Southeast during 1996.

6. NMFS recommended that the USCG should develop training for personnel that emphasizes not only stranding and enforcement issues, but information on the distribution and behavior of these species that will help the USCG to anticipate where and when conflicts may occur. This recommendation was incorporated into the implementation of Conservation Recommendation four.

7. NMFS recommended that when and where possible, routine transits should avoid those high-use and high-density whale habitat areas during the seasons when whales are concentrated in those areas. All USCG units are instructed to avoid high-use and high-density areas “whenever practical.”

8. Per NMFS recommendation, the First and Seventh District are fully participating in the Recovery Plan Implementation Teams. However, the teams are not currently involved in issues directed at the mid-Atlantic area, and the Fifth District has not participated in the other implementation team activities.

9. NMFS recommended the USCG continue fulfilling its mission, with modifications as previously discussed, which fully support recovery efforts of protected species. The USCG addressed this recommendation under the specific numbers previously listed and will continue to support recovery through additional means.

10. NMFS recommended that during standard operations, and following a whale sighting, USCG vessels should maintain a minimum distance from the whale (minimum of 100 yards). This recommendation was implemented through the updated guidance document in all three districts and specifies “100 yards if practical.”

The remaining conservation measures, 11 through 14 had not been fully implemented at the time of the BO as they addressed activities that affected endangered species and areas other than the right whale and its habitat, which was a priority.

The Reasonable and Prudent Alternative issued in this BO expand on current Conservation Recommendations and add several new measures. A summary of the alternatives includes:

1. Implement all conservation measures that concern endangered whales from the September 1995 BO.
2. Post dedicated lookouts during all transits within 20 nm of shore that are in areas with high whale concentrations.
3. All dedicated lookouts must successfully complete a marine mammal lookout training program.
4. All three of the East Coast Districts must continue current activities in conjunction with the respective Recovery Plan Implementation Teams to provide support for aerial surveys.
5. Issue speed guidance for vessels to clearly require use of the “slow safe speed” standard.
6. Participate in investigating, testing, and implementing technological solutions to prevent ship strikes.
7. Adopt a vessel approach guideline of 500 yards for right whales and 100 yards for all other whales.
8. Provide information on whales to commercial and recreational vessel operators that is geared towards avoiding collisions with endangered whales.
9. Provide timely information on current whale locations to commercial vessels coming into major ports within the critical habitat in the Northeast and Southeast US.
10. Complete Section 7 consultation on USCG permitting before the final rule is issued.
11. Coordinate with NMFS and other agencies on a proposal to the International Maritime Organization (IMO) that requests two MSR systems along the East Coast of the US.

The 1998 BO includes the following conservation recommendations:

1. Initiate Gulf of Mexico and marine event consultations within six months of receiving this BO.
2. USCG will assist in identification of floating whale carcasses and assistance in both marking and retrieving of that carcass if it is a right whale.
3. USCG should periodically review compliance with the speed guidance it has issued.
4. A “Job Aid” has been prepared to provide USCG stations with information that will assist personnel in getting the best information for efforts required under the Law Enforcement Guidance that implement the Atlantic Protected Living Marine Resources Initiative.
5. Evaluate USCG authorities to identify more aggressive opportunities to reduce the threat of ship strikes of endangered large whales, both by USCG and commercial ship traffic.
6. If approved by the IMO, USCG would support the implementation of the MSR systems.
7. USCG should work with NMFS and other agencies to develop information on critical habitat, marine sanctuaries, and endangered species migration routes, feeding and breeding areas for use by mariners and boaters.
8. USCG should assess mission requirement like full power trials so they can be scheduled during times of year and in areas where and when they present the least hazard to endangered and threatened species.
9. USCG First District should continue to support the EWS and other sighting programs.
10. USCG should continually update and revise its training courses for USCG lookouts.

USCG Vessels

The USCG Atlantic fleet patrols waters along the East Coast in response to marine pollution events, port safety and security issues, law enforcement efforts, search and rescue missions, vessel traffic control, and maintenance of aids to navigation. Most of these operations occur in waters less than 20 miles from the shore.

U.S. Army Corps of Engineers–Mitigation Measures

Biological Opinions

The USACE has engaged in a number of ESA Section 7 consultations on local actions involving harbor dredging and related activities in the Southeast US. The consultations did not find that these actions are likely to adversely affect right whales, although mitigation measures were included in the BOs to lessen the likelihood of an interaction between right whales and vessels. The USACE began consulting with NMFS on the effects of hopper dredging in the Canaveral Ship Channel in Florida in 1978. Consultations for dredging in the southeastern US were reinitiated in 1980, 1986, 1991, 1995, and most recently in 1997. While these BOs focus on threatened and endangered sea turtles, they also address potential impacts on whales; and right whale mitigation measures were developed from the reasonable and prudent measures listed in these BOs.

The 1991 BO was the first cumulative area consultation between NMFS and the USACE regarding hopper dredging in channels along the southeastern Atlantic seaboard from North Carolina through Canaveral, Florida. These activities have the potential to result in interactions between hopper dredges and right whales; therefore, several reasonable and prudent measures were developed in this BO to reduce the impacts on whales:

1. Endangered species observers (with at sea large whale identification experience) are required on dredges from December 1 to March 31st in Georgia and northern Florida to maintain surveys for the occurrence of right whales during transit between channels and disposal areas. Whale sightings must be documented in an annual report to NMFS.

2. Aerial surveys that initiated in Kings Bay, Georgia, are required to continue in accordance with the Right Whale EWS surveys, which are funded in part by the USACE. Dredging within right whale critical habitat from December to March must follow the protocol established within the EWS.

3. Whales that are observed by aerial and shipboard surveys are individually identified and counted, along with cow/calf pairs, and the movements and distribution of the whales is noted.

4. During evening hours or when there is limited visibility due to fog or sea states of greater than Beaufort 3, the dredge must slow down to 5 knots or less when transiting between areas if whales have been spotted within 15 nm of the vessel's path within the previous 24 hours. During daylight hours, the dredge operator must take necessary precautions to avoid whales.

USACE operators and contractors operating in the area from North Carolina to Pawleys Island, South Carolina; Pawleys Island to Tybee Island, Georgia; and Tybee Island to Titusville, Florida, are required to adhere to these measures. There are additional measures for reducing sea turtle takes, although these are outside the scope of the EIS.

There have also been several Section 7 consultations with the USACE in the Northeast. In 2000, NMFS consulted with USACE Baltimore office on the Assateague State Park Nourishment Project. NMFS completed a BO in 2002 on dredging in the Thimble Shoal Federal Navigation Channel and Atlantic Ocean Channel for the USACE Norfolk office. In 2003, a consultation reinitiated on maintenance dredging in the Cape Henry Channel, York Split Channel, York River Entrance Channel, and Rappahoannock Shoal Channel, Virginia. In general, the resulting opinions from these consultations have concluded that the potential for a whale-vessel interaction is unlikely to occur either due to the project location or the slow speed at which dredges operate. Nevertheless, these consultations included similar conservation measures to those described above for the dredging activities in the Southeast. The conservation measure is as follows: "When whales are present in the action area, vessels transiting the area should post a bridge watch, avoid intentional approaches closer than 100 yards (or 500 yards in the case of right whales) when in transit, and reduce speeds to below 4 knots."

Cape Cod Canal

The USACE Marine Traffic Controllers have partnered with NOAA in support of the Northeast Region Right Whales Sighting Advisory System. These duties include communicating known whale locations of right whales to vessel masters transiting the Cape Cod Canal, and protecting whales from vessel traffic when they occasionally are found in the canal.

A memorandum of understanding (MOU) was signed by the USACE in March 2004 to formalize ongoing efforts between NMFS and the Cape Cod Canal Office. These efforts include:

1. Alerting ships' masters of right whale locations as provided by NMFS when right whales are spotted in areas where Canal traffic may transit. Such alerts to include right whale sightings in Cape Cod Bay and the SBNMS should be given to all eastbound canal traffic. Such alerts to include right whale sightings in Rhode Island and Block Island Sounds and off Long Island should be given to westbound canal traffic. Westbound traffic reporting to the Traffic Controllers at the east approach channel (CCB Buoy) should also be given alerts for right whale sightings in the southwest quadrant of Cape Cod Bay.

2. Alerts shall be given to all vessels 65 feet and greater.

3. Providing reasonable protection and separation of vessel traffic from right whales within the canal and within the east or west approach channels.

4. Contributing to mariner's awareness of the potential for collisions with whale by including information about right whales and guidance on actions to protect right whales in a separate page of the Cape Cod Canal Tide Tables.

This Page Intentionally Left Blank

APPENDIX B

Notice of Intent (NOI) to prepare an EIS and Written Scoping Comments

This Page Intentionally Left Blank

Dated: June 16, 2005.

P. Michael Payne,

Acting Deputy Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 05–12342 Filed 6–21–05; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 060804F]

Endangered Fish and Wildlife; National Environmental Policy Act; Right Whale Ship Strike Reduction Strategy Notice of Intent to Prepare an Environmental Impact Statement and Conduct Public Scoping

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of intent; request for written comments.

SUMMARY: NMFS intends to prepare an Environmental Impact Statement (EIS) to analyze the potential impacts of implementing the operational measures in NOAA's Right Whale Ship Strike Reduction Strategy (Strategy). This notice describes the proposed action and possible alternatives intended to reduce the likelihood and threat of right whale deaths as a result of collisions with vessels.

DATES: Written or electronic comments must be received no later than 5 p.m., eastern standard time, on July 22, 2005. At this time there are no scheduled scoping meetings.

ADDRESSES: Written comments, or requests to be added to the mailing list for this project, should be submitted to: P. Michael Payne, Chief, Marine Mammal and Sea Turtle Conservation Division, Attn: Right Whale Ship Strike EIS, Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910. Comments may also be submitted via fax to (301) 427–2522, Attn: Right Whale Ship Strike EIS, or by e-mail to: *Shipstrike.comments@noaa.gov*. Include in the subject line the following identifier: I.D. 060804F.

Additional information including the Environmental Assessment (EA) and the economic analysis report used in the preparation of the EA are available on the NMFS website at *http://www.nmfs.noaa.gov/pr/shipstrike/*.

FOR FURTHER INFORMATION CONTACT: Greg Silber, Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910; telephone (301) 713–2322, e-mail *greg.silber@noaa.gov*; or Barb Zoodsma, Southeast Regional Office, NMFS, 263 13th Avenue South, St. Petersburg, FL 33701; telephone (904) 321–2806, e-mail *barb.zoodsma@noaa.gov*.

SUPPLEMENTARY INFORMATION:

Background

The abundance of North Atlantic right whales is believed to be fewer than 300 individuals despite protection for half a century. The North Atlantic right whale is also considered one of the most endangered large whale populations in the world. Recent modeling exercises suggest that the loss of even an individual animal has measurable effects that may contribute to the extinction of the species (Caswell et al., 1999). The models also suggests that preventing the mortality of one adult female a year significantly alters the projected outcome.

The two most significant human-caused threats and sources of mortality to right whales are entanglements in fishing gear and collisions with ships (Knowlton and Kraus, 2001; Jensen and Silber, 2003). Collisions with ships (referred to as ship strikes) account for more confirmed right whale mortalities than any other human-related activity. Ship strikes are responsible for over 50 percent of known human-related right whale mortalities and are considered one of the principal causes for the lack of recovery in this population. Right whales are located in, or adjacent to, several major shipping corridors on the eastern U.S. and southeastern Canadian coasts.

NMFS has implemented conservation measures to reduce the likelihood of mortalities as a result of ship strikes. These activities include the use of aerial surveys to notify mariners of right whale sighting locations, interagency collaboration with the U.S. Coast Guard (USCG) which issues periodic notices to mariners regarding ship strikes, joint operation with the USCG of Mandatory Ship Reporting (MSR) systems to provide information to mariners entering right whale habitat, support of regional Right Whale Recovery Plan Implementation Teams, support of shipping industry liaisons, and consultations with other Federal agencies regarding the effects of their activities on right whales (under section 7 of the Endangered Species Act). However, right whales continue to sustain mortalities as a result of collisions with vessels despite the efforts of these programs.

NMFS recognizes that this complex problem requires the implementation of additional proactive measures to reduce or eliminate the threat of ship strikes to right whales. The goal of the Strategy is to reduce, to the extent practicable, the distributional overlap between ships and right whales. The Strategy allows for regional implementation and accommodates differences in oceanography, commercial ship traffic patterns, navigational concerns, and right whale use. Implementation of the Strategy will require proposed and final rulemaking to be taken.

Purpose of this Action

NEPA requires Federal agencies to conduct an environmental analysis of their proposed actions to determine if the actions may significantly affect the human environment. NMFS is considering a variety of measures, including regulatory and non-regulatory initiatives. NMFS may implement the operational measures of the Strategy through its rulemaking authority pursuant to the Marine Mammal Protection Act (MMPA). Under MMPA section 112(a) (16 U.S.C. 1382(a)), NMFS has authority, in consultation with other Federal agencies to the extent other agencies may be affected, to "prescribe such regulations as are necessary and appropriate to carry out the purposes of [the MMPA]." In addition, NMFS has authority under the Endangered Species Act to promote conservation, implement recovery measures, and enhance enforcement to protect right whales. NMFS is seeking public input on the scope of the required National Environmental Policy Act (NEPA) analysis, including the range of reasonable alternatives, associated impacts of any alternatives, and suitable mitigation measures.

On June 1, 2004, NMFS published an Advanced Notice of Proposed Rulemaking (ANPR) (69 FR 30857) and announced its intent to prepare a draft EA to address the potential impacts of implementing the Strategy. The EA considered the context and intensity of the factors identified in NOAA's NEPA guidelines and regulations, along with short- and long-term, and cumulative effects of a No Action Alternative and the proposed action (see **ADDRESSES**). The analysis concluded that the effects of the proposed action on the human environment are likely to be highly controversial. This finding was based on the controversial nature of the Strategy on the human environment and the possible cumulative effects of the proposed action on certain sectors within the maritime industry. The major controversy concerns the potential economic impacts on the commercial shipping industry. Further, the EA concluded that individual impacts of the proposed action may be insignificant but the cumulative impacts on the shipping industry may be significant. As a result, the cumulative effects on the environment as a result of implementing this action, including the alternatives proposed by this action, are considered significant. Therefore, an EIS is the appropriate level of environmental analysis for the proposed action under NEPA, not an EA. This is consistent with NEPA regulations at section 1501.4(c). This notice announces NMFS's intent to prepare an EIS expanded from the EA to analyze the potential impacts of implementing the operational measures in NOAA's Right Whale Ship Strike Reduction Strategy. This notice describes the proposed action and several possible alternatives intended to reduce the likelihood and threat of mortalities caused by ship strikes.

Scope of the Action

The Draft EIS is expected to identify and evaluate all relevant impacts and issues associated with implementing the Strategy, in accordance with Council on Environmental Quality's Regulations at 40 CFR parts 1500, 1508, and NOAA's procedures for implementing NEPA found in NOAA Administrative Order (NAO) 216–6, Environmental Policy Act, dated May 20, 1999.

NMFS is proposing to implement the operational measures in the Strategy within each of three broad regions: (a) the southeastern Atlantic coast of the U.S., (b) the Mid-Atlantic coastal region, and (c) the northeastern Atlantic coast of the U.S.

The implementation of operational measures, and the specific times and areas (with boundaries) in which the measures would be in effect, are expected to vary within and between each region. However, each region would contain specific elements to reduce the threat of ship strikes to right whales. The operational measures proposed in the alternatives apply to non-sovereign vessels 65 ft (19.8 m) and greater in length. The operational measures do not apply to vessels operated by Federal agencies or the military. Any potential effects of Federal vessel activities, and mitigation, will be evaluated through the Endangered Species Act section 7 consultation process for all alternatives. A more detailed description of the operational measures proposed for each region are in the ANPR (June 1, 2004; 69 FR 30857).

That notice describes the proposed action and possible alternatives intended to reduce the likelihood and threat of mortalities caused by ship strikes pursuant to requirements under NEPA. In particular, the Draft EIS is intended to identify potential impacts to human activities that occur as a result of the proposed action and its alternatives.

The areas of interest for evaluation of environmental and socioeconomic effects will include the territorial sea and the Exclusive Economic Zone off the east coast of the U.S. and international waters in the North Atlantic Ocean.

Public Involvement and the Scoping Process

Public participation in the Strategy has been encouraged through several methods including soliciting public comments on the ANPR and holding public meetings, industry stakeholder meetings, and other focus group meetings. NMFS has been working with state and other Federal agencies, concerned citizens and citizens groups, environmental organizations, and the shipping industry to address the ongoing threat of ship strikes to right whales. NMFS' intent is to encourage the public and interest groups to participate in the NEPA process, including interested citizens and environmental organizations, affected low-income or minority populations or affected local, state and Federal agencies, and any other agencies with jurisdiction or special expertise.

NMFS published the ANPR for Right Whale Ship Strike Reduction in the **Federal Register** on June 1, 2004 (69 FR 30857) and provided a comment period to determine the issues of concern with respect to the practical considerations involved in implementing the Strategy and to determine whether NMFS was considering the appropriate range of alternatives. Comments were received from over 5,250 governmental entities, individuals, and organizations, and can be accessed at the NMFS website (see **ADDRESSES**). These comments were in the form of e-mail, letters, website submissions, correspondence from action campaigns (e-mail and U.S. postal mail), faxes, and a phone call.

NMFS extended the comment period to November 15, 2004 (September 13, 2004; 69 FR 55135) to provide for an extended series of public meetings on the ANPR and this topic in general. Five public meetings on the ANPR were held in the following locations: Boston, MA, at the Tip O'Neill Federal Building (July 20, 2004); New York/New Jersey at the Newport Courtyard Marriot (July 21, 2004); Wilmington, NC, at the Hilton Riverside Wilmington (July 26, 2004); Jacksonville, FL, at the Radisson Riverwalk Hotel (July 27, 2004); and Silver Spring, MD, at NOAA Headquarters Science Center (August 3, 2004). Public comments were requested at these meetings and transcribed for the public record. Also, nine industry stakeholder meetings were held to explain the ANPR at the following locations: Boston, MA (September 30, 2004); Portland, ME (October 1, 2004); Norfolk, VA (October 4, 2004); Morehead City, NC (October 6, 2004); Jacksonville, FL (October 13, 2004); Savannah, GA (October 14, 2004); New London, CT (October 20, 2004); Newark, NJ (October 25, 2004); and Baltimore, MD/Washington, DC (October 27, 2004). A summary report of these meetings and a list of the attendees are posted on the internet at *http://www.nero.noaa.gov/shipstrike*.

NMFS also held two focus group discussion meetings with participants from non-governmental organizations, academia, and Federal and state government agencies. The first meeting was held in Silver Spring, MD on September 26, 2004, and the second meeting was in New Bedford, MA on November 5, 2004.

The comments on the ANPR focused primarily on several broad topics including: speed restrictions, vessel size and operations, speed and routing issues specific to regions, routing restrictions (Port Access Routes Study [PARS] and Areas To Be Avoided [ATBA]), safety of navigation, suggestions for alternative or expanded dates for operational measures, military and sovereign vessel exemptions, enforcement, and compliance.

Alternatives

NMFS will evaluate a range of alternatives in the Draft EIS for developing a final Strategy to reduce mortality to right whales due to ship strikes based on a suite of possible mitigative measures contained in each of the elements of the overall Strategy. The following alternatives are being considered based on comments received on the ANPR and during the public meetings: Alternative 1, a no-action alternative; Alternative 2, Use of Dynamic Management Areas (DMAs); Alternative 3, Speed Restrictions in Designated Areas; Alternative 4, Use of Designated or Mandatory Routes; Alternative 5, Combination of Alternatives 1, 2, 3 and 4; and Alternative 6, NOAA Ship Strike Strategy.

For all speed restrictions being considered under an alternative, NMFS expects to consider 10, 12, and 14 knots in the analyses. Other variations or additional alternatives may be developed based on significant issues raised during this public scoping period. The probable environmental, biological, cultural, social and economic consequences of the alternatives and those activities that may cumulatively impact the environment are expected to be considered in the Draft EIS.

Alternative 1 - No Action (Status Quo): Under this alternative NMFS would continue to implement existing measures and programs, largely non-regulatory, to reduce the likelihood of mortality from ship strikes. Research would continue and existing technologies would be used to determine whale locations and pass this information on to mariners. Ongoing activities under this alternative would include the use of aerial surveys to notify mariners of right whale sighting locations; the operation of Mandatory Ship Reporting Systems; support of Recovery Plan Implementation Teams; education and outreach programs for mariners; and ongoing research on technological solutions. The development, enhancement, and implementation of the draft Education and Outreach Strategy would continue in coordination with the Recovery Plan Implementation Teams. The alternative would also rely on Endangered Species Act section 7 consultations to address, and mitigate the potential effects of, the activities of vessels operated by government agencies. Additionally, efforts will continue to identify technologies that will mitigate or prevent ship strikes to right whales but that would impose minimal or no environmental impacts.

Alternative 2 - Use of DMAs: A second alternative under consideration would incorporate the elements of Alternative 1 with additional measures to implement DMAs. The DMA component of this alternative would be implemented ONLY when right whale sightings occur.

Under this alternative there would need to be a commitment to continuing aircraft surveillance coverage. If confirmed right whale sightings occur, a DMA would be specified and mariners would have the option of either routing around the DMA or to proceed within the DMA at restricted speeds. NMFS is considering various models for whale density required to trigger a DMA action; the current default is the same criteria used for the Atlantic Large Whale Take Reduction Plan (ALWTRP) Dynamic Area Management fishing restrictions. Consecutive DMAs would be imposed if trigger thresholds persist. If subsequent flights confirm the whales are no longer aggregated in this location, the DMA would be lifted.

Alternative 3 - Speed Restrictions in Designated Areas: This alternative includes all elements of Alternative 1 and implements large-scale speed restrictions throughout the range of northern right whales. Restrictions would apply as follows:

1. Speed restrictions year round off the northeast U.S. coast. This area would include either (1) all waters bounded on the east by the U.S. coastline, the west by 68° W longitude, the north by the U.S./Canadian border and the south by 41°30′ N latitude, or (2) all waters in the area used by Seasonal Area Management (SAM) zones as designated in the ALWTRP;
2. Speed restrictions from October 1 through April 30 off the U.S. mid-Atlantic coast. This area would include all waters extended from U.S. coastline out 25 nm from Providence/New London (Block Island Sound) south to Savannah, Georgia.
3. Speed restrictions from December 1 through March 31 off the Southeast U.S. This area would include all waters within the MSR WHALESSOUTH reporting area and the presently designated right whale critical habitat.

Alternative 4 - Use of Designated or Mandatory Routes: This alternative includes all the elements of Alternative 1 and relies on altering current vessel patterns to move vessels away from areas where whales are known to aggregate in order to reduce the likelihood of a mortality due to a ship strike.

This alternative also creates an ATBA in the Great South Channel as described in NOAA's ANPR, and considers recommendations of a PARS by the USCG. At present the PARS analysis is assessing possible lane changes in Cape Cod Bay and waters off the Southeast U.S. The alternative also will analyze the possibility of moving the Traffic Separation Scheme into/out of Boston to avoid high density aggregations of whales at the northern end of Cape Cod Bay and Stellwagen Bank.

Alternative 5 - Combination of Alternatives: This alternative includes all elements of Alternatives 1 - 4. The cumulative effects of Alternative 5 would be the additive effects of each of the previous alternatives.

Alternative 6 - NOAA Ship Strike Strategy: This alternative includes all the operational measures identified in the NOAA Ship Strike Strategy. The principal difference between Alternative 5 and 6 is that Alternative 6 does not include large-scale speed restrictions (as identified in Alternative 3) but instead relies on speed restrictions in much smaller Seasonally Managed Areas as identified in the NOAA Ship Strike Strategy.

Comments Requested

NMFS provides this notice to: advise the public and other agencies of the NOAA's intentions, and obtain suggestions and information on the scope of issues to include in the EIS. Comments and suggestions are invited from all interested parties to ensure that the full range of issues related to this proposed action and all significant issues are identified. NMFS requests that comments be as specific as possible. In particular, the agency requests information regarding: the potential direct, indirect, and cumulative impacts resulting from the proposed action on the human environment. The human environment could include air quality, water quality, underwater noise levels, socioeconomic resources, and environmental justice.

Comments concerning this environmental review process should be directed to NMFS (see **ADDRESSES**). See **FOR FURTHER INFORMATION CONTACT** for questions. All comments and material received, including names and addresses, will become part of the administrative record and may be released to the public.

Authority

The environmental review of the Ship Strike Strategy will be conducted under the authority and in accordance with the requirements of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), National Environmental Policy Act Regulations (40 CFR 1500–1508), other appropriate Federal laws and regulations, and policies and procedures of the Services for compliance with those regulations.

Literature Cited

Caswell, H., M. Fujiwara, and S. Brault. 1999. Declining survival probability threatens the North Atlantic right whale. Proc. Nat. Acad. Sci. 96:3308 3313.

Jensen, A.S., and G.K. Silber. 2003. Large whale ship strike database. U.S. Dep. Commerce, NOAA Technical Memorandum NMFS-F/OPR 25, 37 p.

Knowlton, A.R., and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. Jour. Cetacean Res. and Manag. (Special Issue) 2:193 208. Russell, B.A. 2001.

Dated: June 16, 2005.

P. Michael Payne

Chief, Marine Mammal and Sea Turtle Conservation Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 05–12352 Filed 6–21–05; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 061405C]

Atlantic Coastal Fisheries Cooperative Management Act Provisions; Application for Exempted Fishing Permit Related to Horseshoe Crabs

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; request for comments.

SUMMARY: NMFS announces that the Director, Office of Sustainable Fisheries, is considering issuing an Exempted Fishing Permit to Limuli Laboratories of Cape May Court House, NJ, to conduct the fifth year of an exempted fishing operation otherwise restricted by regulations prohibiting the harvest of horseshoe crabs in the Carl N. Schuster Jr. Horseshoe Crab Reserve (Reserve) located 3 nautical miles (nm) seaward from the mouth of the Delaware Bay. If granted, the EFP would allow the harvest of 10,000 horseshoe crabs for biomedical purposes and require, as a condition of the EFP, the collection of data related to the status of horseshoe crabs within the Reserve. This notice also invites comments on the issuance of the EFP to Limuli Laboratories.

DATES: Written comments on this action must be received on or before July 7, 2005.

ADDRESSES: Written comments should be sent to John H. Dunnigan, Director, Office of Sustainable Fisheries, NMFS, 1315 East-West Highway, Room 13362, Silver Spring, MD 20910. Mark the outside of the envelope ''Comments on Horseshoe Crab EFP Proposal.'' Comments may also be sent via fax to (301) 713–0596. Comments on this notice may also be submitted by e-mail to: *Horseshoe-Crab.EFP@noaa.gov*. Include in the subject line of the e-mail comment the following document identifier: Horseshoe Crab EFP Proposal.

FOR FURTHER INFORMATION CONTACT: Tom Meyer, Fishery Management Biologist, (301) 713–2334.

SUPPLEMENTARY INFORMATION:

Background

The regulations that govern exempted fishing, at 50 CFR 600.745(b) and 697.22, allow a Regional Administrator or the Director of the Office of Sustainable Fisheries to authorize for limited testing, public display, data collection, exploration, health and safety, environmental clean-up and/or hazardous removal purposes, the targeting or incidental harvest of managed species that would otherwise be prohibited. Accordingly, an EFP to authorize such activity may be issued, provided: there is adequate opportunity for the public to comment on the EFP application, the conservation goals and objectives of the fishery management plan are not compromised, and issuance of the EFP is beneficial to the management of the species.

The Reserve was established on March 7, 2001 to protect the Atlantic coast stock of horseshoe crabs and to support the effectiveness of the Atlantic States Marine Fisheries Commission's (Commission) Interstate Fishery Management Plan (ISFMP) for horseshoe crabs. The final rule (February 5, 2001; 66 FR 8906) prohibited fishing for and possession of horseshoe crabs in the Reserve on a vessel with a trawl or dredge gear aboard while in the Reserve. While the rule did not allow for any biomedical harvest or the collection of fishery dependent data, NMFS stated in the comments and responses section that it would consider issuing EFPs for the biomedical harvest of horseshoe crabs in the Reserve.

The biomedical industry collects horseshoe crabs, removes approximately 30 percent of their blood, and returns them alive to the water. Approximately 10 percent do not survive the bleeding process. The blood contains a reagent called *Limulus* Amebocyte Lysate (LAL) that is used to test injectable drugs and medical devices for bacteria and bacterial by-products. Presently, there is no alternative to the LAL derived from horseshoe crabs.

NMFS manages horseshoe crabs in the exclusive economic zone in close cooperation with the Commission and the U.S. Fish and Wildlife Service. The Commission's Horseshoe Crab Management Board met on April 21, 2000, and again on December 16, 2003, and recommended to NMFS that biomedical companies with a history of collecting horseshoe crabs in the Reserve are given an exemption to continue their historic levels of collection not to exceed a combined harvest total of 10,000 crabs annually. In 2000, the Commission's Horseshoe Crab Plan Review Team reported that biomedical harvest of up to 10,000 horseshoe crabs should be allowed to continue in the Reserve given that the resulting mortality should be only about 1,000 horseshoe crabs (10 percent mortality during bleeding process). Also in 2000, the Commission's Horseshoe Crab Stock Assessment Committee Chairman recommended that, in order to protect the Delaware Bay horseshoe crab population from over-harvest or excessive collection mortality, no more than a maximum of 20,000 horseshoe crabs should be collected for biomedical purposes from the Reserve. In addition to the direct mortality of horseshoe crabs that are bled, it can be expected that more than 20,000 horseshoe crabs will be trawled up and examined for LAL processing. This is because horseshoe crab trawl catches usually include varied sizes and sexes of horseshoe crabs and large female horseshoe crabs are the ones usually selected for LAL processing. The remaining horseshoe crabs are released at sea with some unknown amount of mortality. Although unknown, this mortality is expected to be negligible.

Collection of horseshoe crabs for biomedical purposes from the Reserve is necessary because of the low numbers of horseshoe crabs found in other areas along the New Jersey Coast from July through early November and because of the critical role horseshoe crab blood plays in health care. In conjunction with the biomedical harvest, NMFS is considering requiring that scientific data be collected from the horseshoe crabs taken in the Reserve as a condition of receiving an EFP. Since the Reserve was first established, the only fishery data from the Reserve were under EFPs issued to Limuli Laboratories for the past four years, and under Scientific Research Activity Letter of Acknowledgment issued Virginia Polytechnic Institute and State University's Department of Fisheries and Wildlife Science on September 4, 2001 (for collections from September 1–October 31, 200l), on September 24, 2002 (for collections from September 24–November 15, 2002), on August 14, 2003 (for collections from September 1–October 31, 2003), and on September 15, 2004 (for collections from September 15–October 31, 2004). Further data are needed to improve the understanding of the horseshoe crab population in the Delaware Bay area and to better manage the horseshoe crab resource under the cooperative state/Federal management program. The data collected through the EFP will be provided to NMFS, the

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
1	Supports Alternative 6 as the minimum threshold for protection.	Acknowledged[1]
2	NOAA/NMFS should return to interagency process to resolve policy issues identified in a joint USCG/Dept. of State letter dated November 10, 2004.	Outside the scope of DEIS[2]; NOAA has resumed the interagency process since the publication of the NOI and continues to consult with other agencies.
	Alternatives should be consistent with domestic and international policy concern and proposed alternatives in the NOI could affect interrelated issues such as: Effects on freedom of navigation, application to foreign flag vessels in innocent passage, and gaining international awareness and acceptance; and Means of enforcing speed restrictions and routing measures on the open seas and, correspondingly, determining whether and ensuring the measures being considered are effective.	These issues are being discussed through the interagency process.
	Interagency discussions should be part of the scoping process to ensure that all reasonable alternatives are analyzed in the EIS and that the EIS adequately presents justification for each alternative's viability.	Acknowledged
3	The USCG passenger vessel data is incomplete and only captures a fraction of actual arrivals; this may be due to differing definitions of "passenger vessel" and "small passenger vessel" in the United States Code, or that most US-flagged passenger vessels have tonnage below 100 gross tons, which were below the USCG threshold.	The USCG database does not capture vessels less than 150 gross tons.
	Consider using the National Ferry Database (US DOT) as an additional source of passenger vessel arrivals	This database was utilized in the economic analysis for the DEIS
	Draft EA's treatment of the whale watching industry contains no statistics regarding the number of operators, number of vessels, or economic value of this industry. The EIS should include information on the number of affected whale watching vessels and the economic impacts on the industry.	The DEIS includes a complete analysis of the number of affected whale watching vessels and the economic impact.
	Conduct interviews with ferry operators to discuss the possible impacts of the proposed operational measures and analyze the potential for large impacts on particular ferry companies or routes.	Stakeholder interviews were conducted as a part of the economic impact assessment. (Also see Section 4.4.5.2)
	EIS should analyze the impacts on smaller (200 passengers or below) overnight cruise vessels that are in coastwise service along the east coast.	If these vessels are captured in the USCG vessel arrival database, then they will be analyzed in the DEIS under passenger vessels.
4	Supports Alternative 6 as a minimum for the protection and survival of right whales.	Acknowledged
5	Supports Alternative 6 as the most appropriate alternative to affect the most significant range of vessel activities likely to impact right whales	Acknowledged

[1] Acknowledged indicates that NMFS considered the comment, but did not believe a response was warranted.
[2] If a response is outside the scope of the DEIS, it is generally specific to the language/measures in the proposed rule, and not the DEIS, which only analyzes these measures.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
6	Reinitiate the interagency ship strike reduction dialogue to facilitate productive discussion on the overall Strategy with the involved federal agencies.	Outside scope of DEIS; NOAA has resumed the interagency dialogue with the involved Federal agencies.
	Substitute the following language [in clarifying sovereign vessels]: Operational measures do not apply to public vessels. Public vessel means a vessel that is owned or operated by the United States, or a foreign government, when the vessel is used on government non-commercial service. Public vessels include warships, naval auxiliaries, USNS vessels, afloat prepositioned force ships, pre-commissioned vessels, and other vessels owned or operated by the United States when engaged in non-commercial service.	NMFS provides language to clarify sovereign (or Federal) vessels in the proposed rule.
	Consider addition of a new alternative that expands the use of existing conservation measures to the Mid-Atlantic region with no adoption of regulatory measures.	This alternative was considered but rejected as it would not provide sufficient protection to migrating right whales.
	Clarify the effects analysis in the No Action Alternative.	Analyzed in Ch.4
	The scope of the EIS should be clarified such that the "Scope of Action" mirrors the draft EA/OEA and the summary description provided in the Federal Register.	Acknowledged
	EIS should delete any evaluation of section 7 consultation by other agencies from the scope of the defined alternatives.	The DEIS does not evaluate Section 7 consultation as the process is outside the scope of the DEIS, although previous consultations are described in Appendix A.
	The EIS must fully describe the very limited nature of the data from which the proposed 12-knot speed restriction is derived, and ensure that the effectiveness of this measure in reducing right whale collisions is clearly assessed using best available science.	Additional data has become available since the EA was posted, and these data have been incorporated into the DEIS, along with a description of existing data.
	There is no discussion in the EA allowing for the discretion on the part of the master if safety is an issue.	NMFS is aware of navigational safety as it pertains to the measures being proposed. Public health and safety and vessel maneuverability are also mentioned in the DEIS.
	There is no description of how this speed is to be defined; engine order telegraph, vessel's speed along its track, or speed through the water?	Speed restrictions will be a function of "ground speed".
	There was little explanation indicating how 12 knots was decided upon.	The DEIS will analyze 10, 12, and 14 knots, and the proposed and final rules will identify and provide justification for the maximum speed.
	Given the sparse nature of data concerning ship speed and right whale collisions, and the lack of reaction generally displayed when approached by a ship the assumption that 12 knots will be protective and reduce hydrodynamic forces that draw the whale into the ship or propeller does not seem warranted.	Policies regarding speed restrictions are based on the best available data. The DEIS and proposed rule reflect this.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
6 (Continued)	The assumptions that right whales might not hear ships because high frequency propeller noise is outside their best hearing range and that machinery noise would not be projected forward of the ship are problematic. Although some high frequency tonals may not be perceived, the lower frequency components of the broadband radiated noise are within the estimated best frequency of right whales.	Most ship noise is probably well within the hearing range of right whales. The factors that contribute to right whale vulnerability to ship strikes are not well known, but hearing range is probably not one of them. Refer to the sections on right whale hearing and ocean noise in Chapter 3.
	Provide the synopsis presented in the NEIT/SEIT meetings that gives a more comprehensive description of the Navy's protective measures. Also note the percentage of coastal traffic the Navy comprises, to provide perspective.	The DEIS provides a comprehensive description of current Navy mitigation measures using information from these meetings. The percentage of Navy vessel traffic was also added; see Appendix A.
7	The comprehensive measures included in Alternatives 5 and 6 have the best chance of meeting this criteria and complying with the ESA and MMPA.	Acknowledged
	NMFS should examine carefully in the DEIS the impact on right whales of delaying implementation of protective measures.	Outside the scope of the DEIS.
	Agrees that NMFS has both the authority and the obligation to take immediate measures to protect this imperiled marine mammal.	Acknowledged
	The objections raised by affected economic sectors through the ANPR and public outreach processes, while not trivial, do not present sufficient justification for NMFS to limit right whale protections.	Acknowledged
	Commenter urges NMFS to carefully consider the scope of its regulations in the DEIS and clearly identify effective measures for recreational vessels throughout all three regions.	Acknowledged
	The purpose and need of the proposed action must be defined to encompass the requirements of the MMPA and ESA, and the consideration of alternatives should be structured accordingly.	Acknowledged
	Commenter supports the use of Dynamic Management Areas to overlay additional protections where more consistent management, either seasonal or year round, is insufficient or impractical; they are insufficient by themselves. (Applicability and enforcement of these measures should be made explicit in any proposed regulations involving dynamic management.)	Acknowledged
	The commenter strongly endorses the immediate creation of a speed limit of 10 knots in the areas and during the times NMFS has identified in the NOI. They also endorse year-round restrictions in the broader geographic scope detailed in Alternative 3, although Alternative 3 alone does not present a comprehensive approach necessary to ensure right whale protection.	The DEIS analyzes 10, 12 and 14 –knot speed restrictions for all alternatives.
	Mandatory shipping routes are insufficient by themselves and must be included as part of a comprehensive strategy to protect right whales.	Routing measures are analyzed in alternatives 4, 5, and 6. Alternatives 5 and 6 combine routing measures with additional measures.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
7 (Continued)	The ship strike strategy (Alternative 6) may need to be modified or supplemented to provide sufficient protections for right whales.	Alternative 6 has been modified from the original version published in the NOI.
	Enforcement for routing, speed restrictions, dynamic management areas as well as the MSR system, should be thoroughly explored by the agency, explained in detail, and presented for public comment in any proposed rule.	Enforcement is outside the scope of the DEIS; any comments on enforcement will be addressed in the final rule.
	It is essential that NMFS undertake and update ESA Section 7 consultations for large sovereign vessels not covered by the Strategy in order to ensure compliance with the ESA for those other agencies.	Section 7 consultations commence at the action agency's discretion and are outside the scope of the DEIS.
8	The ESA is clear that cost is not a threshold consideration when weighing measures to protect endangered species, and the act remains relatively blind to cost when the survival of a species is at stake. Therefore, NMFS must provide meaningful protection measures for the species regardless of the resulting economic costs.	The proposed operational measures would be promulgated pursuant to NMFS' authorities under ESA section 11(f) and MMPA section 112(a). Under these provisions, NMFS has discretion in how it fashions protective measures for right whales, including taking into account ways to minimize economic and other impacts.
	There is also an economic incentive to preserving the species. The multi-million dollar whale watching industry in the US and Canada could be adversely affected by the continual decline in right whales. The aesthetic and spiritual value of preserving a healthy right whale population should also be evaluated in the EIS.	Acknowledged
	Commenter believes that [Alternative 2] dynamic management is an important component of an overarching risk-reduction program; in and of itself, it is not sufficient to reduce risk. They are also concerned with the timeliness of DMA implementation and stated that the EIS should evaluate whether or how this can be done on a more timely bases for reducing risk from ship collisions.	Acknowledged; analyzed in Alternative 2, 5 & 6.
	Speed restrictions [Alternative 3] are an important component of risk reduction as they allow more time for both the whale and the mariner to avoid collision and can reduce the force of impact in the event of a collision, but the commenter does not believe that they are sufficient in and of themselves as a means reducing risk.	Acknowledged; analyzed in Alternatives 3, 5 & 6.
	Routing [Alternative 4], like dynamic management and speed restrictions, needs to be part of a larger program of risk reduction that incorporates a number of strategies to reduce risk.	Acknowledged; analyzed in Alternatives 4, 5 & 6.
	Commenter generally supports Alternative 5 provided these measures encompass all of the additional measures outlined in the NOAA ship strike strategy and include expanded protection measures.	Acknowledged.
	A speed limit of 10 knots appears to be the most protective.	Acknowledged

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
8 (Continued)	Commenter is concerned that sovereign vessels are exempt; therefore the EIS should evaluate the impact of exempting these vessels.	Sovereign vessels are exempt from the operational measures, therefore it is outside the scope of the EIS to evaluate the impact of their exemption.
9	NMFS must make every effort to implement these regulations as soon as possible.	Acknowledged
	NMFS must also address the steps needed to ensure the effective enforcement of these regulations, including making sufficient resources available and developing and implementing new technologies.	See response to comment 7.
	Commenter recommends that the Coast Guard join as a co-author in this rulemaking process, so that these regulations are specifically incorporated into its enforcement regime. If the USCG does not join as a co-author of these regulations, then NMFS should enter into a Memorandum of Agreement with the USCG detailing each entity's enforcement authority and the division of the administrative burden.	The USCG has been an active partner in reducing the threat of ship strikes, as participants in recovery plan implementation teams, and an interagency working group. The USCG has prepared a Port Access Routes Study to assess a number of proposed ship strike reduction measures. However, the proposed regulations will be promulgated under NMFS' ESA/MMPA authorities.
	While issues of economic impact of these regulations must be addressed through the NEPA process, these, and other similar considerations, must give way so that the right whale may receive the required level of protection. See TVA v. Hill, 437 US 153, 174 (1978) (concluding that is it "beyond doubt that Congress intended endangered species to be afforded the highest of priorities.")	NMFS is seeking to obtain the greatest protection for right whales while at the same time minimizing economic impacts. Also see response to comment 8.
	Arguments that the regulatory measures will lead to shipping delays and economic losses…are directly at odds with the underlying intent of the ESA, which was enacted to reverse the trend of species being driven to extinction as "the consequence of economic growth and development untempered by adequate concern and conservation." 16 USC. § 1531	NMFS is attempting to promote recovery of right whales by reducing the threat of ship strikes. At the same NMFS is seeking to minimize economic impacts.
	Commenter recommends regulations cover all vessels under the jurisdiction of the US measuring 65 ft and greater. However, an exemption could be created for those sovereign vessels operation pursuant to parameters established in a Biological Opinion issued by NMFS.	The operational measures apply to all vessels under the jurisdiction of the US, except vessels owned or operated by, or under contract to, the Federal government. A number of Federal agencies are already operating under mitigation measures from a Biological Opinion (see Appendix A).
	Commenter believes that while a DMA system should be implemented as a management tool, given the systems obvious limitations it should not be relied upon in lieu of uniform seasonal management measures, but rather, should augment them.	Acknowledged; analyzed in Alternatives 5 & 6.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
9 (Continued)	When developing a system to prevent ship strikes, NMFS cannot base the trigger criteria on one particular type of whale behavior, but rather, must establish a system that will identify whales at a high risk of being involved in whale-vessel interaction.	Additional DMA triggers were developed for the alternatives to account for whales at a high risk of being struck by a vessel.
	Alternative 3 does not go far enough to protect the species; while the temporal and geographic scope of the speed restrictions are substantial, they would not protect whales that are found outside of management areas at other times of the year	Acknowledged; analyzed in proposed alternatives.
	Noting the shortcomings addressed in comments submitted on the ANPR, the commenter considers the regulatory measures outlined in Alternative 6 to be the bare minimum necessary to protect the right whale. They recommend that NMFS make the necessary changes and additions to the regulatory framework proposed in the ANPR before the EIS is commenced.	Alternative 6 has been modified since the ANPR and NOI.
10	The liner shipping industry operates 'strings' of vessels, mostly containerships, on regular day-of-the-week schedules to a fixed range of ports in the US and abroad. A delay to one vessel can impact not only that vessel's schedule, but also the schedules of other vessels in the string.	Impacts on multi-port vessel strings are analyzed in Sections 4.4.2.
	Vessel operating costs are considerably higher in 2005 than the 2002 estimates.	The most current data available (2004 and 2005) is used in the DEIS to make these assessments.
	Cost estimates in the EA for speed reduction measures are based on time/distance/speed conversions in the restricted zones and do not take into account additional costs such as extra fuel burned at sea to maintain schedules.	All direct and indirect impacts are assessed in the DEIS. Fuel is incorporated into the operating costs, described in Section 3.4.1.4.
	Costs associated with bypassing scheduled ports to maintain schedules are considerable and need to be examined in the EIS.	These impacts are analyzed in the Indirect Impacts, Section 4.4.3.
	Commenter does not believe the data support a reduction in ship strikes at a 12 knot speed restriction, and strongly supports hydrodynamic studies.	Several research papers provide supporting evidence for speed restrictions (e.g. Laist et al., 2001; Jensen and Silber, 2003; Pace and Silber, 2005; Vanderlaan and Taggart, in review) and are discussed in the DEIS. NOAA is also considering hydrodynamic studies.
	The EIS should contain a full review of the role of Naval and Coast Guard vessels in efforts to reduce right whale ship strikes.	Current Navy and USCG protection measures are described in the DEIS, Appendix A.
	Commenter supports Alternatives 2 and 4	Acknowledged
11	The EIS should very clearly articulate the proposed management measures that would apply to each port/region in order to allow a complete understanding of the restrictions being considered. Of particular concern is the incomplete description of Dynamic Management Areas. The EIS should summarize the details associated with DMA implementation and information on restrictions that would have resulted using sighting data over the most recent 5 years.	The DEIS (e.g. Ch.2 – Alternatives) describes the measures proposed in each alternative by region. The details of DMA implementation are summarized in Alternative 2 and the proposed rule.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
11 (Continued)	A full economic impact assessment should be conducted on each port affected by the regulations and included in the EIS. It should consider direct costs incurred by the shipping lines as a result of the delays, the indirect costs the industry and the regional economy, and the economic implications and job losses associated with temporary and permanent vessel diversions that will likely result.	Ch.4 provides an analysis of the impacts on each port, the direct costs to the shipping lines, collectively, and the economic implications that may result will be analyzed in the socioeconomic section.
	If the proposed regulations cause ships to temporarily or permanently divert from one port to another, it will result in a shift of cargo movement along the eastern seaboard from vessels to trucks. This will result in air quality and traffic impacts along an already highly congested corridor, much of which is already in non-compliance for various air contaminants. These and other secondary environmental impacts should be fully evaluated and quantified for each region in the EIS.	Foreseeable indirect environmental impacts are analyzed in Section 4.4.3 of the DEIS.
	Commenter strongly opposes mandating a specific speed limit without any scientific bases that it will be effective, particularly with the knowledge that speed restrictions will cause economic impacts and that a 10 to 13 knot limit may not allow for the safest operation of a vessel. Prior to proceeding with the EIS, the necessary studies must be conducted.	Data indicate that ship speeds of 12 knots or less would reduce the risk of whale death and serious injury resulting from collisions with ships. The USCG has implemented speed restrictions of 10 knots or less; these speeds apparently do not affect maneuverability in most circumstances.
	NMFS should work with the maritime industry and initiate whatever studies are necessary to fully explore technological solutions (GPS, AIS) to providing mariners with real time locations for right whales.	NMFS has and will continue to work with the maritime industry. Technological solutions are being researched through NOAA grants, although technological solutions are not included in the operational measures.
	Commenter urges NMFS to dedicate significant resources toward research and development of the potential technological solutions such as acoustic/sonar detection systems.	Outside the scope of the DEIS.
	The EIS should fully evaluate all potential alternatives to speed and route restrictions and compare them with the proposed regulatory measures.	Analyzed in the Chapter 2: Alternatives.
12	Commenter supports the EIS process and encourages NMFS to evaluate the economic impact that the strategy would have not only on vessel operators, but also on marine terminal operators, maritime labor organizations, local pilots, shippers and other potentially affected entities.	Foreseeable effects on local economies, including port-related jobs, are analyzed in Section 4.4.3. However, as delays from speed restrictions in SMAs will be known months in advance, there should be minimal, if any, landside impacts.
13	The evaluation should include an economic analysis of the impacts to ship call schedules, cargo handling and distribution operation, pilot and tug operations, and other maritime transportation related activities. In addition, the impact of the proposed alternatives on the regional economies served by the affected ports should be addressed.	See response to comment 12.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
14	The economic and public safety consequences of the proposed restrictions could be substantial for [Suez liquefied natural gas North America (SLNGNA)], [Distrigas of Massachusetts (Distrigas)] and the customers it serves.	The economic impacts of the proposed restrictions on LNG vessels is analyzed in the cumulative impacts section 4.7.3.1. NMFS is not aware of any public safety issues posed by the proposed regulations.
	For vessel port calls into Boston, MA, the proposed restrictions could also delay the deployment of resource-constrained public safety, immigration and customs officials, severely hindering SLNGNA's ability to meet very strict tide limitations for transits into Boston, bridge closure restrictions in Chelsea, and nighttime transit restrictions in Boston Harbor. If vessels are delayed in arriving at Boston, SLNGNA will be subject to substantial market risk due to day-to-day market fluctuations.	Impacts on the shipping industry in the port of Boston are included in Section 4.4 and other effects, including tide limitations are addressed in the cumulative effects analysis (Section 4.7.3).
	Vessels inbound to Cove Point, MD face nighttime transit restrictions, as well as eight-hour transit, thus making the discharge window extremely tight. Vessels are required to arrive at the Cape Henry Pilot Station at least eight hours prior to dusk or must wait until the following day to transit. Delays occasioned by the proposed regulations, [in addition to the abovementioned restrictions] especially if DMAs are employed, could cause SLNGNA to miss scheduled load dates as well as subsequent discharge dates.	Restrictions will be known ahead of time, allowing captains time to plan accordingly. Transits may be increased but mariners will have sufficient information for most spatial restrictions prior to planning their routes and can compensate accordingly. (Sections 4.4 and 4.7.3)
	As a further consequence of the proposed restrictions, the number of cargoes shipped by SLNGNA annually could potentially be reduced. Therefore it is critical that the cumulative impacts of the proposed operational measures, including the significant impacts to the natural gas supply for New England, be critically evaluated during the scoping and EIS processes.	See previous response to comment 14. However, impacts on the natural gas supply for New England is outside the scope of the DEIS.
15	The scope of the EIS should include the potential impact of the proposed measures on marine terminal operating costs and total logistical costs, in addition to the costs to vessel operators. This would ensure that an appropriate assessment of the socioeconomic impacts on port communities was undertaken.	See response to comment 12.
16	The EIS process should not interfere with immediately taking the necessary steps to protect right whales as required by the ESA and MMPA. Courts have been quite clear on this (See Appendix A, comment 16 for case citations). Pac. Legal Found. v. Andrus, held that NEPA compliance should not interfere with agency's compliance with ESA. US v. South Florida Water Mgmt. Dist., noted that NEPA should not be used to frustrate actions to benefit the environment and that and EIS could proceed concurrent with action. Sierra Club v. Marsh, found that "[i]t would be inconsistent with NEPA's purposes" to allow a party to "obstruct implementation" of a government action "which will protect endangered species."	The situation of the North Atlantic right whale is serious, and ship strikes are the principal threat. NMFS determined that the petition for emergency rulemaking was not warranted because promulgating a speed limit at that time would curtail full public notice, comment and environmental analysis, duplicate agency efforts and reduce agency resources for a more comprehensive strategy, as well as risk delaying implementation of the draft Strategy.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
16 (Continued)	The NOI cites solely the potential economic impacts of implementing the Strategy as the reason for conducting the EIS. As NMFS must surely be aware, economic impacts alone are not sufficient grounds for conducting an EIS. E.g., County of Seneca v. Cheney, and Knowles v. United States Coast Guard.	Under the "Purpose of this Action", the NOI also cites NEPA requirements to conduct environmental analysis.
17	The commenter does not agree that speed restrictions should be mandated for vessels transiting ports on the US East Coast without having substantially more scientific data on which to base this decision.	See response to comments 10 and 11.
	The EIS final rulemaking should state that the safety and steerage of the vessel has been considered as a primary concern.	Both the DEIS and the proposed rule addresses ships' maneuverability.
	The economic study included in the draft EA should be updated and should include long-term projections of impacts based on the future fleet anticipated to call on the US East Coast. The proposed restrictions will result in delays, diversions and bypasses that will directly affect the economic strength of individual ports and port communities, as well as the shipping industry.	The economic study has been updated and expanded in the DEIS. However, the DEIS does not include quantitative long-term future projections, NEPA analysis is based on the most recent available data.
	Savannah has additional restrictions imposed by the USCG on transits associated with LNG vessels.	Analyzed in Chapter 4.7.3, Cumulative Impacts.
	The commenter believes that current measures such as the Early Warning System, aerial surveys and outreach and educational efforts by NMFS are working, and until there is proof that the proposed strategy will result in better protection or that reduced speeds can be proved to reduce collisions with ships, the commenter does not support the strategy.	See Section 1.3 in reference to the effectiveness of current measures. With respect to speed restrictions, see responses to comments 10 and 11.
18	The proposed action identified in the NOI to prepare an EIS will, if ever actually implemented, be inadequate to protect the critically endangered right whale from ship strikes. Drafting and circulation of a DEIS, taking public comments, responding to such comments, preparing the FEIS, issuing proposed and final rules, and finally, implementing the requirements of any final rule will take, at a minimum several months or several years to accomplish.	NMFS believes the proposed action will reduce the threat of ship strikes to North Atlantic right whales, and is adhering to review and comment processes required by law.
	The commenter urges NMFS to take immediate actions and issued an emergency regulation consistent with Marine Mammal Commission recommendations to protect right whales from ship strikes pending the completion of the EIS and notice and comment rulemaking.	This petition for emergency rulemaking was denied in the Federal Register (70 FR 56884, September 29, 2005).
	Commenter does not understand why NMFS is not even considering as an alternative applying the rulemaking to federally owned or operated vessels. NMFS should initially apply their general rulemaking to all vessels; following specific agency consultations, agencies could then perhaps seek modification of such rules to better match their specific operational requirements.	See response to comment 8.
	With regard to the NMFS preferred alternative, the commenter does not understand why NMFS is declining to apply "large-scale speed restrictions" in favor of seasonal restrictions in "Seasonally Managed Areas". NMFS should instead impose year-round speed restrictions covering all areas in which right whales might be found throughout the year, and seasonal speed restrictions only in those areas in which right whales are only found for portions of the year.	Proposed operational measures will apply at times and locations in which co-occurrence of whale and ship densities are highest. The SMAs are based on right whale sighting data that indicate the time of the year the whales are present.
19	Application of plan to recreational vessels over 65 feet is unsupported and unreasonable. The	NMFS considered and rejected exempting

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
	commenter does not understand and opposes NMFS rationale for applying any new management measures to recreational boats that are 65 feet or more, and recommends that NMFS not apply its management measures to recreational vessels of any length.	recreational vessels. There have been several reported instances (1-southeastern US, 1-South Africa) where recreational vessels over 65 feet have struck and injured whales. In March 2005, a recreational vessel struck a right whale, and resulted in severely lacerated tail flukes.
	NMFS must consider the impacts of its proposals to the boaters and the businesses, such as marinas, boat dealers and repair shops, restaurants, etc., that support them.	Acknowledged
	Any new management measures must be designed and implemented with the full involvement and approval of the USCG. NMFS should begin interagency consultations with the USCG before going further on any proposed measures.	See response to comment 9.
	The commenter supports the No Action Alternative, unless and until recreational boats are excluded from these new management measures and until NMFS works with the Coast Guard to develop proposals that adequately take into account the potential impacts on vessel safety and homeland security.	See response to comment 19 with respect to application of the proposed rule to recreational vessels. NMFS works regularly with the USCG on proposed actions, including its preparation of a Port Access Route Study to assess navigational safety. Federal agency vessels, including those of the US armed forces engaged in national defense of homeland security activities are exempt from the measures.
20	Prior assessments have addressed economic impacts to vessel operators calling at East Coast ports but the impacts to port operators and other members of the maritime community operating in these ports have not been thoroughly evaluated. The evaluation should include an economic analysis of the impacts to ship call schedules, cargo handling and distribution operations, pilot and tug operations, and other maritime transportation related activities.	See response to comment 12.
	The impact of the proposed alternatives on the regional economies served by the affected ports should be addressed.	Socioeconomic impacts will be addressed in Section 4.4.
21	NMFS must provide meaningful protections for the species regardless of the resulting economic costs. Specifically, the ESA is designed to “halt and reverse the trend toward species extinction, whatever the cost.” (T.V.A. v. Hill, 1978)	See response to comment 8.
	The EIS should consider the ethical values that some people hold in relation to whales and the marine environment. There are equally important “value-based” reasons as to why society would chose to protect whales; reasons for which there are no economic metrics to define.	Quantitative estimates of the economic benefits to protecting right whales are currently unavailable; however, Section 5.3.1 of the EIS qualitatively discusses these benefits.
	Regulations are necessary for recreational and commercial whale watch vessels, based on the proven inadequacy of the 1999 voluntary Whale Watch Guidelines.	Acknowledged

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
21 (Continued)	The commenter believes that all sovereign vessels should be included in the ship strikes management regime, regardless of the federal agencies' individual efforts to address ship strikes, and the requirements under Section 7 of the ESA.	See response to comment 8.
	NMFS should work closely with DoD in light of P.L. 108-136, and at a minimum obtain a memorandum of understanding that outlines protective measures that DoD will take to adhere to ship strike management measures to protect NARWs.	See response to comment 8.
	Alternative 6 is the minimum level of protection necessary to protect right whales from vessel collisions. However, alternative 6 excludes large-scale speed restrictions, and for this reason, NMFS should combine alternatives 5 and 6 to include broader-scale speed restrictions…Ships should be required to adhere to speed restrictions not to exceed 13 knots, and preferably a restriction of < 13 knots...	Acknowledged; analysis is provided in the DEIS.
	As a part of a suite of management measures (speed restrictions; ATBA; re-routing; mandatory shipping lanes), the commenter supports the use of DMAs year round for the entire eastern seaboard to address the occurrence of right whales outside of established management areas and/or time periods.	Acknowledged; analyzed in alternatives 2, 5 & 6.
	Individual sightings in the mid-Atlantic should be considered as triggers for dynamic measures.	Additional triggers for a DMA are analyzed in alternatives 2, 5 & 6.
	Commenter suggests that NMFS apply speed restrictions and other management measures during the entire period when right whales are present each year in the Southeast region: November 15- April 15.	These dates (Nov.15-Apr.15) have been adopted in Alternative 6 for the SEUS region.
	The TSS and the area extending westward from the GSC management area to Nantucket and Cape Cod, and northward to the southern boundary of the Off Race Point area, should be subject to management measures for the ships 65' or greater on an annual bases from March 15th through July 31st, including speed restrictions.	Acknowledged; analyzed in alternatives 3, 4, 5 & 6.
	In addition to designating the GSC proposed mgmt. area, and the suggested area to the west as an ATBA for all ships greater than 65'or 300 gross tons, NMFS should impose a uniform speed restriction of 10-13 knots applicable to these vessels during the designated time period.	Speed restrictions in the GSC seasonal management area are proposed and analyzed in alternatives 3, 5 & 6.
	Management measures standing alone would be insufficient in protecting right whales from ship strikes. The commenter supports the designation of mandatory routes as part of a comprehensive ship strike management regime.	Analyzed in alternatives 4, 5 & 6.
	The commenter believes that mandatory shipping lanes with speed restrictions should be designated in the western portion of CCB for approaches to Boston, Portland, and Canada from the Cape Cod Canal and vice versa.	Recommended shipping routes from the Cape Cod Canal are analyzed in the Port Access Route Study and alternatives 4, 5 & 6.
	There is a rectangular area east of the Off Race Point proposed management area and west of the GSC management area that should be included in the scheme. The commenter recommends that NMFS strongly consider the area delineated by the eastern boundary 42°30' N. 69° 54' W. and western boundary 42° 30' N. 69° 00'W, and the northern boundary coordinates even with the northern boundaries of the Off Race Point and GSC management areas, as an ATBA from March 15- July 31st .	Relative to the ANPR and the NOI, the Off Race Point and GSC management areas expanded; and these revisions will be reflected in the DEIS. See Chapter 2, Alternative 6.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
22	It is important to consider the role of right whales in the ecosystem, the economic benefit of the survival of right whales, as well as the negative economic impacts that may result from their extinction.	Monetary estimates of the benefits to protecting right whales and the negative economic impacts that may result from extinction are currently unavailable; however, Section 5.3.1 of the EIS qualitatively discusses the benefits.
	If DMAs were to be successful as a sole ship strike reduction measure, dedicated surveys of the entire east coast would need to be conducted year round. While DMAs are an important management tool, they cannot be relied upon as the sole measure to reduce ship strikes.	Acknowledged
	The plan does not account for any vessels under 20 m. Any vessel is capable of striking a whale fatally since the force of the strike is equivalent to the product of vessel mass and acceleration.	The strategy accounts for the vessel size classes that pose the highest risk to right whales.
	Commenter is concerned that NMFS will exempt sovereign vessels.	See response to comment 8.
	Commenter is deeply concerned that the rationale for the use of seasonal measures appears to be solely based on limited survey effort. Opportunistic sightings indicate that whales are active in these areas throughout the year.	See response to comment 18.
	Alternative 4, in and of itself, is an insufficient risk reduction measure. Additionally, since DMAs are not included in Alternative 4, there are no means to require action is taken when whales are found in areas not previously considered in this alternative.	Acknowledged
	Commenter believes alternative 5 is the most conservative proposed by NMFS and alternative 6 is the minimum threshold of protection in order to ensure the survival of the critically endangered North Atlantic right whale population.	Acknowledged
23	Commenter favors alternative 6, given several considerations outlined in the comment (Appendix A).	Acknowledged
	Daylight transits only in “small specific areas”. Alternatively night time transit in a controlled traffic scheme as per alternative 6.	Comment is not specific enough for a response.
	Only supports speed reduction of 12 knots or greater.	Acknowledged
	A competent agency should instate a “Traffic Scheme” designed to take in consideration whales’ habitat and behavior. Access to traffic scheme should be coordinated by shore “Traffic Control Stations”.	Recommended shipping routes are considered in alternatives 4, 5 & 6, and in the USCG’s Port Access Route Study.
	The number of vessels transiting at the same time in the traffic scheme should be coordinated and limited. Vessels in the traffic scheme should run at the same speed and properly spaced.	International regulations exist that set the rules for transiting in traffic separation schemes. And, due to navigational safety concerns and commercial timetables, there may be limits on how much ships can be coordinated.
	Check in points to “Traffic Control” to verify that position, course and speed of vessels in the traffic scheme are consistent.	Comment is not specific enough for a response.

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
23 (Continued)	Consider tagging whales with solar powered radar detectors	Alternative considered but rejected. See Section 2.3.3.
	Consider sounds and/or other technology to keep whales away from traffic scheme/lanes.	Alternative considered but rejected. See Section 2.3.4, right whale hearing.
	Fishing boats and leisure boats should be prohibited activities, other than transit, in the traffic scheme.	International regulations exist that set the rules for transiting in traffic schemes.
	Create awareness programs through education and controlled tours.	Outreach and education programs are included in the strategy, although are not operational measures considered in the DEIS.
24	The proposed LNG terminal near Eastport, Maine in Passamaquoddy Bay will mean that tankers arriving will cross the right whale breeding ground concentrations when they turn to come into the bay.	Acknowledged; see Sections 4.7.2.7 and 4.7.3.1.
25	Ships that strike whales should be fined.	The MMPA prohibits the taking of whales. Enforcement actions may include penalties, and even imprisonment; however, at this time, fines for ships that comply with regulations are not being considered.
	Implement emergency regulations now.	See response to comment 18
	Year-round speed restrictions should be in place now. Ships should only go in certain routes not all over the ocean.	Year round speed restrictions are unwarranted in certain areas as whale protection measures, but year-round speed restrictions are proposed in the NEUS under Alternative 3. Certain shipping routes are being considered under Alternatives 4, 5, and 6.
26	The success of this effort will depend largely on a continuing effort to report sightings by as many pilots and ships' crew members as possible. Recreational boaters should be encouraged to report sightings over marine channel 16 or over toll-free phone numbers.	Sighting reports by untrained observers often need to be verified, because erroneous sightings may put undue burden on the shipping industry.
	Penalties should be strongly considered for ships' owners whose pilots have been adequately forewarned and yet strike whales due to failure to comply with required speed limits.	See response to comment 25.
27	Commenter supports the continued non-regulatory measures as defined in Alternative 1 and if speed restrictions become part of the management strategy, then seasonally managed speed restricted areas versus coast-wide speed restrictions are encouraged.	Acknowledged; analyzed in alternatives 1 & 6.
	Commenter suggests that all potentially impacted port facilities have a PARS that would allow a captain's speed year-round within the access route.	PARS are for routing measures. Routes are being considered only for certain locations.
28	East and west coast submarine travel and the use of active sonar are potentially detrimental to marine life.	Acknowledged

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
29	Commenter commends the agency for drafting [these regulations], although states that the government has moved to slowly. Asks agency to remember there are citizens who do not belong to "special interest" groups to whom you should listen.	NMFS recognizes the urgency of the problem and is working to move the process forward within the constraints of legal mandates.
30	Commenter believes Alternative 1 is the most logical of the 6 options. More substantial-definitive data is required to support consideration of additional measures.	Acknowledged
31	Are there technical alternatives to control commercial shipping?	NMFS has considered certain technical alternatives, but rejected these alternatives from further analysis (see Section 2.3).
	Is the NOAA "65 ft and above" criteria supported by any scientific facts?	Yes; see Section 1.4.
	Are there better criteria than arbitrary calendar requirements to determine when the restrictions should apply? Current surveillance methods and warnings are effective.	The dates for management measures are based on years of right whale sighting data.
	Are there better approaches than arbitrary coast-wide restrictions that could reduce the overall dollar cost of the regulations	Alternative 6 analyzes restrictions in specific areas and alternative 5 analyzes coast-wide restrictions. Right whale range includes all waters off the US and Canadian east coast.
	If imposed, how will the restrictions be evaluated for effectiveness? Is there a plan for continuing improvement of the approved actions?	NMFS will develop plans for monitoring effectiveness and improving the program if the threat of ship strikes continues at an unacceptable rate.
	NOAA should prepare an EIS that compares alternatives in dollar costs and presents the dollar value of return on investment for the Strategy.	This DEIS includes a cost analysis of the alternatives, however the value of the return on the investment is not available at this time.
32, 33	Supportive of Alternative 6 as the minimum threshold for protection; although additional protections may be needed for areas and times beyond those outlined in the Strategy.	Acknowledged
34	Supportive of Alternative 6	Acknowledged
35, 36	Encourages going forward with implementing the Strategy as written.	Acknowledged
37	Supports guidelines to help protect and minimize damage to right whales.	Acknowledged
38	Supports Alternative 6 although does not believe that any of the alternatives go far enough to do what is necessary to protect this magnificent animal from extinction.	Acknowledged
	The whale is a natural resource; it belongs to all of us. It makes no sense that a special interest group be allowed to control the future of the resource. It is not theirs to control. It is ours to protect.	Acknowledged
39	It is imperative that the draft proposal by NMFS to slow ships and modify shipping routes away from critical habitat is given a time line for putting these modifications into effect immediately.	Acknowledged

Written Comments from Right Whale Ship Strike NOI (June 22, 2005)		
Comment Number	**Specific Comment**	**Response**
40	The proposed regulations have no meaningful science to support their imposition on the maritime industry.	See response to comment 6.
	Speed restrictions impacting vessels on their approach and departure from Boston Harbor could have a major impact on how freight travels into the entire New England regions. If ports are bypassed, taking containers off ships and putting them on trucks will significantly increase truck traffic on the I95 corridor either south from Halifax or north from New York.	These issues are addressed in the indirect and cumulative impacts sections.
	Boston is a small port that provides a waterborne method of transporting goods and people to a large geographic sector of our country. Loss of a major steamship line could have significant and long range negative consequences to this region.	Impacts on port operations are mentioned in Section 4.4.
	Technology must be given the opportunity to participate in providing a workable strategy. AIS and forward looking sonar are available now.	See response to comment 31.
41	Supports Alternative 6	Acknowledged
42	A whale bumper fit over the bow and welded in place with the space in the new concavity on either side filled in to prevent parasitic drag is in order.	Insufficient information in the comment to provide a response.
43	Please rush into effect the draft proposal to slow ships down.	Acknowledged; see response to comments 16 and 29.

This Page Intentionally Left Blank

APPENDIX C

COLREGS Demarcation Lines

This Page Intentionally Left Blank

COLREGS Demarcation Lines

1. **South and east of Block Island Sound.**

   §80.150 Block Island, R.I.
   The 72 COLREGS shall apply on the harbors of Block Island. (Chart 13205)

   §80.155 Watch Hill, R.I. to Montauk Point, N.Y.
   (a) A line drawn from Watch Hill Light to East Point on Fishers Island.
   (b) A line drawn from Race Point to Race Rock Light; thence to Little Gull Island Light thence to East Point on Plum Island.
   (c) A line drawn from Plum Island Harbor East Dolphin Light to Plum Island Harbor West Dolphin Light.
   (d) A line drawn from Plum Island Light to Orient Point Light; thence to Orient Point.
   (e) A line drawn from the lighthouse ruins at the southwestern end of Long Brach Point to Cornelius Point.
   (f) A line drawn from Coecles Harbor Entrance Light to Sungic Point.
   (g) A line drawn from Nichols Point to Cedar Island Light.
   (h) A line drawn from Threemile Harbor West Breakwater Light to Threemile Harbor East Breakwater Light. (Charts 13215 & 13209)

2. **Ports of New York and New Jersey (Montauk Point to western end of Martha's Vineyard).**

   New York Harbor: A line drawn from East Rockaway Inlet Breakwater Light to Sandy Hook Light (33 CFR 80.165). (Chart 12326)

3. **Delaware Bay (Ports of Philadelphia and Baltimore).**

   Delaware Bay: A line drawn from Cape May Light to Refuge Light; thence to the northernmost extremity of Cape Henlopen (33 CFR 80.503). (Chart 12304)

4. **Entrance to Chesapeake Bay (Ports of Hampton Roads and Baltimore).**
   Chesapeake Bay Entrance, VA: A line drawn from Cape Charles Light to Cape Henry Light (33 CFR 80.510). (Chart 12221)

5. **Ports of Morehead City and Beaufort, NC.**

   Cape Lookout, NC to Cape Fear, NC:

   (a) A line drawn from Cape Lookout Light to seaward tangent of the southeastern end of Shackleford Banks.

   (b) A line drawn from Morehead City Channel Range Front Light to the seaward extremity of the Beaufort Inlet west jetty.

(c) A line drawn from the southernmost extremity of Bogue Banks at 34° 38.7’ N, 76° 06.0’W across Bogue inlet to the northernmost extremity of Bear Beach at 34° 38.5’N, 77° 07.1’W.

(d) A line drawn from the southeastern most extremity on the southwest side of New River inlet at 34° 31.5’N, 77° 20.6’W, to the seaward tangent of the shoreline on the northeast side of New River Inlet (33 CFR 80.525). (Coast Chart 11543 or Harbor Chart 11545)

6. **Wilmington, NC.**

Cape Lookout, NC to Cape Fear, NC:

(a) A line drawn from the seaward extremity of the jetty on the northeast side of Masonboro Inlet to the seaward extremity of the jetty on the southeast side of the inlet.

(b) Except as provided elsewhere in this section from Cape Lookout to Cape Fear, lines drawn parallel with the general trend of the highwater shoreline across the entrance of small bay and inlets (33 CFR 80.525).

Cape Fear, NC to Little River Inlet, NC.

(a) A line drawn from the abandoned lighthouse charted in approximate position 33° 52.4’ N, 78° 00.1’ W across the Cape Fear River Entrance to Oak Island Light (33 CFR 80.530). (Harbor Chart 11537, Coast Charts 11536 and 11539).

7. **Georgetown, SC.**

Little River Inlet, SC to Cape Romain, SC:

(a) A line drawn from the charted position of Winyah Bay North Jetty End buoy 2N south to the Winyah Bay South Jetty (33 CFR 80.703). (Harbor Chart 11531)

8. **Charleston, SC.**

Charleston Harbor, SC:

(a) A line formed by the submerged north jetty from the shore to the west end of the north jetty.

(b) A line drawn from across the seaward extremity of the Charleston Harbor Jetties.

(c) A line drawn from the west end of the South Jetty across the South Entrance to Charleston Harbor to shore on a line formed by the submerged south jetty (33 CFR 80.710). (Coast Chart 11521)

9. **Savannah, GA.**

Savannah River: A line drawn from the southernmost tank on Hilton Head Island charted in approximate position 32° 06.7’N, 80° 49.3’ W to Bloody

Point Range Rear Light; thence to Tybee (Range Rear) Light (33 CFR 80.715). (Coast Chart 11513)

This Page Intentionally Left Blank

APPENDIX D

Port Area Socioeconomic Profiles

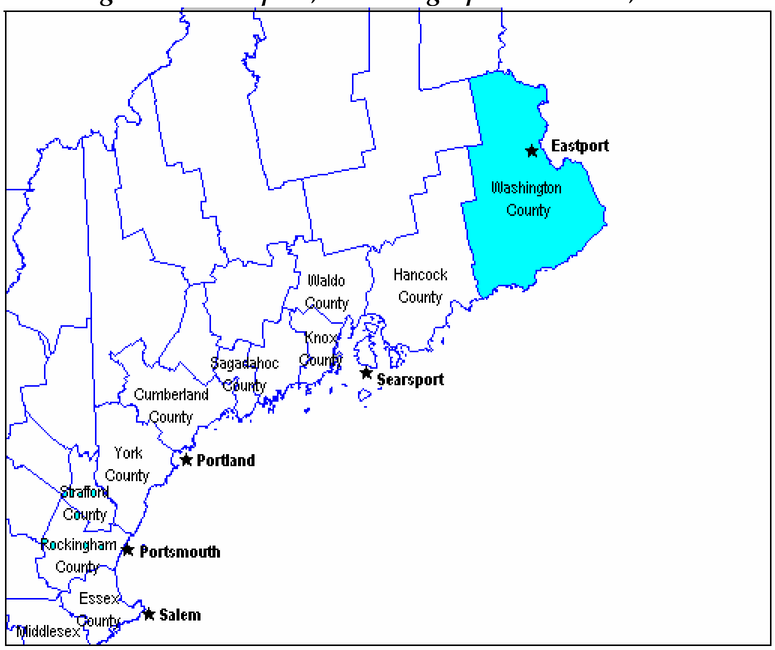
This Page Intentionally Left Blank

1. Eastport, ME

Location and Background Information

The Port of Eastport is located in Washington County, Maine. It is the easternmost port in the United States and is nestled in a safe harbor behind Canada's Campobello Island. The waters of Passamaquoddy Bay and Cobscook Bay converge in Eastport generating some of the highest tidal ranges in the United States. This massive flow keeps the local waters clean and productive as Eastport is home to one of the largest salmon aquaculture operations in the US. Eastport is also centrally located to many of the State's forest products industries.[1]

Figure 1-1. Eastport, ME: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

Washington County, Maine has a total population of 33,941 according to the 2000 US Census. Of the total population, 17,365 are females; representing 51.2 percent of the total population and 16,576 are males, representing 48.8 percent of the total population. The median age for the population is 40.5 years: 39.7 for males and 41.2 for females. The majority of the population is located between the 40 – 49 age range bracket, both for males and females (Figure 1-2).

The majority of the population of this county is white (93.4 percent), followed by 'others' (include American Indians and Alaska Natives, Native Hawaiian and Pacific Islanders, other races and a combination of two or more races), which represent 5.8 percent of the total population. The Asian

[1] Maine Port Authority website. URL http://www.maineports.com/water_eastport.html

population represents 0.5 percent of the total population, closely followed by the Black or African American population (0.3 percent). (Figure 1-3). In terms of ethnic structure and makeup, only 0.9 percent of the total population is of Hispanic or Latino origin.[2]

Figure 1-2. Eastport, ME: Structure of the Population by Age Group, 2000

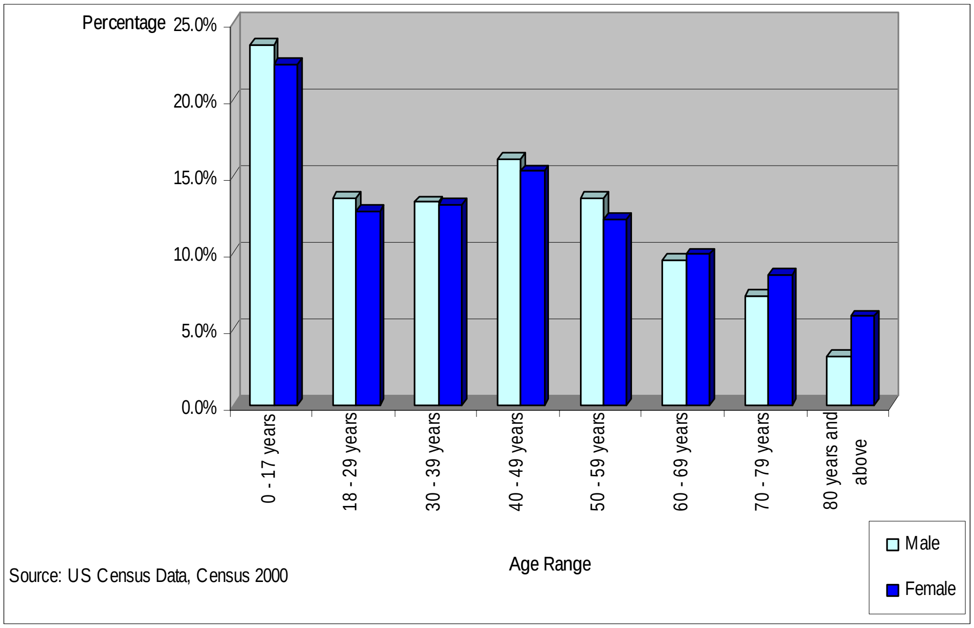
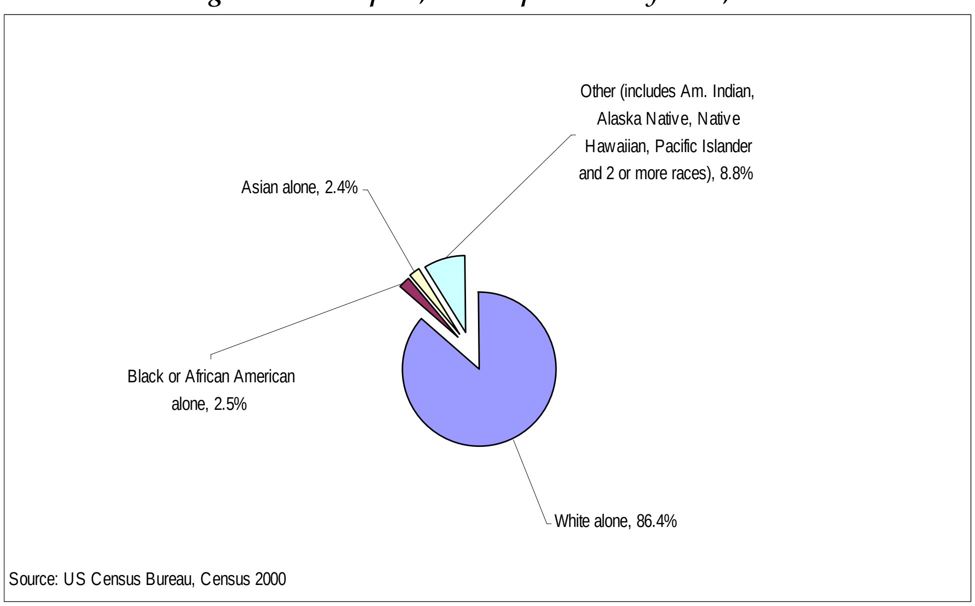


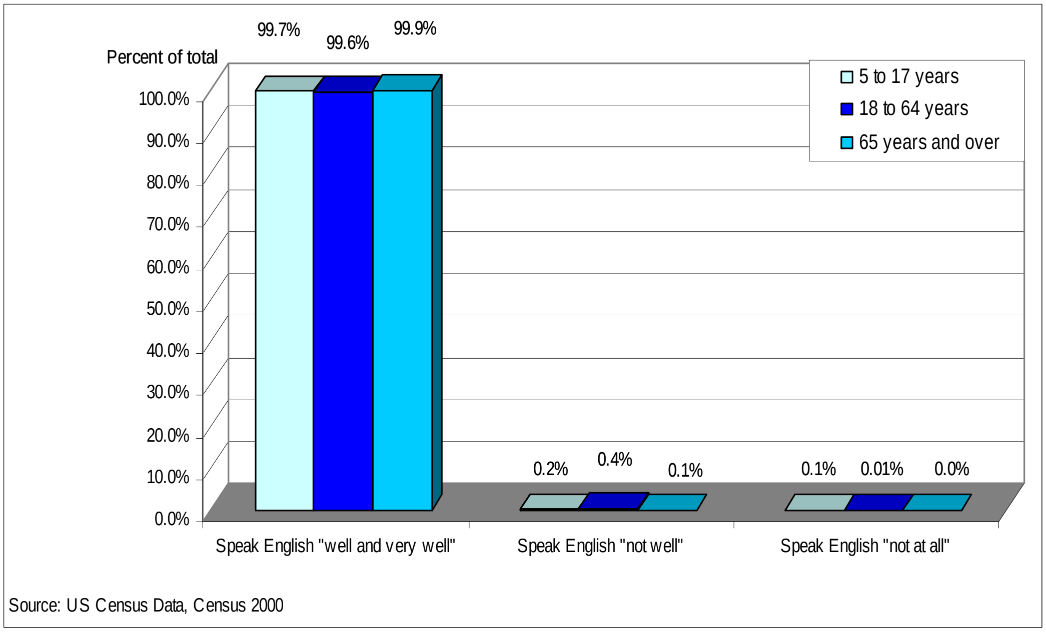
Figure 1-3. Eastport, ME: Population by Race, 2000



[2] US Census Data, Census 2000

It is evident from the data specified in Figure 1-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 1-4. Eastport, ME: Ability to Speak English by Age Group, 2000

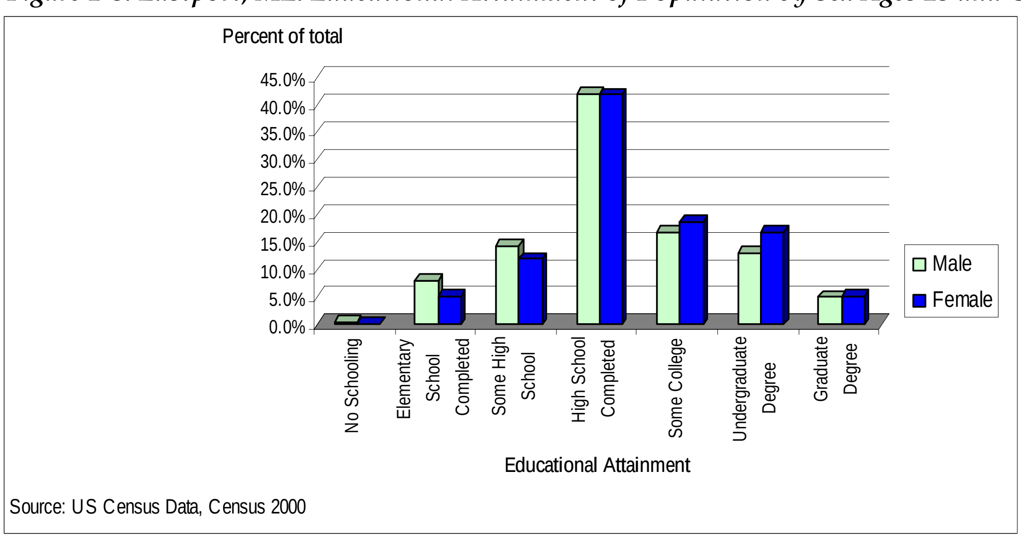


EDUCATION

Almost half of the population of Washington County, ME has completed High School and 13.1 percent of males and 16.9 percent of females have obtained an undergraduate degree. It is interesting to observe that females' educational attainment is higher than male's post high school. (Figure 1-5).

There are only two 4-year colleges in the county of Washington in Maine: Washington County Community College and the University of Maine - Machias.

Figure 1-5. Eastport, ME: Educational Attainment of Population by Sex Ages 25 and Over, 2000



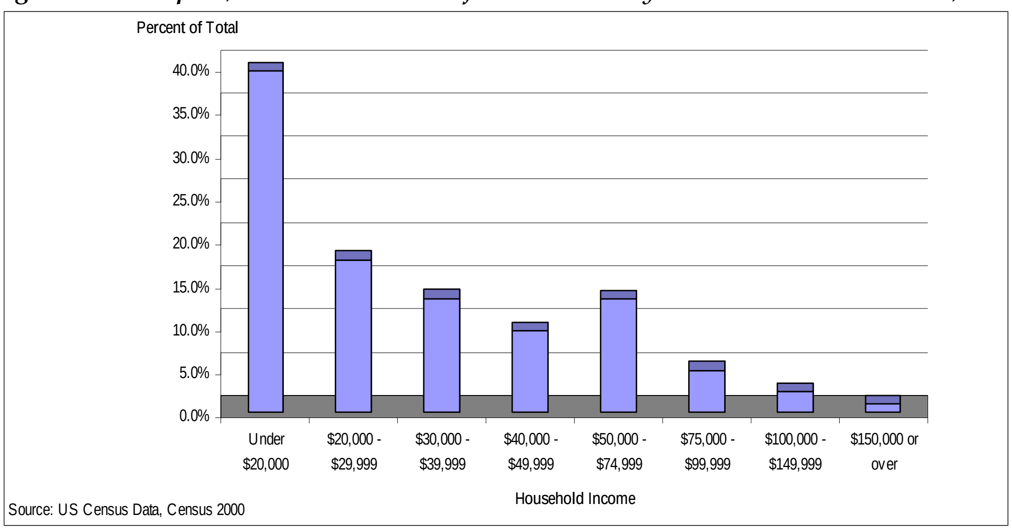
Socio-Economic Characteristics

INCOME

Over 40 percent of households in Washington County, ME have an income level under $20,000. About 17.5 percent of households fall under the income bracket of $20,000 - $29,999. Nearly 15 percent of all households have incomes between $30,000 and $39,999 and an equal percentage have an income between $50,000 and $74,999. (Figure 1-6).

Household median income in this county as of 1999, according to the 2000 US Census, was $25,869.00. The per capita income for 1999, according to the 2000 US Census, was $14,119.00. The percentage of people under the poverty line in the region was 19 in the year 2000. Average household size in Washington County is 2.34.[3]

Figure 1-6. Eastport, ME: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

As is evident from Figure 1-7, most females in Washington County, Maine are employed in the education, health and social services industry (42.5 percent), followed their employment in 'other' industries, which include the arts, entertainment, recreation, food services, public administration and information (20.4 percent). For males, the distribution of employment among industries fluctuates less. The highest participation is distributed amongst three industry categories: agriculture, forestry, fishing, hunting and mining (19 percent); manufacturing (18 percent); and 'other' (16 percent).

An estimated 9.3 percent of males and 7.5 percent of females are unemployed in Washington County, Maine. [4]

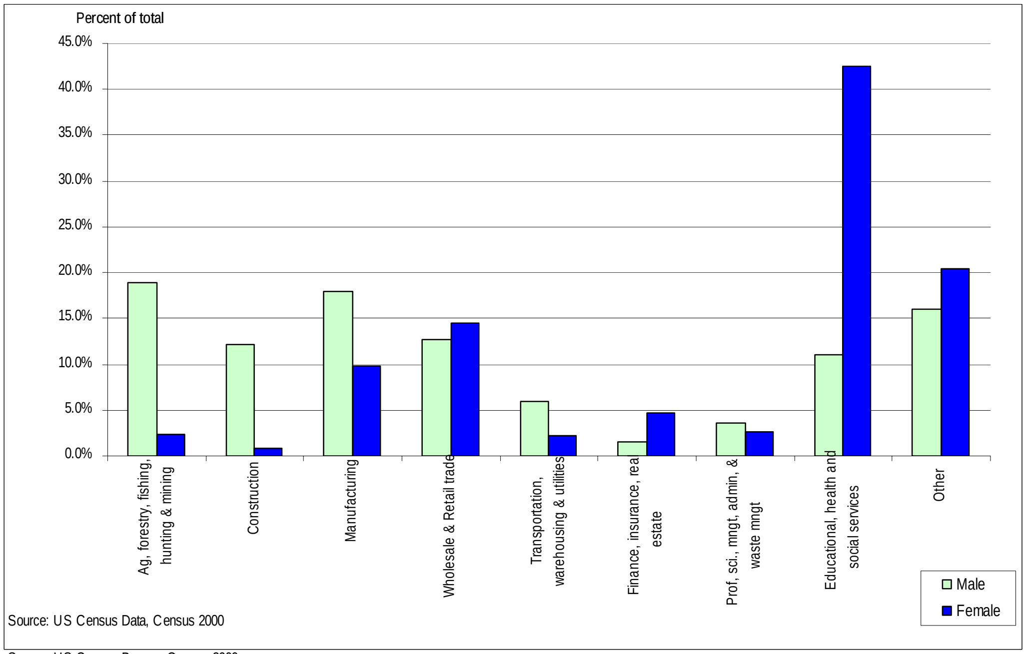
As can be observed in Figure 1-7, an estimated 14.9 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 24 percent of males and 9.9 percent of females are employed in production, transportation and material moving occupations. The

[3] US Census Data, Census 2000

[4] US Census Data, Census 2000

aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.8 percent of men's occupations and 0.3 percent of female's occupations.

Figure 1-7. Eastport, ME: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Eastport Breakwater Terminal has berthing for a vessel of up to 700 ft. An equipment maintenance shop, the Eastport Port Authority office, US Customs, and Coast Station Eastport are located just off the pier. The downtown Fish Pier berths the Port's two tugboats, Ahoskie and Pleon, on the North side, and has slips for transient boats on the South side. Approach depths to the Breakwater are over 100 feet and the mean low water depth is 42 feet. The Breakwater is also used by the aquaculture industry, commercial fishermen, and recreational boaters and fishermen.

Located at the downtown area of Eastport, the Breakwater offers cruise ships a direct docking within close proximity to all of Eastport's offerings. Estes Head Cargo Terminal can accommodate a ship of 900 feet in Berth A and one up to 550 feet in Berth B. Berth B is also an excellent berth for barges. EHCT's 43 acre site has several open storage areas, three 20,000 square foot, drive-thru warehouses, and one 43,000 square foot warehouse. The operations are easily supervised from the Federal Marine Terminals' office located just above the Estes Head pier. Approach depths to this pier are also well in excess of 100 feet and the mean low water depth is 64 feet. [5]

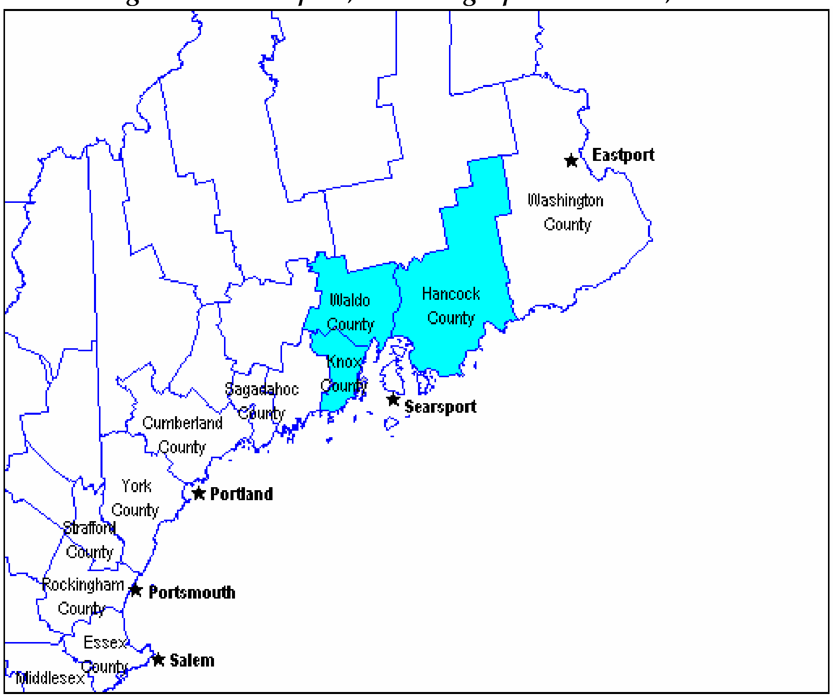
[5] http://www.portofeastport.org/facilities.html

2. Searsport, ME

Location and Background Information

Searsport is part of Knox County, Hancock County and Waldo County, Maine. The Port of Searsport is located at the heart of Penobscot Bay. The port has recently undergone a major reconstruction effort to effectively serve the needs of shippers moving product both into and out of Maine, and through the onsite rail yard of the Montreal, Maine & Atlantic Railway, to provide service to the heartlands of both the US and Canada.[1]

Figure 2-1. Searsport, ME: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of Knox, Hancock and Waldo counties, Maine is 127,689, according to the 2000 US Census. Of the total population, 17,825 are males (49.1 percent) and 18,455 are females (50.9 percent). The median age for the population is 39.3 years: 38.5 for males and 39.3 for females. It is evident from Figure 2-2 that over 15 percent of the population in this port area falls within the 40 – 49 years age bracket and about 25 percent of males and nearly the same percent of females are between the ages of 0 and 17 years.

[1] Maine Port Authority: http://www.maineports.com/water_searsport.html

As can be observed in Figure 2-3, the majority of the population in the region is white (97.8 percent), followed by 'others' (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), which represent 1.7 percent of the total population. The Asian population represents 0.3 percent of the total population, closely followed by the Black or African American population (0.2 percent). Moreover, in terms of ethnic structure, only 0.6 percent of the total population is considered to be of Hispanic or Latino origin.[2]

Figure 2-2. Searsport, ME: Structure of the Population by Age Group, 2000

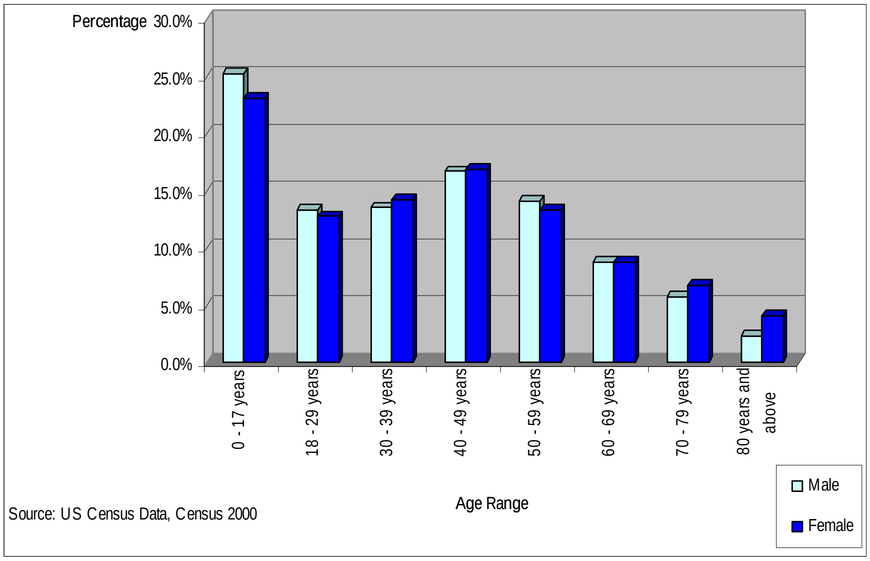
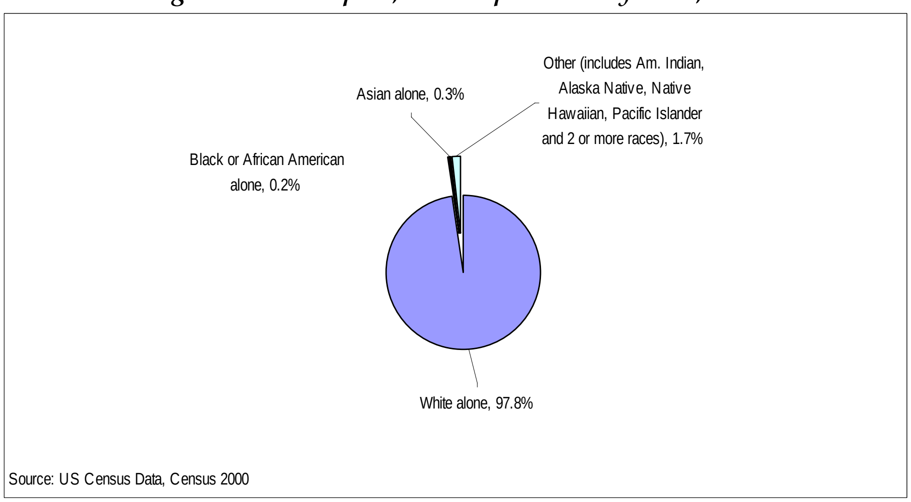


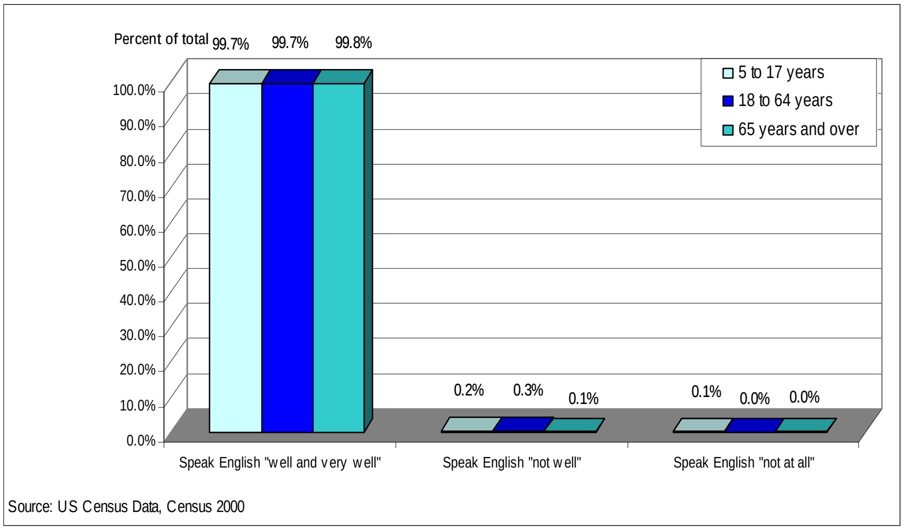
Figure 2-3. Searsport, ME: Population by Race, 2000



2 US Census Data, Census 2000

It is evident from the data specified in Figure 2-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 2-4. Searsport, ME: Ability to Speak English by Age Group, 2000

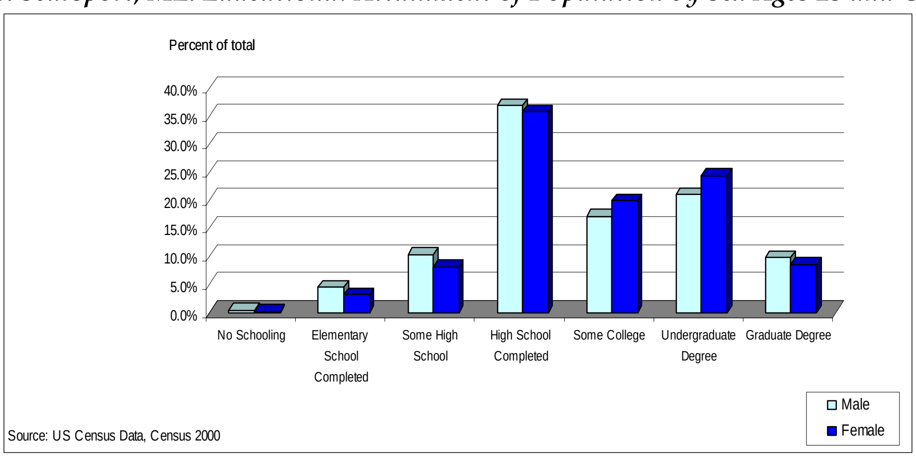


EDUCATION

About 35 percent of males and females, ages 25 and over, have completed high school. Around 20 percent of males and 24 percent of females have obtained an undergraduate degree (Figure 2-5).

The three main colleges in the area are: College of the Atlantic, Maine Maritime Academy in Hancock County and Unity College in Waldo County. [3]

Figure 2-5. Searsport, ME: Educational Attainment of Population by Sex Ages 25 and Over, 2000



[3] Searsport Community Profile: http://www.epodunk.com/

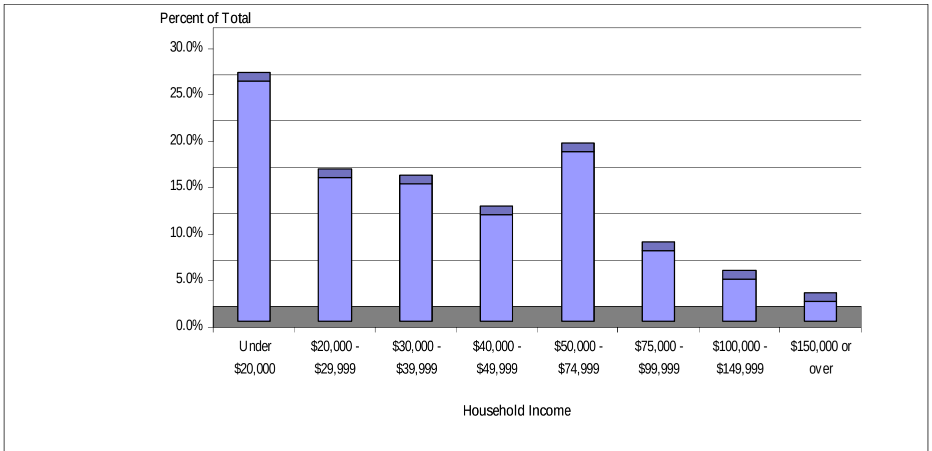
Socio-Economic Characteristics

INCOME

Household median income in the region in 1999 was $35,606.50 and per capita income was $19,188.70. The percentage of people under the poverty line in the region was 11.3 in the year 2000. The average household size in the area in 2000 was 2.43.[4]

About 27 percent of households in the region in 1999 had incomes of under $20,000 and approximately 20 percent of households had incomes between $50,000 and $74,999 (Figure 2-6).

Figure 2-6. Searsport, ME: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

As is portrayed by Figure 2-7, around 34 percent of working females are employed in the education, health and social services industry, followed by their employment in 'other industries', such as arts, entertainment, recreation, food services, public administration and information (about 23 percent). Most males are employed in 'other industries' (19 percent), followed by construction (about 16 percent) and wholesale and retail trade (16 percent).

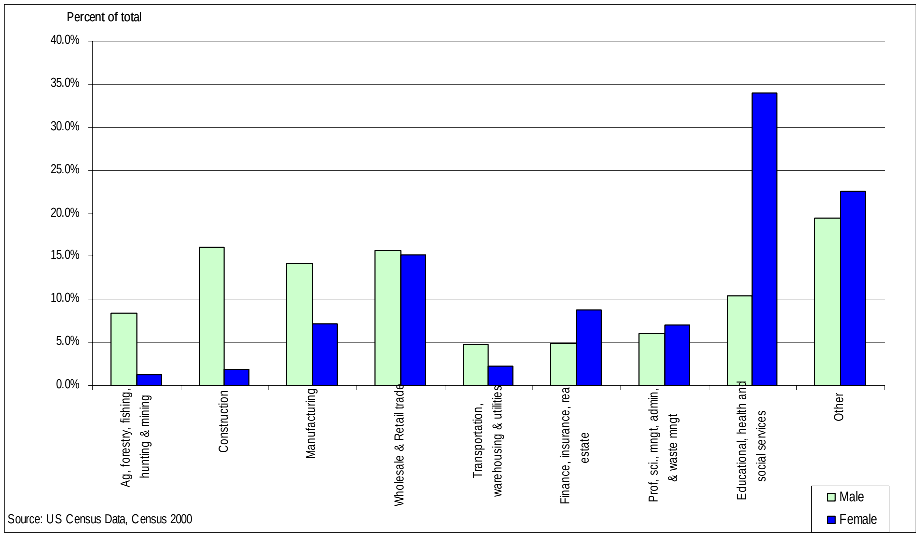
An estimated 4.5 percent of males and 5.1 percent of females were unemployed in the area in the year 2000.[5]

According to the 2000 US Census, an estimated 6.7 percent of males and 0.8 percent of females are employed in farming, fishing and forestry occupations. About 18.9 percent of males and 7.8 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.9 percent of male's occupations and 0.1 percent of female's occupations.

[4] US Census Data, Census 2000.

[5] US Census Data, Census 2000.

Figure 2-7. Searsport, ME: Employed Civilian population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of Searsport consists of the Sprague Energy Terminal on Mack Point. The facility is being redeveloped in partnership with the MDOT over the next 2 years. In the mid-1800s in Searsport, there were eight shipbuilding yards which built wooden vessels of exceptional quality. While residents built the ships, they sailed them as well. Searsport was home to one-tenth of the deep water captains in the American Merchant Marine, and produced more shipmasters per square mile than any town of its size in the world. Searsport's presence as a major seaport has been long and successful. The Sprague Energy Terminal at Mack Point in Searsport had a solid year in 2000 handling bulk and liquid cargoes. The cargo handled included items such as coal, road salt, gypsum, and coke. In 1999, the Port of Searsport also handled over 3 million barrels of liquid petroleum products.

The dry cargo pier has a working surface of 100′ x 560′ and a deck load capacity of 1,000 psf. It has two berths, both are 800 feet long. The liquid cargo pier has a multi purpose hose platform, with 2 berths, one that is 700 feet long and the other is 500 feet long. The port has 1.6 million barrel active tank capacity and truck and rail loading racks. It has truck and rail access and a 90,000 sq. ft. warehouse. Intermodal Truck to Rail Facility. It has over 6,500 feet of on-site rail siding interconnected with the Canadian Pacific for double stack service to the US Midwest, central Canada, and Vancouver. [6]

[6] Maine Department of Transportation website: http://www.state.me.us/mdot/freight/searsport.php

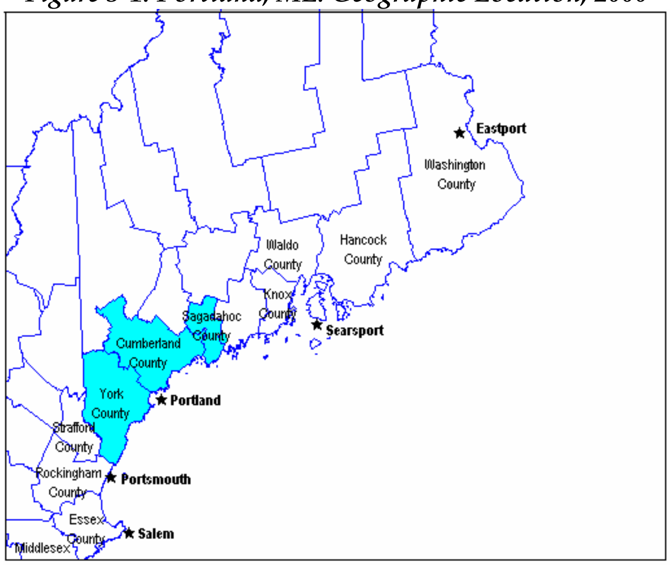
This page intentionally left blank.

3. Portland, ME

Location and Background Information

The port of Portland is located in the Portland-South Portland-Biddeford, Maine Metropolitan Statistical Area (MSA). Portland Harbor, at the western end of Casco Bay, is the most important port on the coast of Maine. The ice-free harbor offers secure anchorage to deep draft vessels in all weather. There is considerable domestic and foreign commerce in petroleum products, paper, wood pulp, scrap metal, coal, salt and containerized goods. It is also the Atlantic terminus pipeline for shipments of crude oil to Montreal and Ontario. In 1998, Portland became the largest port in the Northeast based on throughput tonnages. A rail system connects the Port to a national network that also reaches into Canada, one of the reasons shippers bypass the crowded and more costly port cities of southern New England and the Mid-Atlantic.[1]

Figure 3-1. Portland, ME: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Metropolitan Statistical area is 487,568 according to the 2000 US Census. Of the total population 236,585 are males or 48.5 percent of the population and 250,983 are females or 51.5 percent of the population. The median age for the population of the area is 38.0 years: 36.9 for males and 39.0 for females. Over 15 percent of the population is located between the 40 – 49 years age range brackets, in this case of both males and females and about 25 percent of males and about 23 percent of females are between the ages of 0 to 17 years (Figure 3-2).

[1] http://www.portofportlandmaine.org/navigation.html

As is evident from Figure 3-3, the majority of the population in the area is white (96.6 percent), followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), representing 1.7 percent of the total population. The Asian population represents 0.9 percent of the total population, closely followed by the Black and African American population (0.7 percent). Moreover, in terms of ethnic makeup, 0.9 percent of the total population is of Hispanic or Latino origin.[2]

Figure 3-2. Portland, ME: Structure of the Population by Age Group, 2000

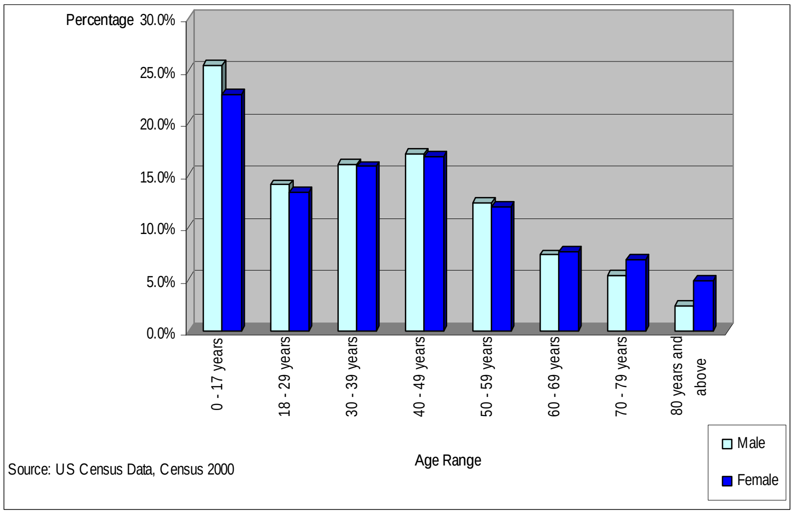
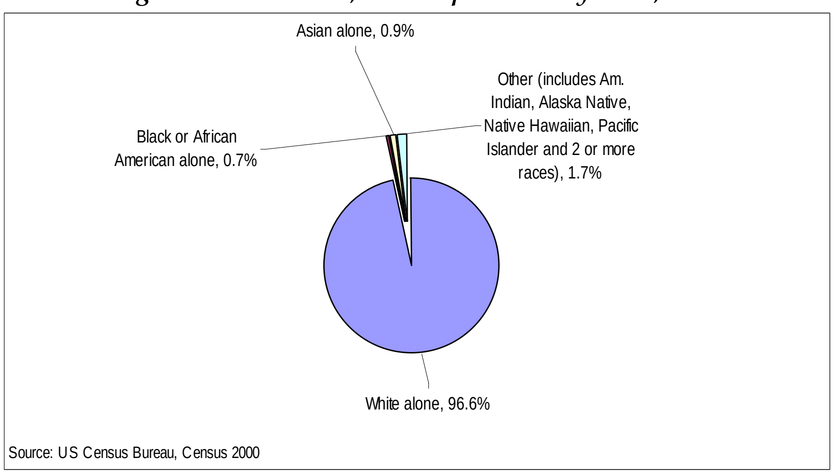


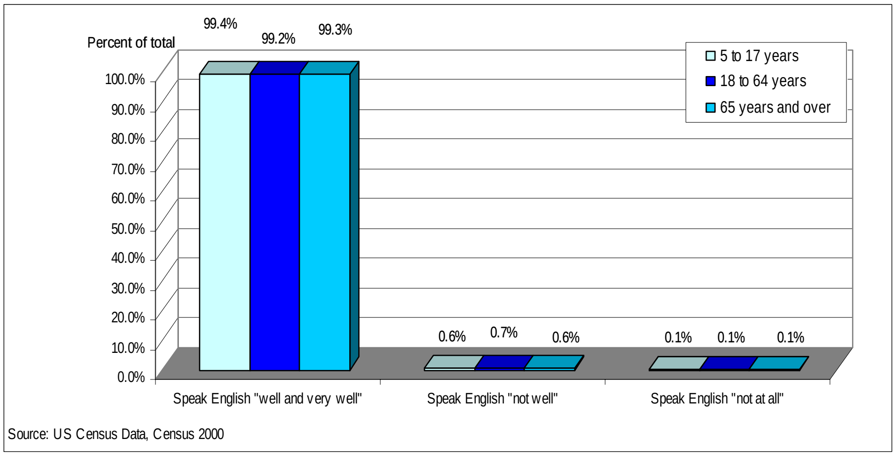
Figure 3-3. Portland, ME: Population by Race, 2000



[2] Source: US Census Data, Census 2000.

It is evident from the data specified in Figure 3-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 3-4. Portland, ME: Ability to Speak English by Age Group, 2000

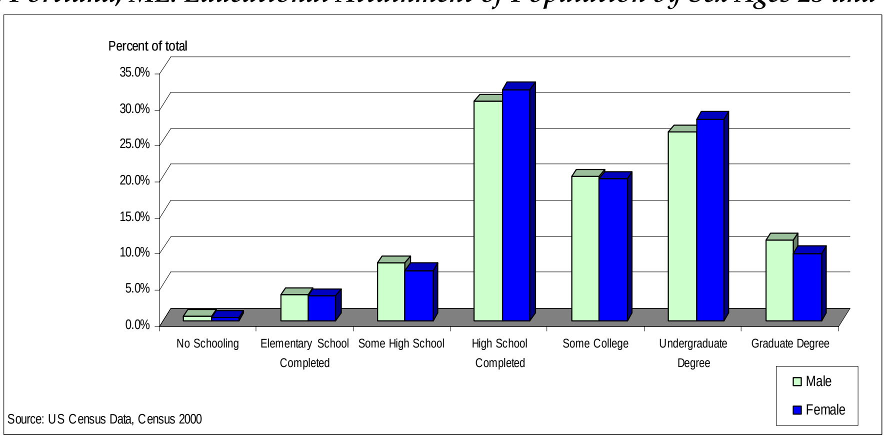


EDUCATION

As portrayed by Figure 3-5, around 30 percent of males and females in this region have completed high school and approximately 25 percent of males and females have obtained an undergraduate degree. This percentage is followed by those who have only completed some college (about 18 – 19 percent).

Some of the colleges and universities in the area are: Bowdoin College, Maine College of Art, Saint Joseph's College and the University of Southern Maine in Cumberland County; and the University of New England and York County Community College in York County, Maine.[3]

Figure 3-5. Portland, ME: Educational Attainment of Population by Sex Ages 25 and Over, 2000



[3] Portland Community Profile: http://www.epodunk.com/cgi-bin/gayInfo.php?locIndex=2303

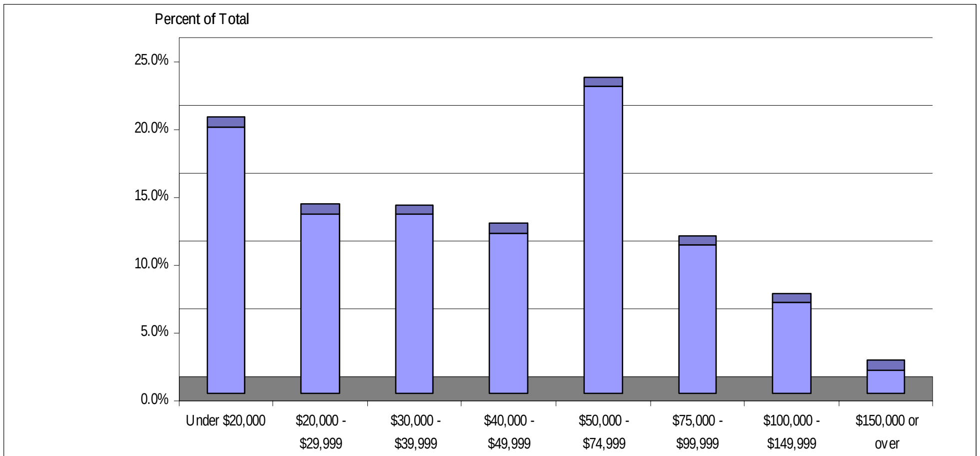
Socio-Economic Characteristics

INCOME

About 23 percent of households in this MSA have incomes within the $50,000 - $74,999 income bracket. This is followed by a rate of 20 percent of households that have incomes of under $20,000 (Figure 3-6).

Household median income in the region in 1999 was $43,735.62 and per capita income was $22,647.78. The percentage of people under the poverty line in the region was 8.0 in the year 2000. Average household size in the year 2000 was 2.42.[4]

Figure 3-6. Portland, ME: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

Around 35 percent of working females are employed in educational, health and social services occupations; followed by 20 percent of females, who are employed within the 'other' category. This category includes arts, recreation, entertainment, food services, public opinion and information occupations. Males' occupations are a bit more evenly distributed among industries, yet the majority of males are employed in manufacturing and wholesale and retail trade (around 19 percent), followed by 'other' which represents about 18 percent (Figure 3-7).

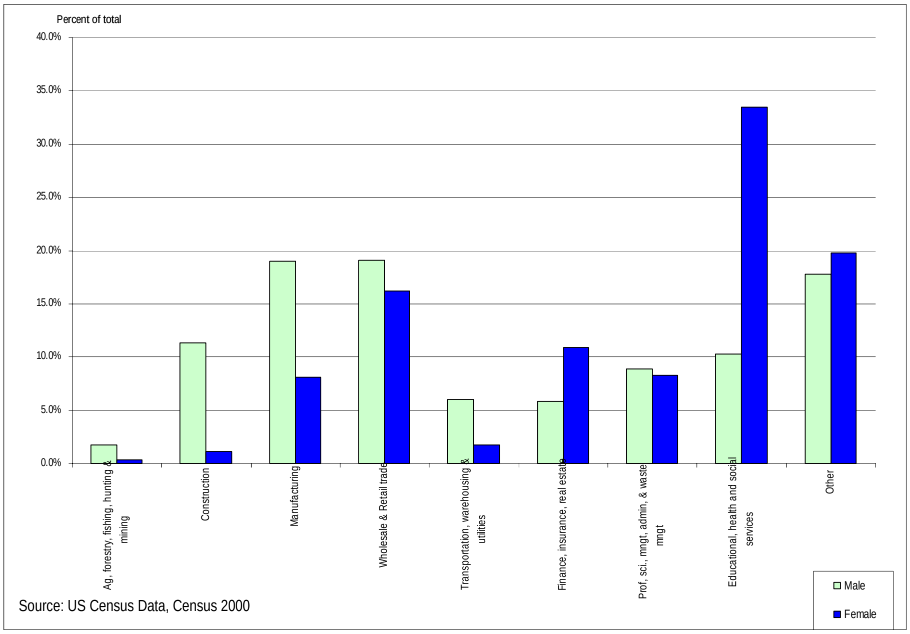
An estimated 3.6 percent of males and 3.5 percent of females were unemployed in 2000.[5]

According to the 2000 US Census, an estimated 1.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 19.7 percent of males and 6.7 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.7 percent of male's occupations and 0.1 percent of female's occupations.

[4] US Census Data, Census 2000.

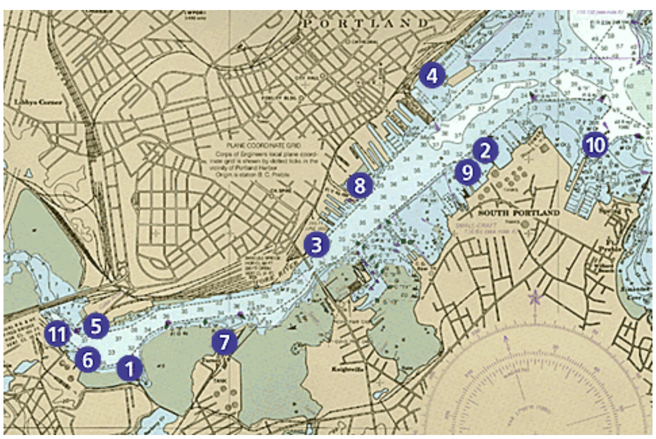
[5] US Census Data, Census 2000.

Figure 3-7. Portland, ME: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

Terminal information at the Port of Portland:



1. Cargill Petroleum
2. Gulf Oil Terminal
3. International Marine Terminal
4 Maine State Pier (Portland Ocean Terminal, Casco Bay Lines)
5. Merrill Marine Terminal
6. Mobil Oil Terminal
7. Motiva Terminal
8. Portland Fish Pier
9 & 10. Portland Pipe Line Pier One (9) and Pier Two (10)
11. Sprague Energy Terminal

PORTLAND FISH EXCHANGE

The Portland Fish Exchange is an all-display fresh fish and seafood auction operated in Portland, Maine. The Exchange offers a fair and open marketplace, bringing together Commercial Fishing Vessels (Sellers) with Wholesalers and Processors (Buyers). Fresh fish and seafood products are unloaded from fishing vessels daily and displayed for Buyers to make purchasing decisions. A daily auction is conducted at midday. Products purchased are destined for restaurants, markets, and processing plants within hours of vessel landings.

The Portland Fish Exchange is recognized throughout the Fish and Seafood Industry as a leader in innovation, quality, and integrity. Located on the waterfront in Portland, the Exchange offers ample pier and berthing space for boats. The 22,000-square-foot facility also offers numerous shipping bays for convenient loading and transport of products. Fish and Seafood can be landed at ports other than Portland and shipped via motor vehicle and/or aircraft to the auction facility for display and sale.

PILOTAGE

Pilots board 1.0 nautical mile north of the ELN Racon "PAPA" buoy at position 43-31.6 North and 70-05.5 West. Portland Pilots monitor VHF 16 and 11. Pilotage is compulsory for all foreign vessels and US vessels under register in the foreign trade drawing over nine feet. Pilotage is optional for coastwise or fishing vessels under enrollment or license that have onboard a pilot licensed by the Federal Government. The Pilot boats are black-hulled with a white superstructure with the word PILOT on both sides. One is 48 feet LOA and the other is 65 feet LOA. Vessels are requested to provide 48 and 24 hours notice of ETA and to update any appreciable changes. The pilots do not maintain the boat on station. Distance from the pilot station to the inner harbor is approximately 10 miles. [6]

[6] Source: http://www.portofportlandmaine.org/commercial_idx.html

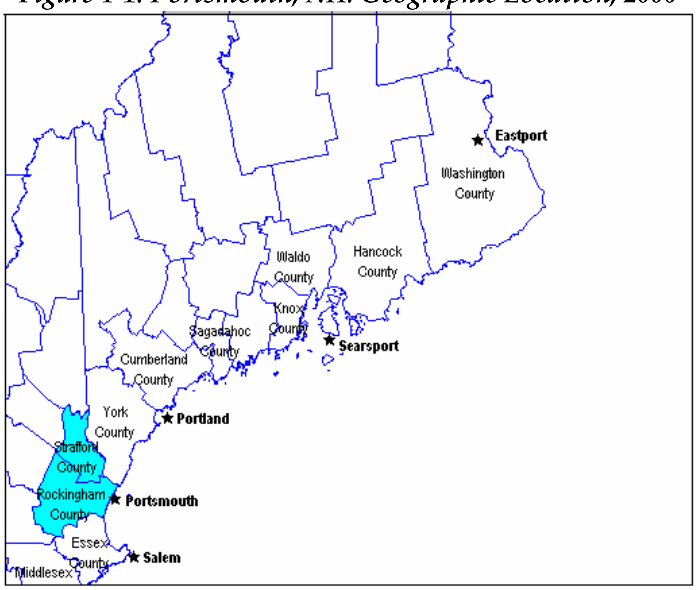
4. Portsmouth, NH

Location and Background Information

The Port of Portsmouth, New Hampshire is part of the Rockingham County-Strafford County, New Hampshire Metropolitan Division of the Boston-Cambridge-Quincy, MA-NH Metropolitan Statistical Area (MSA). This Metropolitan division is comprised by Rockingham County, NH and Strafford County, NH.

With a deep natural harbor and river, Portsmouth is one of the oldest working ports in the United States. The Piscataqua River Basin's recorded seafaring history began with a visit in 1603 by English explorer Martin Pring and it has witnessed increasing maritime activity ever since. In 1957 the New Hampshire State Legislature created the New Hampshire State Port Authority as an autonomous state agency overseen by a board of directors appointed by the Governor and Executive Council. Today, activity at the Port includes pleasure boating and sport and commercial fishing in addition to bulk and general cargo transport to and from points worldwide. [1]

Figure 4-1. Portsmouth, NH: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of this Metropolitan Division is 389,592, according to the 2000 US Census. Of this total, 191,592 or 49.1 percent are males and 198,246 or 50.9 percent are females. The median age in the area is 36.4 years; 35.9 for males and 36.9 for females. As Figure 4-2 portrays, over 15 percent of males and females are between the ages of 30 and 39, and about 17 percent are between 40 and 49 years of age. Over 25 percent of males and nearly that percentage of females are between 0 and 17 years old.

[1] Port of Portsmouth profile: http://www.seacoastnh.com/business/port.html

As shown in Figure 4-3, 96.7 percent of the population in this Metropolitan Division is white, followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), representing 1.6 percent of the population. The Asian population represents 1.1 percent of the total population, closely followed by the Black or African American population (0.6 percent). In terms of ethnic makeup, 1.2 percent of the total population is considered to be of Hispanic or Latino origin.[2]

Figure 4- 2. Portsmouth, NH: Structure of the Population by Age Group, 2000

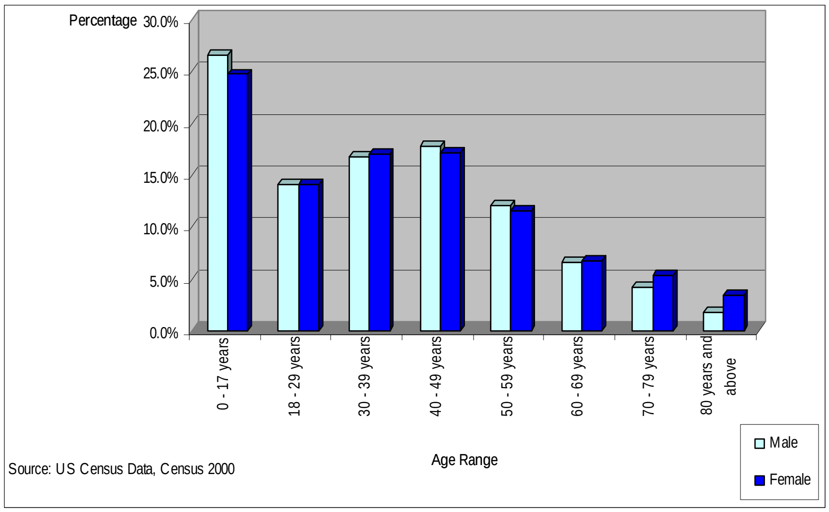
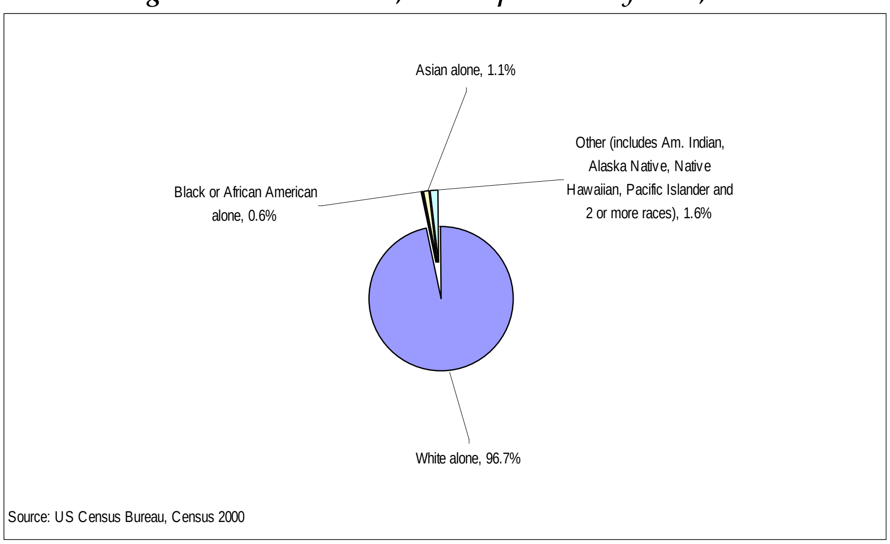


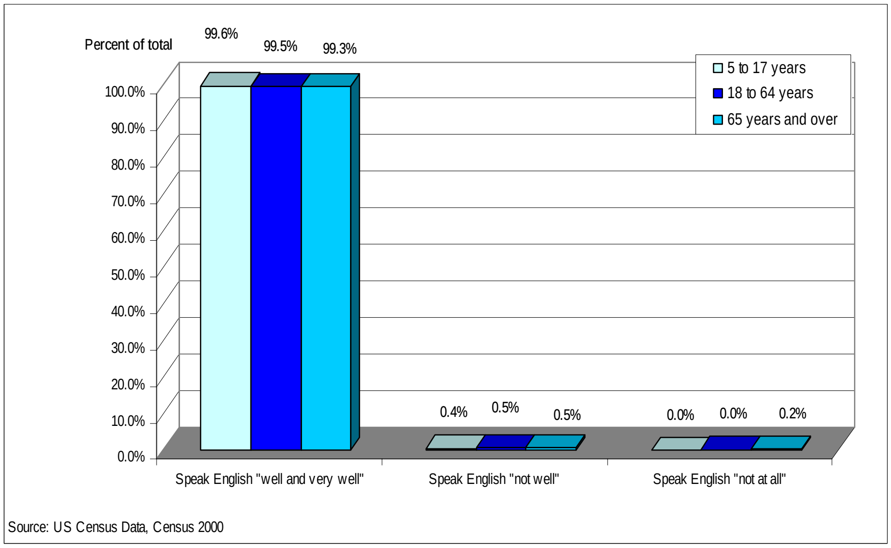
Figure 4-3. Portsmouth, NH: Population by Race, 2000



[2] US Census Data, Census 2000.

It is evident from the data specified in Figure 4-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 4-4. Portsmouth, NH: Ability to Speak English by Age Group, 2000

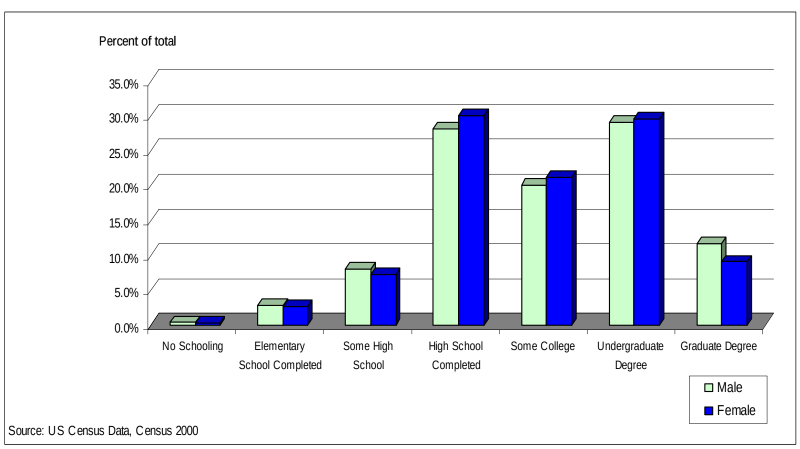


EDUCATION

As evidenced by Figure 4-5, most of the population in this Metropolitan Division has completed high school and has obtained an undergraduate degree (about 30 percent of males and females for each category).

Some of the colleges in the area are: Chester College of New England in Rockingham County and the University of New Hampshire in Strafford County.[3]

Figure 4-5. Portsmouth, NH: Educational Attainment of Population by Sex Ages 25 and Over, 2000



[3] Portsmouth, NH Community Profile: http://www.epodunk.com/

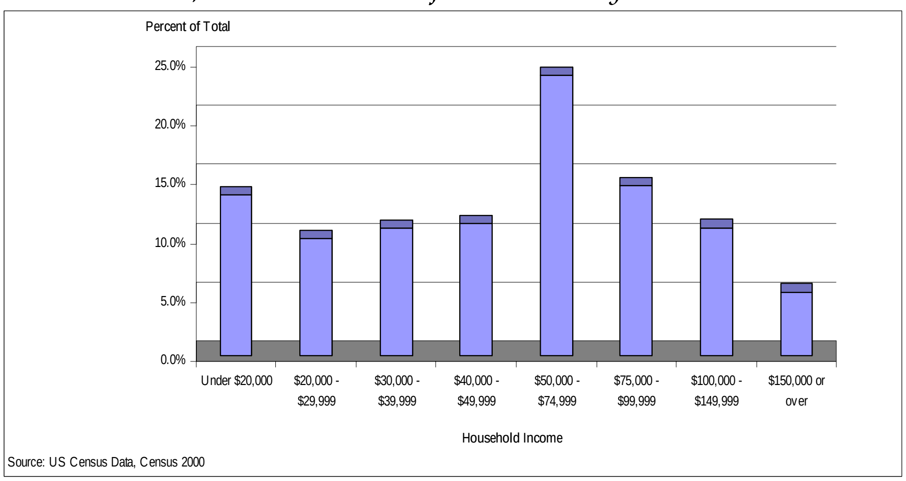
Socio-Economic Characteristics

INCOME

The majority of households in this region have incomes that between $50,000 and $74,999 (about 23 percent). Around 15 percent of households in the region have incomes in the $75,000 - $99,999 income bracket. The rest of households' incomes are more evenly distributed (Figure 4-6).

Household median income for 1999, according to the 2000 US Census, was $54,291.43 and per capita income was $24,876.54. The percentage of people under the poverty line in the region was 5.8 in the year 2000.The average household size in this Metropolitan Division in 2000 was 2.59.[4]

Figure 4-6. Portsmouth, NH: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

About 30 percent of females in this Metropolitan Division are employed in the education, health and social services industry. This is followed by 19 percent employment of females in 'other' industries, which include the arts, entertainment, recreation, public administration, food services and information. About 24 percent of males are employed in manufacturing and approximately 19 percent of males are employed in the wholesale and retail trade industry (Figure 4-7).

An estimated of 3.1 percent males and 3.1 percent of females were unemployed in this region in the year 2000.[5]

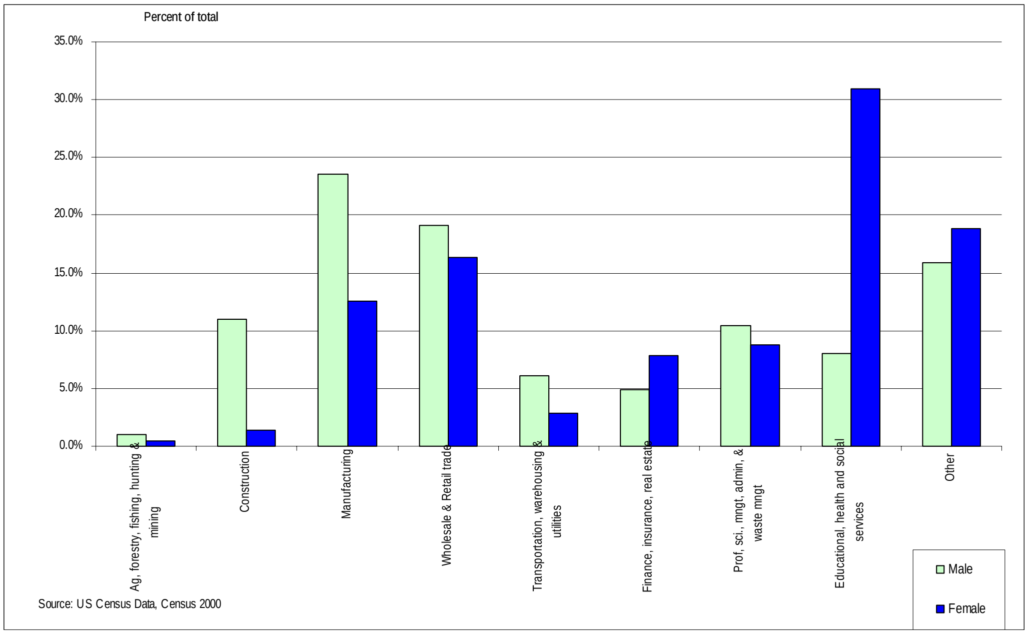
According to the 2000 US Census, an estimated 0.5 percent of males and 0.3 percent of females are employed in farming, fishing and forestry occupations. About 18.7 percent of males and 8.5 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.1 percent of female's occupations.

---

[4] US Census Data, Census 2000.

[5] US Census Data, Census 2000.

Figure 4-7. Portsmouth, NH: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



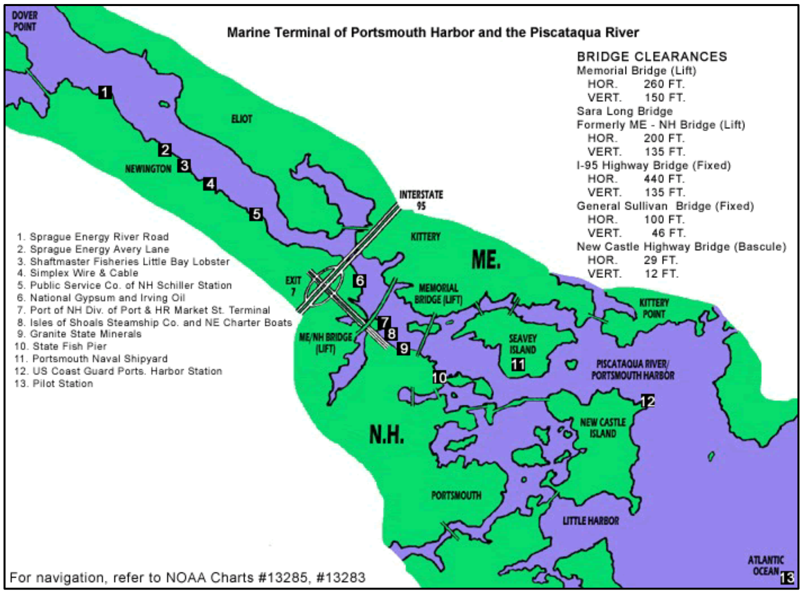
MARITIME INFORMATION

The Port's strategic location makes it ideal for import/export with European trading partners as well as businesses in the Middle East, Africa and the Pacific Rim. The Port, ice-free year round, is the closest such port to Europe, with the transit from sea buoy 2KR only three miles. Rail service is available to the Port Authority and many other private facilities, while access to Interstate Highway 95 is only a half mile away. Pease International Tradeport is two miles away in Newington. The port channel is maintained at 35 feet and has bridge clearances between 135 and 150 feet. In total, about five million tons of cargo enter or exit Portsmouth Harbor each year. Vessels of all types visit the Port Authority, including general purpose liners, bulk carriers, passenger ships, container carriers, feeder vessels and barges. Fresh water, stores, bunkers, telephones and a heliport site are available.[6]

Terminal Information

The DPH Market Street Marine Terminal, located on the Piscataqua River, is the only public access, general cargo terminal on the River. The Piscataqua is a year-round, ice-free, deep draft river. The Market Street Terminal offers 8 acres of paved outside lay down area, 50,000 sq. ft. of covered warehouse, onsite rail access, 600 ft berth, 35 ft/MLW, 312 ft berth, 22 ft/MLW. It has cargo handling capabilities for bulk cargo (scrap, salt, wood chips); break bulk (industrial and machinery parts, construction materials); project cargo (power plant components, vacuum tanks) and container cargo.

[6] Port of Portsmouth profile: http://www.seacoastnh.com/business/port.html



Charter boats operate from 3 of the Division's facilities: Hampton Harbor Marina, Hampton, NH; Rye Harbor Marina, Rye, NH; Market Street Marine Terminal-Burge Wharf, Portsmouth, NH. The vessels range from the 6 passenger (6 pack) boats to 45 passenger vessels. The boats are chartered for fishing for stripers, bluefish, cod or blue fin tuna; scuba diving excursions to the Isles of Shoals or the scallop beds; cocktail or lobster bakes; lobster trap-hauling demonstrations.

There are several party fishing boats, half-day and full-day, that operate from the Hampton and Rye Harbor Marinas. These vessels range in size up to 75 feet in length and carry up to 150 passengers. Some companies are: Atlantic Fishing Fleet, Sushi Hunter Charters, Northeast charter Boat Company, Northwind and Seafari.

Some passenger vessels offer whale watching trips that operate from the Hampton and Rye Harbor Marinas. The Isles of Shoals Steamship Company provides ferry service to Star Island at the Isles of Shoals from the Market Street Marine Terminal-Barker Wharf. The Isles of Shoals is a group of islands located approximately 7 miles off the coast of New Hampshire. The majority of activity on the islands is at the hotel/conference center on Star Island. The DPH is responsible for more than 1,500 moorings in 29 mooring fields.

Commercial Fishing
Pursuant to State Statute RSA 12-G:43(b), the Division of Ports and Harbors (DPH) shall, "aid in the development of salt water fisheries and associated industries." The DPH has responsibility for and jurisdiction over the state-owned commercial fishing piers and facilities at Portsmouth, New Hampshire; Rye Harbor, New Hampshire; and Hampton Harbor, New Hampshire. Berths and slips are only available at Portsmouth. Due to physical limitations at Rye and Hampton, no long-term or overnight berthing is available. Commercial fishermen wishing to use the facilities must be issued a "Pier Use" permit. Bulk fuel is available through permitted vendors; contact the DPH for a list of these vendors. Ice and chandlery is available at Portsmouth. The DPH is the Grantee of Foreign-Trade Zone #81, which includes 5 sites and 1 subzone (Westinghouse Electric): The Market Street Terminal is 11 acres; Portsmouth Industrial Park is 75 acres; Dover Industrial Park, is 50 acres; Manchester Airport is 1400 acres and Pease International Tradeport, 1900 acres. [7]

[7] Port of New Hampshire website: http://www.portofnh.org/who.html

5. Boston, MA

Location and Background Information

The Port of Boston is located in the Boston-Cambridge-Quincy, Massachusetts-New Hampshire Metropolitan Statistical Area (MSA). Boston is the oldest continually active major port in the Western Hemisphere. Though it did not become an international cargo port until 1630, for at least four thousand years previously, it had served as a settlement and trading area for Native American tribes. After the Massachusetts Bay Colony was formed, the port became a very busy place.

Concerned about their utter dependence on British trading ships, they sought greater independence by starting a vigorous shipbuilding industry of their own, and began to establish independent trading links with other colonies and countries to the north and south. For most of the century, Boston was America's largest and busiest port, serving the rapidly expanding colonies with imports of English finished goods in exchange for exports of lumber, fully constructed vessels, rum and salted fish.

Since 1980, container traffic has tripled and Boston has become one of the most modern and efficient container ports in the U.S. General cargo tonnage growth has averaged 3.6% growth each year. The passenger ship industry is also expanding in the Port of Boston. Numerous four and five star cruise lines such as Cunard, Norwegian Majesty, Hapag-Lloyd and Silversea regularly call the port. With more than 62 ship calls last year alone, the port is now considered one of the fastest-growing high-end cruise markets in the country.

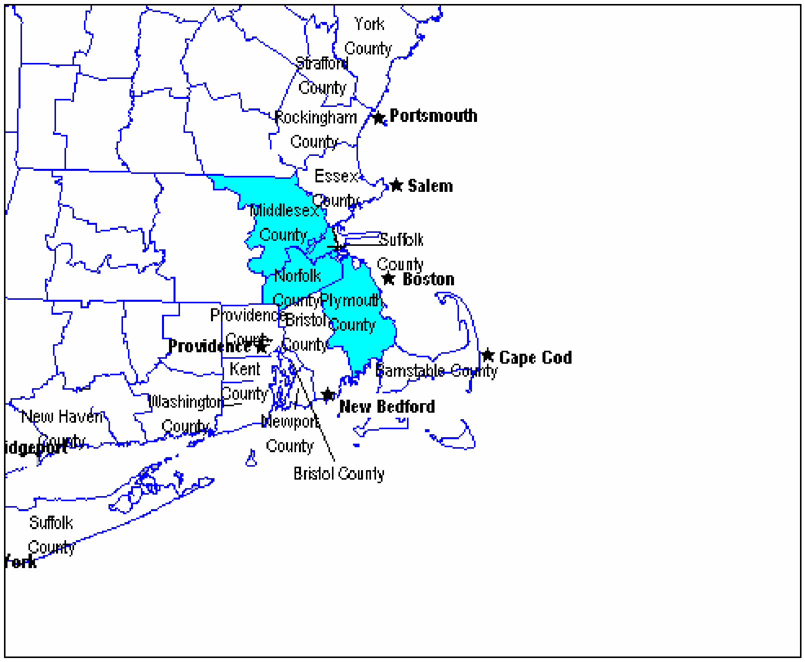
Boston also hosts an enormous complex of privately owned petroleum and liquefied natural gas terminals, which supply more than 90% of Massachusetts' petroleum consumption needs. The port is home to two shipyards, numerous public and private ferry operations, world-renowned marine research institutions, marinas, a major Coast Guard facility and is one of America's highest-value fishing ports.

Boston is one of the most modern and efficient container ports in the U.S. Conley Terminal for containerized cargo shipments and Moran Terminal, currently leased to Boston Autoport for the import and distribution of automobiles handle more than 1.3 million tons of general cargo, 1.5 million tons of non-fuels bulk cargo and 12.8 million tons of bulk fuel cargos yearly.

With 101 passenger ships scheduled to call in the 2005 season, Cruiseport Boston is now considered one of the fastest growing high-end cruise markets in the country. The Black Falcon Cruise Terminal, located in the Boston Marine Industrial Park will serve over 210,000 cruise passengers this year. Another full cruise season is planned for 2006 between the months of April and October.[1]

[1] Massachusetts Port Authority website: http://www.massport.com/ports/about.html

Figure 5-1. Boston, MA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Boston-Cambridge-Quincy, Massachusetts-New Hampshire Metropolitan Statistical Area is of 3,278,333, according to the 2000 US Census. Of this total, 1,582,659 or 48.3 percent are males and 1,695,674 or 51.7 percent are females. The median age in this region is 35.8 years; 34.7 for males and 36.9 for females. The majority of the population in this area falls within two age brackets, 18 – 29 years and 30 – 39 years; accounting for approximately 34 percent of males and 32 percent of females (Figure 5-2).

The majority of the population in this area is white (81 percent), followed by the Black or African American population, which represents 7.3 percent of the total population. The 'other' category (which includes American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represents 6.2 percent of the total population, followed by the Asian population, which represents 5.5 percent of the total population (Figure 5-2). In terms of ethnic makeup, 6.0 percent of the total population is considered to be of Hispanic or Latino origin.[2]

[2] US Census Data, Census 2000.

Figure 5-2. Boston, MA: Structure of the Population by Age Group, 2000

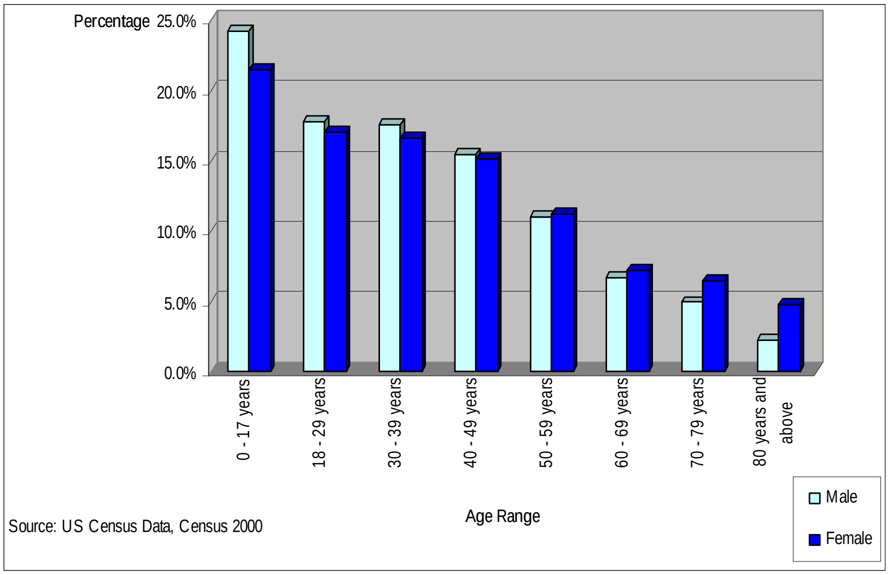
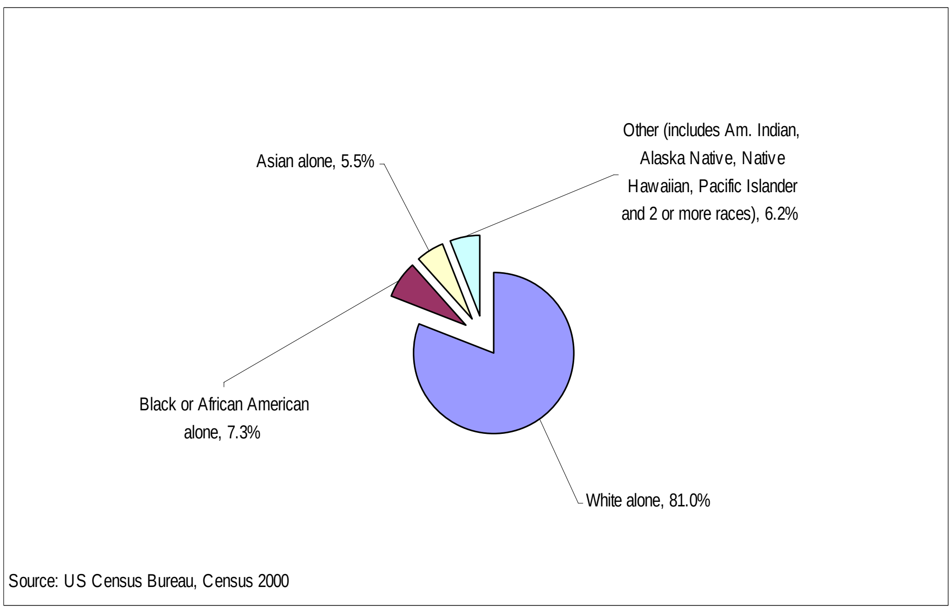
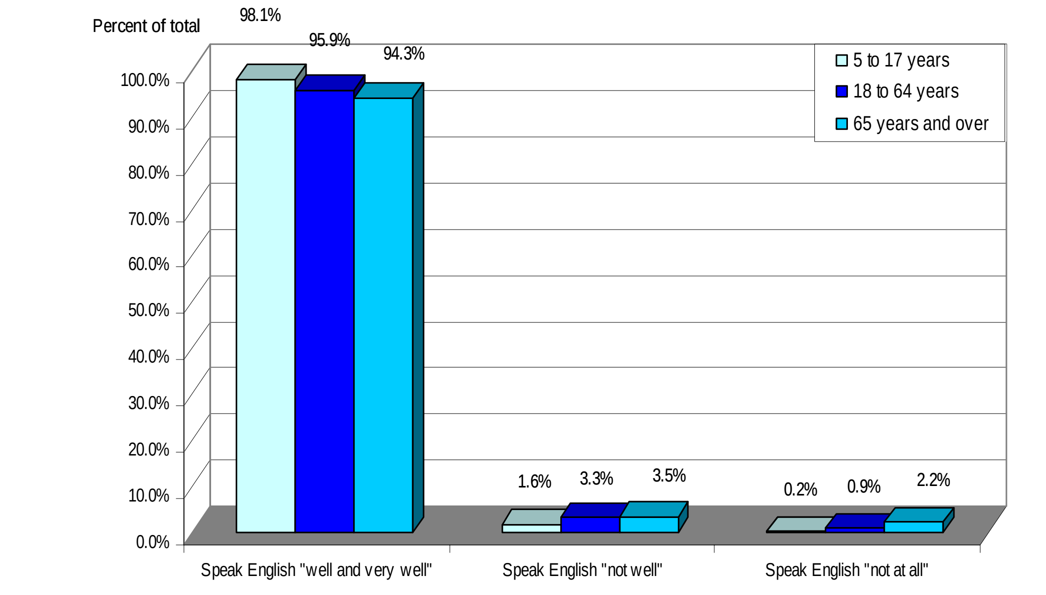


Figure 5-3. Boston, MA: Population by Race, 2000



It is evident from the data specified in Figure 5-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. The older population groups dominate the language less fluently, about 5.7 percent of the population that is 65 years and over and about 4.2 percent of the population in the 18 – 64 years age bracket don't speak English well or do not speak English at all.

Figure 5-4. Boston, MA: Ability to Speak English by Age Group, 2000



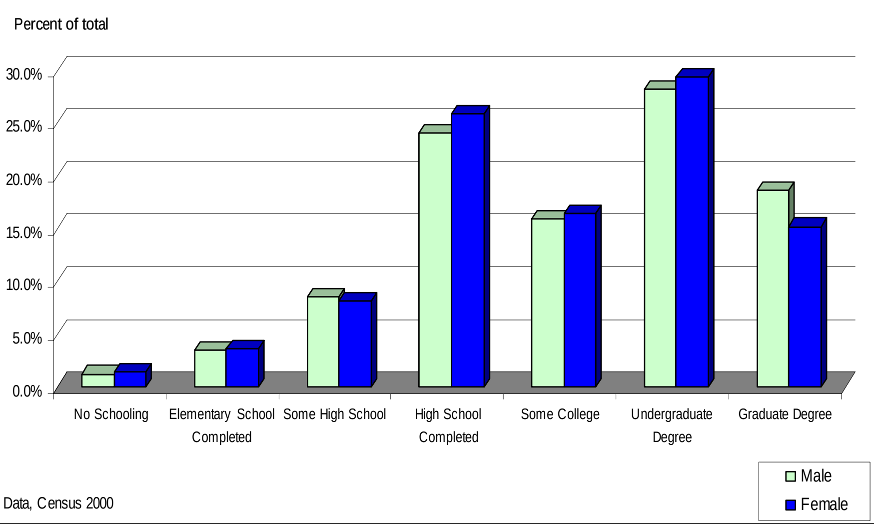
Source: US Census Data, Census 2000

EDUCATION

It is evident from Figure 5-5 that the majority of the population in this area has completed high school (between 24 – 25 percent) and has obtained an undergraduate degree (27 – 29 percent). Around 14 – 18 percent of the population has obtained a graduate degree.

The city of Boston is known for having one of the highest concentrations of colleges and universities in the nation. Some of the finest educational institutions in the country are located in this region, among them Harvard University and MIT. Other well-known colleges in the area are: Boston University, Tufts University, University of Massachusetts Boston, Northeastern University, Emerson College, Boston College and Wellesley College.

Figure 5-5. Boston, MA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



Source: US Census Data, Census 2000

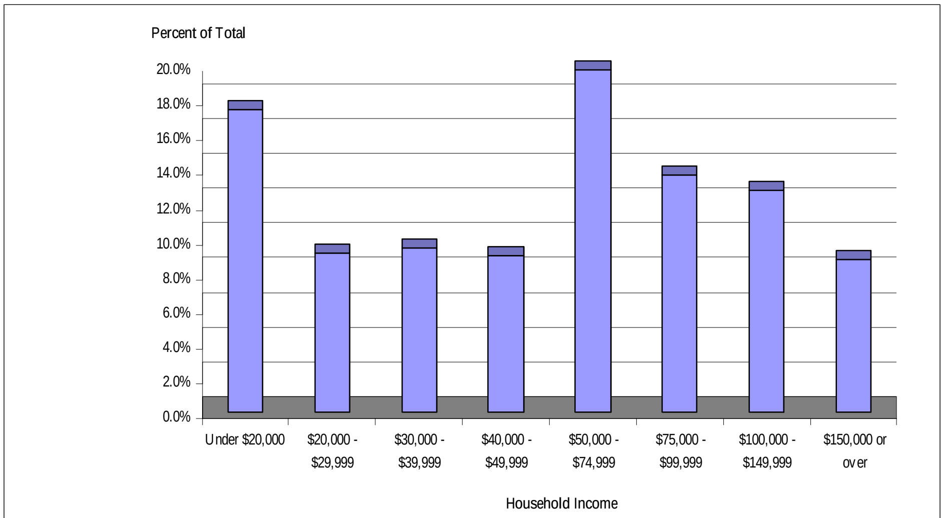
Socio-Economic Characteristics

INCOME

As is apparent from Figure 5-6, most households in the area fall within the income bracket of $60,000 - $74,999 (about 20 percent), followed by 18 percent of households that have incomes under $20,000.

Household median income for the area for the year of 1999, according to the 2000 US Census, was $55,882.15 and per capita income was $28,754.99. The percentage of people under the poverty line in the region was 8.8 in the year 2000. The average household size in this area in 2000 was 2.52.[3]

Figure 5-6. Boston, MA: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

It is evident from Figure 5-7 that about 35 percent of females are employed in the education, health and social industry; whereas males are mostly concentrated in 'other' industries such as the arts, entertainment, recreation, food services, public administration and information (20 percent). Women also have a high representation in the previous category (approximately 19 percent). Slightly over 15 percent of males are employed in professional, science management, administration and waste management services industries.

An estimated 4.3 percent of males and 4.1 percent of females were unemployed in this metropolitan statistical area in the year 2000.[4]

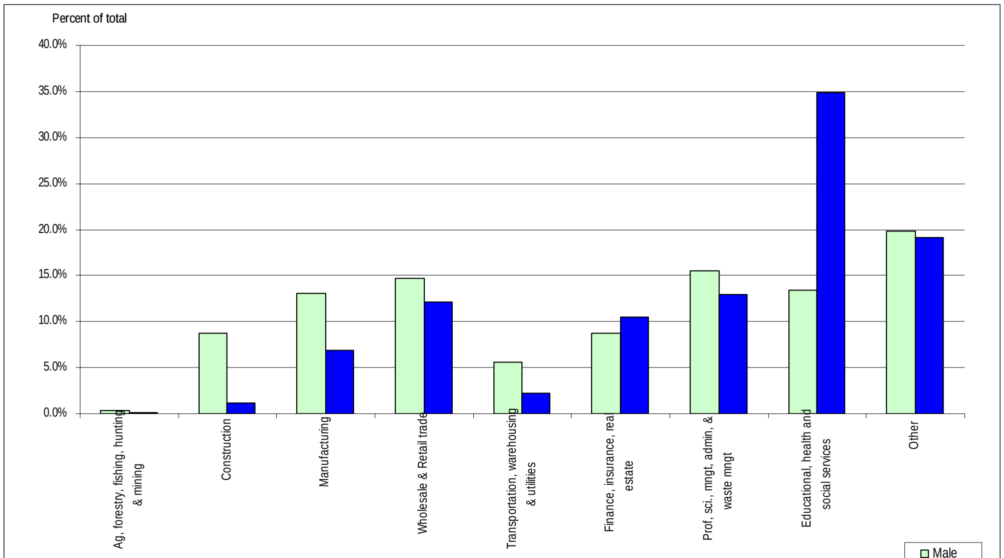
According to the 2000 US Census, an estimated 0.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 12.5 percent of males and 4.7 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.04 percent of female's occupations.

---

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 5-7. Boston, MA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



Source: US Census Bureau, Census 2000

MARITIME INFORMATION

The Boston Harbor Navigation Improvement Project (BHNIP), already underway, will deepen key portions of Boston's Inner Harbor, its tributary channels, and berth areas to allow the significantly larger "post-Panamax" class of vessels to call in the Port. A total of approximately 2.3 million cubic yards of material will be dredged from key portions of the channels and berths. The completion of this project, coupled with the harbor's nine foot tide swing, will allow even the largest vessels to enter the harbor safely. Boston's channels will be deeper than those of many of the east coast ports, greatly enhancing the Port of Boston's competitive position and providing a significant economic benefit to the New England region.

Dredging of Boston's Inner Harbor began in August 1998 by Great Lakes Dredge & Dock Company. Dredging is proceeding rapidly with most of the silt material already removed from the Reserved Channel and the Mystic River. Three disposal cells have been constructed, filled, and capped in the Mystic River, and three other cells are currently open and being used for disposal in the Mystic and Chelsea Rivers. Several of the berths adjoining the project have been dredged and project benefits are already beginning to be realized.

Massport, in cooperation with The Massachusetts Highway Department and the City of Boston, has developed a permitted overweight container route between Conley Terminal, near-dock sites in Boston, and the CSX rail transfer facility four miles to the west. Companies that pay the federal Harbor Maintenance Tax for goods moving through Massachusetts ports, are eligible for a dollar-for-dollar Massachusetts tax credit. This credit applies to containerized cargo, break bulk, and road vehicles.

Multiple off-dock transloading facilities including warehouse space and cooler facilities for perishables, and several trucking operations are available close to Massport maritime facilities. The Massachusetts Seaport Bond Bill provides partial funding for Double stack rail clearances in the state, and Massport is working with the Executive Office of Transportation and Construction to expedite signing of the Master Agreement between the railroads. Furthermore, Massport works closely with the U.S. Department of Agriculture and private companies to provide fumigation services as needed for cargo in the port.[5]

[5] Massachusetts Port Authority website: http://www.massport.com/ports/about_value.html

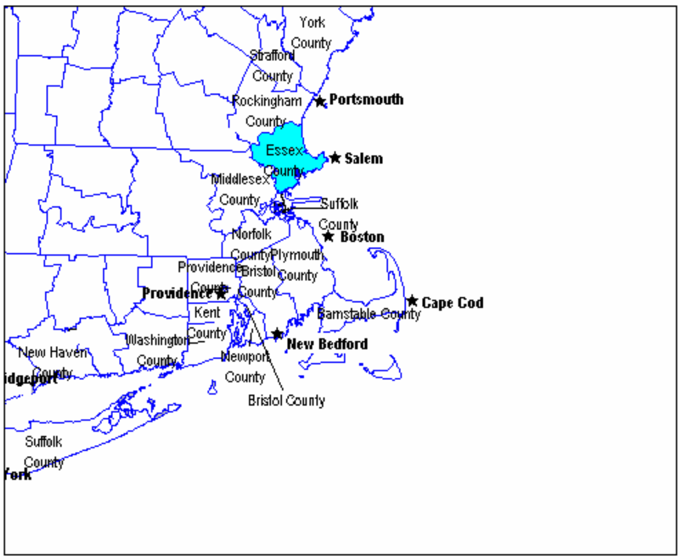
This page intentionally left blank.

6. Salem, MA

Location and Background Information

The Port of Salem is located in the Essex County, MA Metropolitan Division, which is part of the Boston-Cambridge-Quincy, Massachusetts – New Hampshire Metropolitan Statistical Area (MSA). Founded in 1626, Salem became one of the first and most significant commercial seaports in colonial America. Located along the northeastern coast of Massachusetts, Salem is the second largest and deepest natural harbor of the commonwealth. [1]

Figure 6-1. Salem, MA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of Essex County, MA is 723,419, according to the 2000 US Census. Of this total, 346,421 or 47.9 percent are males and 376,998 or 52.1 percent are females. The median age in the county is 37.5 years; 36.2 for males and 38.6 for females. The majority of the population is concentrated in two age brackets: 30 – 39 years and 40 – 49 years; approximately 32 percent of males and 30 percent of females (Figure 6-2).

As evidenced by Figure 6-3, the majority of the population in the county is white (86.4 percent), followed by 8.8 percent of 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone). The Black or African American population represents 2.5 percent of the total population, closely followed by the Asian population (2.4 percent). In terms of ethnic structure, 11.0 percent of the total population is considered to be of Hispanic or Latino origin.[2]

[1] Seaport Advisory Council webpage: http://www.mass.gov/seaports/salem.htm

[2] Source: US Census Data, Census 2000.

Figure 6-2. Salem, MA: Structure of the Population by Age Group, 2000

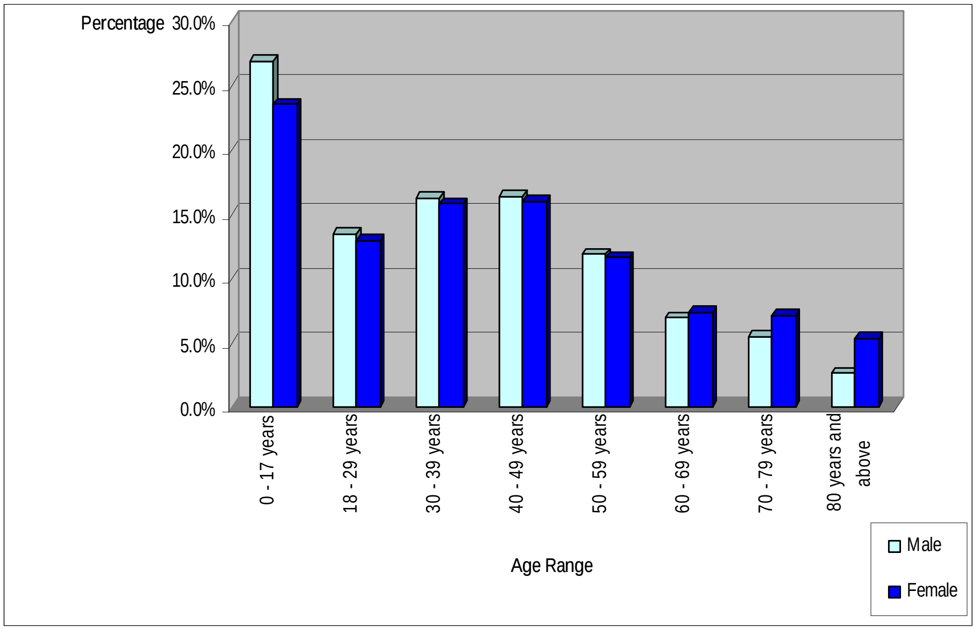
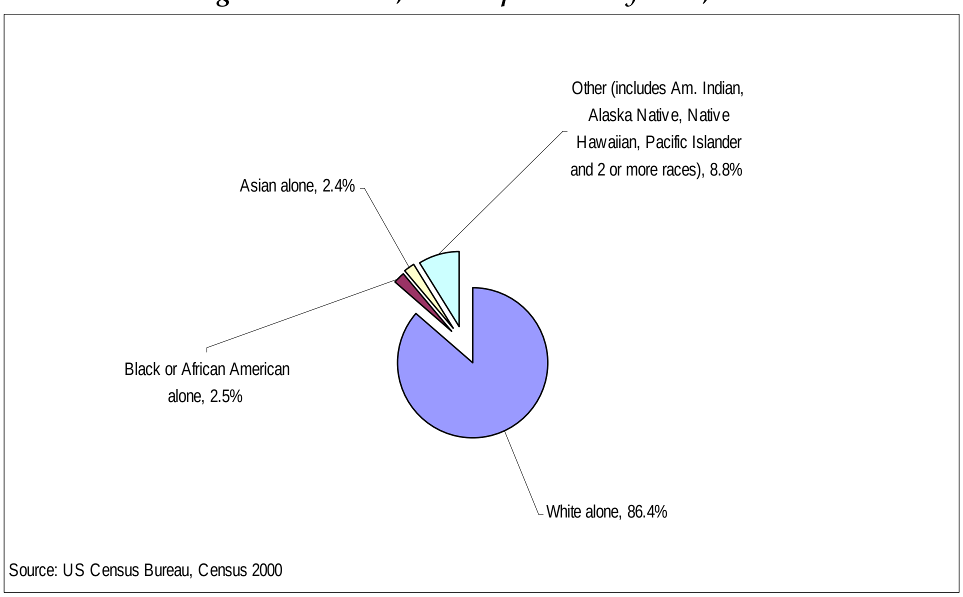
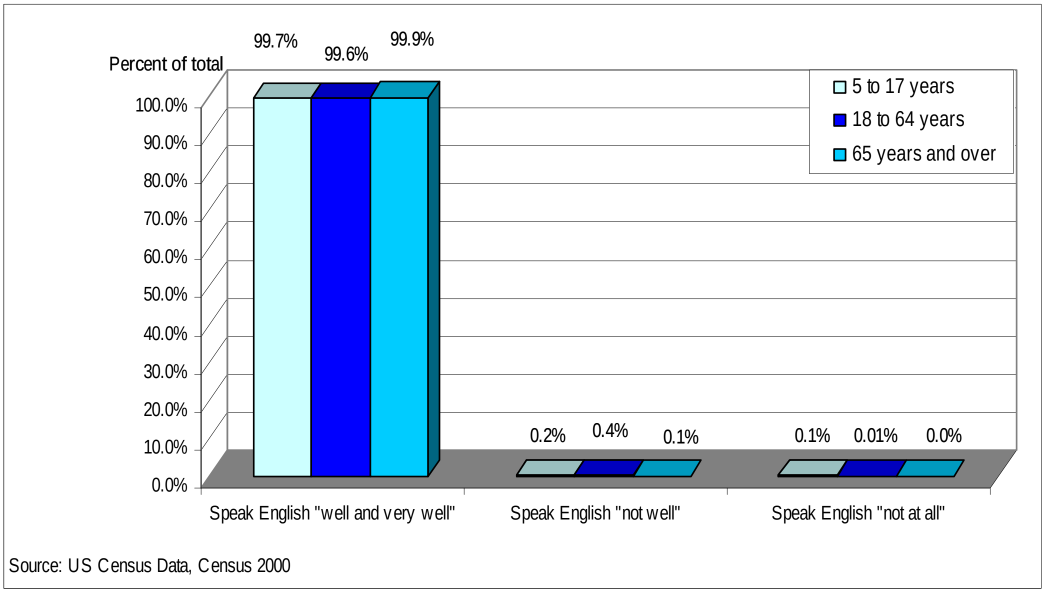


Figure 6-3. Salem, MA: Population by Race, 2000



It is evident from the data specified in Figure 6-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 6-4. Salem, MA: Ability to Speak English by Age Group, 2000

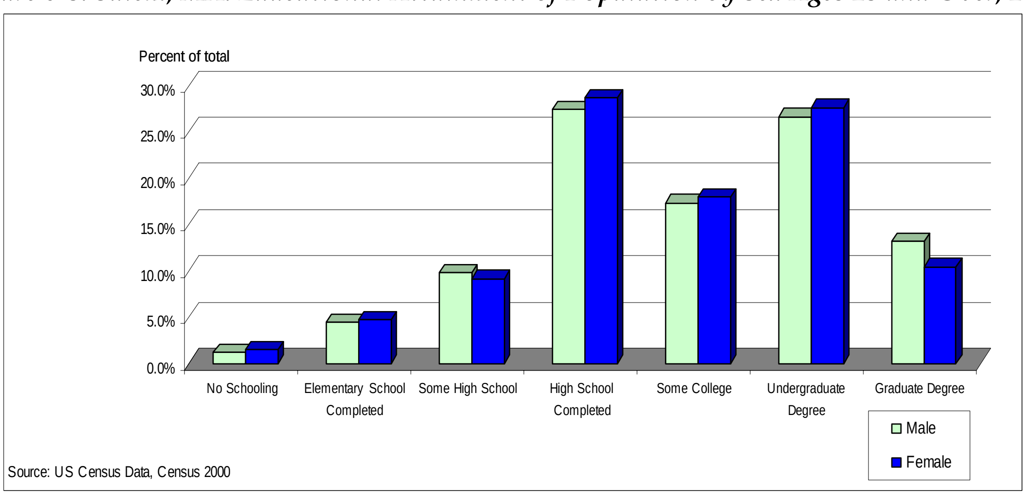


EDUCATION

About 26 percent of males and 27 percent of females have completed high school in the area, and about 25 – 26 percent of males and females have obtained an undergraduate degree (Figure 6-5).

Salem is home to Salem State College and Marian Court College.[3]

Figure 6-5. Salem, MA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



[3] Salem Community Profile: http://www.epodunk.com/

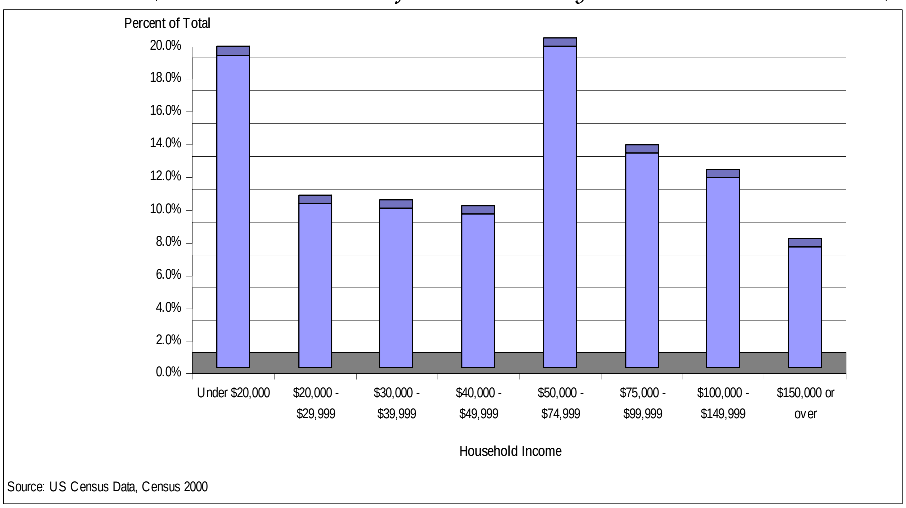
Socio-Economic Characteristics

INCOME

As is portrayed by Figure 6-6, most households in Essex County, MA have an income of under $20,000 or in the bracket of $50,000 - $74,999 (20 percent in each category).

Household median income in 1999, according to the 2000 US Census, was $51,576 and per capita income was $26,358. The percentage of people under the poverty line in the region was 8.9 in the year 2000. The average household size in 2000 was 2.57.[4]

Figure 6-6. Salem, MA: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Around 34 percent of working females in this region are employed in educational, health and social services industries and around 19 percent of them are employed in 'other' industries, including occupations in the arts, entertainment, recreation, food services, public administration and information. Approximately 21 percent of males are employed in the manufacturing sector, and 18 percent of them are employed in 'other' industries (Figure 6-7).

An estimated 4.5 percent of males and 4.7 percent of females were unemployed in 2000.[5]

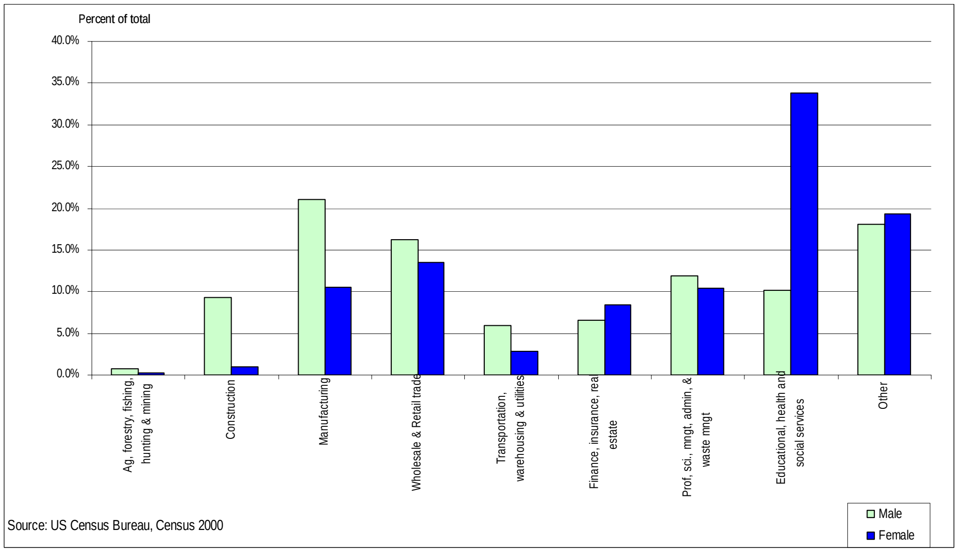
According to the 2000 US Census, an estimated 0.5 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 17.0 percent of males and 7.4 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.043 percent of female's occupations.

---

[4] US Census Data, Census 2000.

[5] US Census Data, Census 2000.

Figure 6-7. Salem, MA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of Salem won early fame as the center of an active shipping trade to the ports of Asia. Salem's vessels and sea captains established lucrative trading routes to China, Japan, Polynesia and throughout the Pacific Basin. Between 1750 and 1810, thousands of sailing voyages began and ended in the Port of Salem. Shipping activity diminished after the War of 1812, and Salem lost its prominence to emerging ports with facilities for new, larger clipper ships. Commercial shipping returned to Salem Harbor in 1940 with the construction by New England Power Company of an electric generating plant. A new deep-water channel was dredged to allow for fuel delivery, and these facilities are the base for all bulk cargo shipments today. Salem's port facilities receive more than one million tons of coal and three million barrels of petroleum products each year. These products arrive in vessels as large as 800 feet in length and 34 feet of draft. A major port expansion project, now underway, will enlarge port capacity, increase allowed draft and produce a new ship berth facility designed to serve cruise vessels and coastal ferry operations. This $18-million infrastructure improvement will reestablish the regional prominence of this historic seaport.

Attractions such as the Peabody-Essex Museum, House of Seven Gables, Salem Witch Museum and the National Maritime Historic Site of the National Park Service are among the key attractions in Salem.[6] The Port of Salem is located on the Northeastern coast of Massachusetts, 12 miles north of Boston. It has one 800-foot berth and is operated by the New England Power Company. Salem has a cargo of more than one million tons of coal and three million barrels of oil annually. Its main trade is with South America and other states in the United States.

The Port has storage capacity for 100,000 tons of bulk and one million barrels of oil and it offers fuel, water and stores services. The Port is one mile away from an existing rail and is three miles away from Route 128/I-95. Future plans include the expansion of the existing ship basin and the construction of a second 600-foot pier and cruise terminal.[7]

---

[6] Seaport Advisory Council website: http://www.mass.gov/seaports/salem.htm

[7] Port Advisory Council website: http://www.mass.gov/seaports/salem.htm

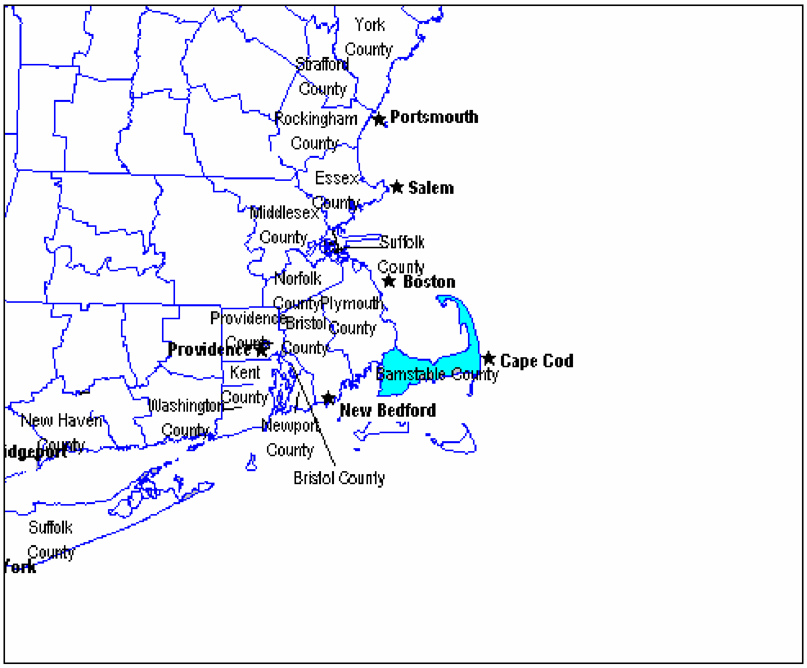
This page intentionally left blank.

7. Cape Cod Bay, MA

Location and Background Information

The Port of Cape Cod is located in the Barnstable Town, Massachusetts Metropolitan Statistical Area (MSA). This MSA is comprised by Barnstable County, MA.

Figure 7-1. Cape Cod Bay, MA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

Total population of the Barnstable Town, MA MSA is 222,230; according to the 2000 US Census. Of this total, 105,199 or 47.3 percent are males and 117,031 or 52.7 percent are females. The median age for the region is 44.6; 42.9 for males and 46.1 for females.

As Figure 7-2 shows, the majority of the population in this county is white (94.3 percent), followed by 'others' (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), which represent 3.5 percent of the total population. The Black or African American population represents 1.5 percent of the total population, closely followed by Asian population (0.6 percent). In terms of ethnic makeup, 1.3 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000

Figure 7-2. Cape Cod Bay: Structure of the Population by Age Group, 2000

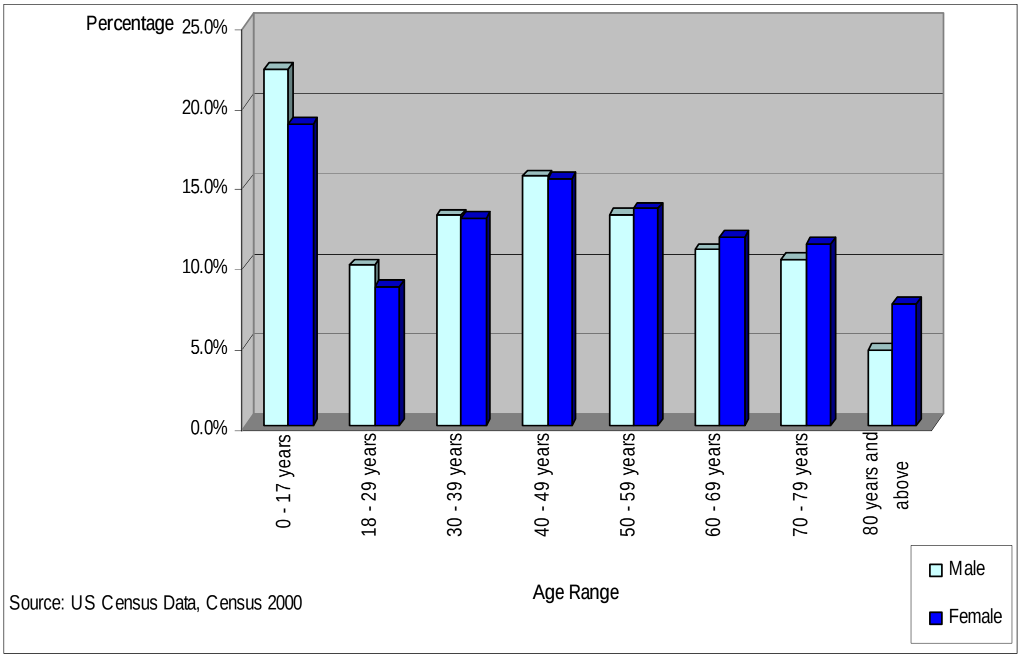
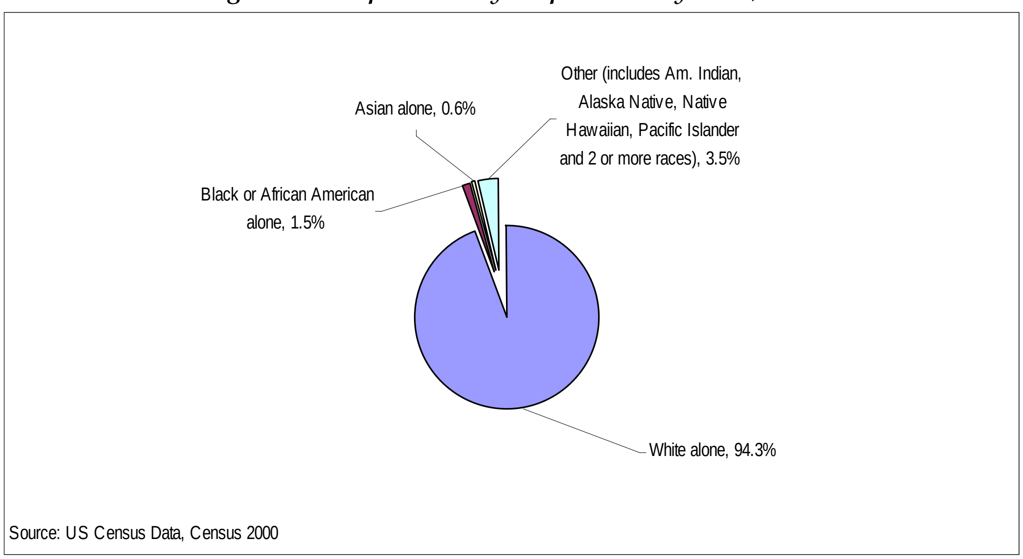
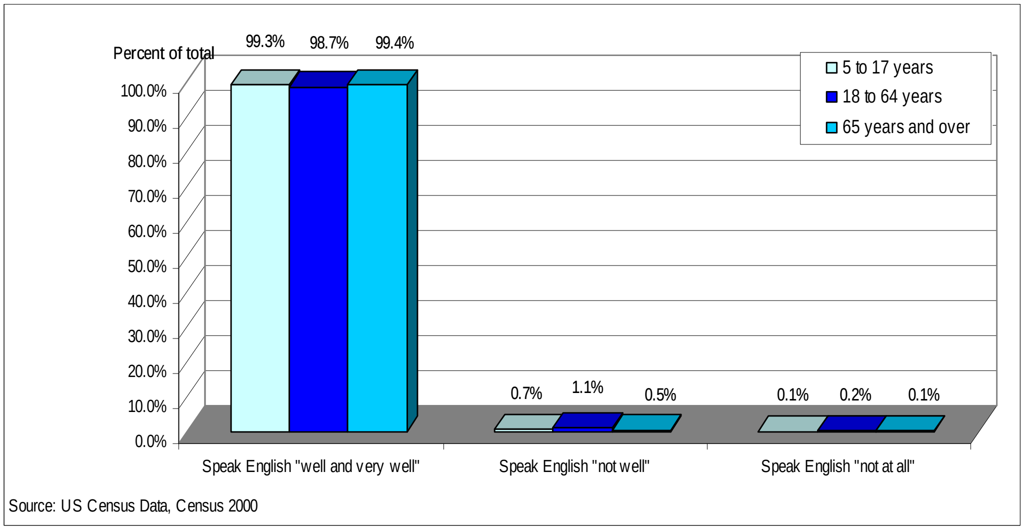


Figure 7-3. Cape Cod Bay: Population by Race, 2000



It is evident from the data specified in Figure 7-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

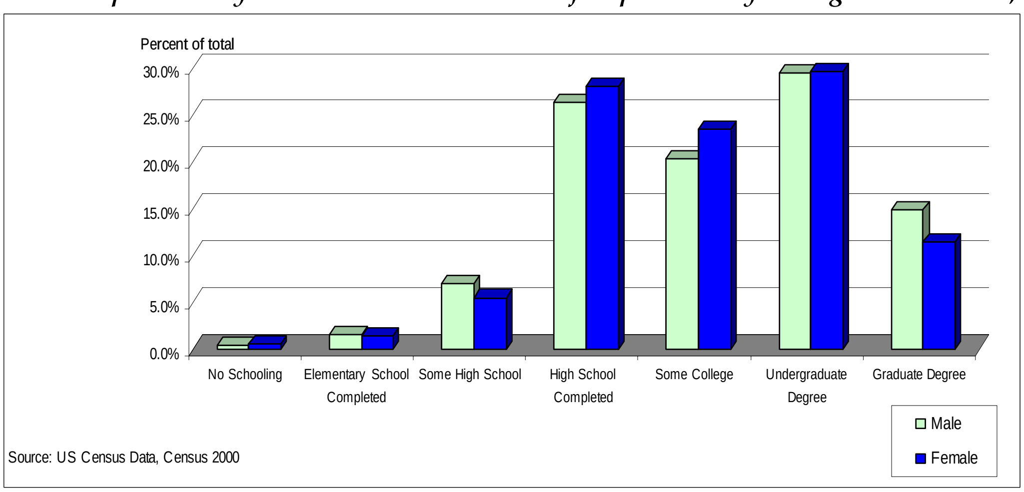
Figure 7-4. Cape Cod Bay: Ability to Speak English by Age Group, 2000



EDUCATION

Most of the population in the region has obtained an undergraduate degree and has completed college. In lesser numbers, some people have finished some college or obtained a graduate degree (Figure 7-5).

Figure 7-5. Cape Cod Bay: Educational Attainment of Population by Sex Ages 25 and over, 2000



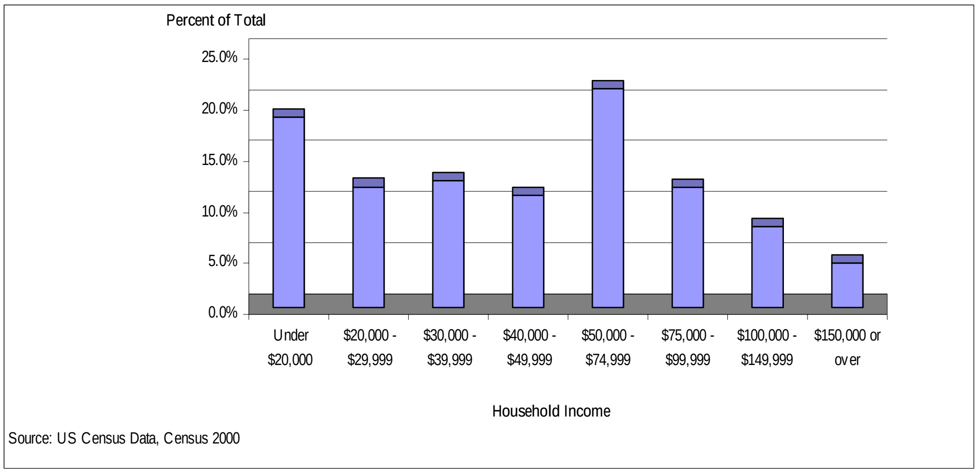
Socio-Economic Characteristics

INCOME

About 22 percent of households in the region have incomes that fall within the $60,000 - $74,999 income bracket. Twenty percent of households have incomes under $20,000.

Household median income in the Cape Cod Bay area in 1999, according to the 2000 US Census, was $45,933.00. The per capita income for 1999, according to the 2000 US Census, was $25,318. The percentage of people under the poverty line in the region was 6.9 in the year 2000. The average household size is 2.28.

Figure 7-6. Cape Cod Bay: Distribution of Households by Household Income Level, 1999



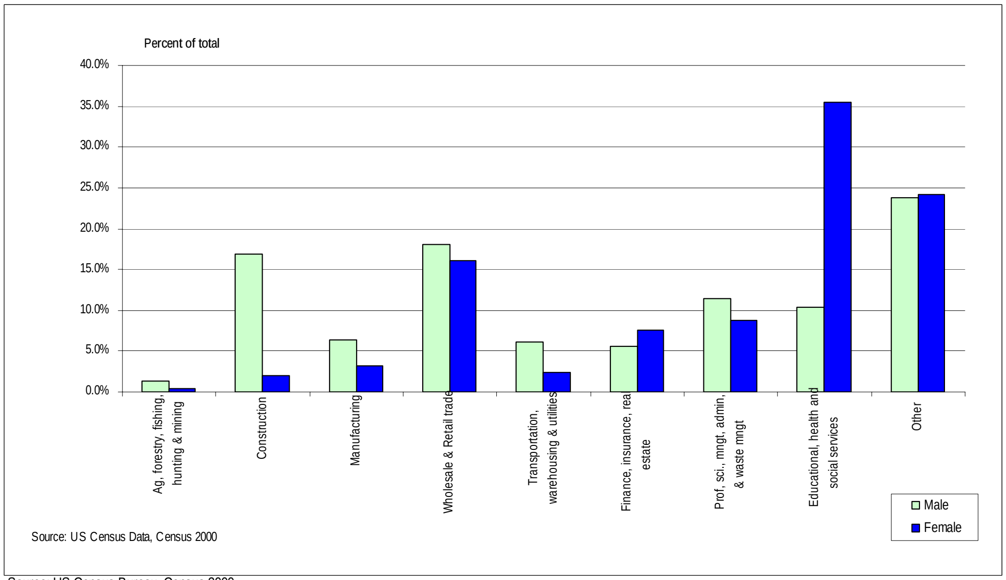
EMPLOYMENT

Around 35 percent of working females in this region are employed in educational, health and social services sectors and around 24 percent of them are employed in 'other' industries, including occupations in the arts, entertainment, recreation, food services, public administration and information. Approximately 23 percent of males are employed in 'other' industries and 18 percent of them are employed in the wholesale and retail sector (Figure 6-7).

An estimated 5.6 percent of males and 4.6 percent of females are unemployed.

According to the 2000 US Census, an estimated 1.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 11.2 percent of males and 3.5 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.9 percent of male's occupations and 0.1 percent of female's occupations.

Figure 7-7. Cape Cod Bay: Employed Civilian population by Sex and Industry 16 years and over, 2000



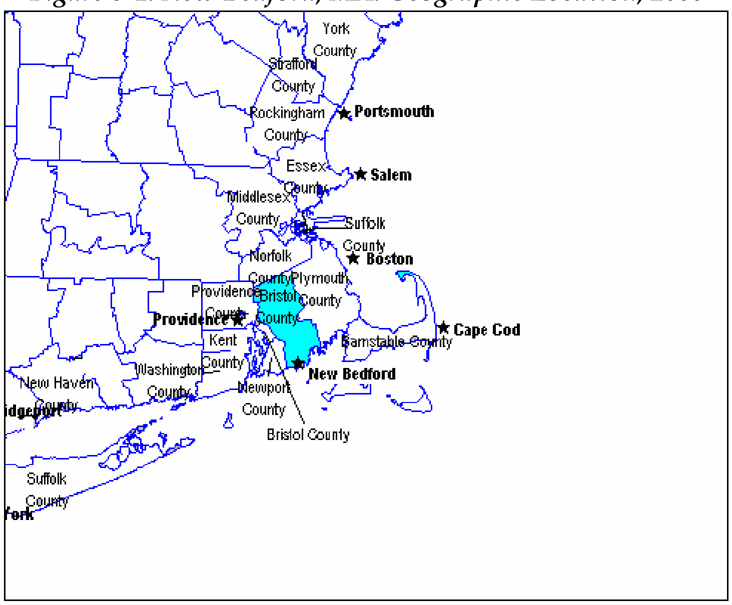
This page intentionally left blank.

8. New Bedford, MA

Location and Background Information

The Port of New Bedford is part of the Providence-New Bedford-Fall River, Rhode Island – Massachusetts Metropolitan Statistical Area (MSA). New Bedford is located in Bristol County, MA. New Bedford is centrally located on the southeastern coast of Massachusetts. It provides easy access to New England and Canadian markets and has established itself as one of the busiest ports in Massachusetts. Since the early 1960s, the Port of New Bedford has been one of the area's largest handlers of perishable goods, servicing vessels from around the world. Shipments include fruit, vegetables, and bulk commodities of frozen fish and meat products. Currently, New Bedford has various vessel berths and is able to accommodate the largest refrigerated vessels afloat. [1]

Figure 8-1. New Bedford, MA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of Bristol County, MA is of 534,678, according to the 2000 US Census. Of this total, 256,747 or 48 percent are males and 277,931 or 52 percent are females. The median age of the population is 36.7 years; 35.4 for males and 38 for females. As evidenced by Figure 8 – 2, about 30 percent of males and females fall within the 30 – 39 and 40 – 49 years age bracket.

The majority of the population in the county is white (91 percent), followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), which represent 5.6 percent of the total population. The African American or Black population

[1] Seaport Advisory Council: http://www.mass.gov/seaports/newbed.htm

represents 2 percent of the total population; closely followed by the Asian population, which represents only 1.4 percent (Figure 8-3). Moreover, in terms of ethnic structure, 3.6 percent of the total population is considered to be of Hispanic or Latino origin.[2]

Figure 8- 2. New Bedford, MA: Structure of the Population by Age Group, 2000

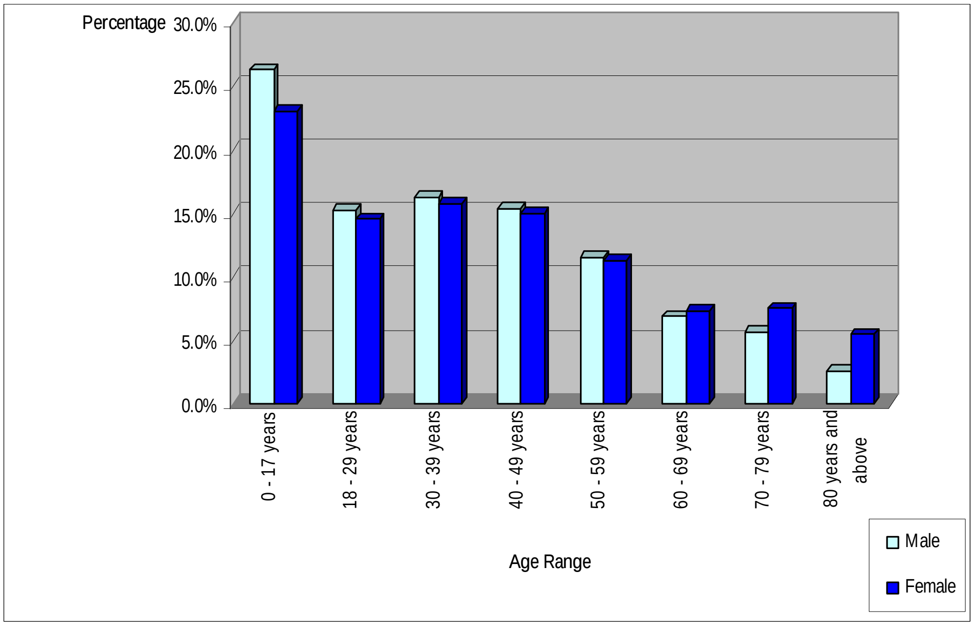
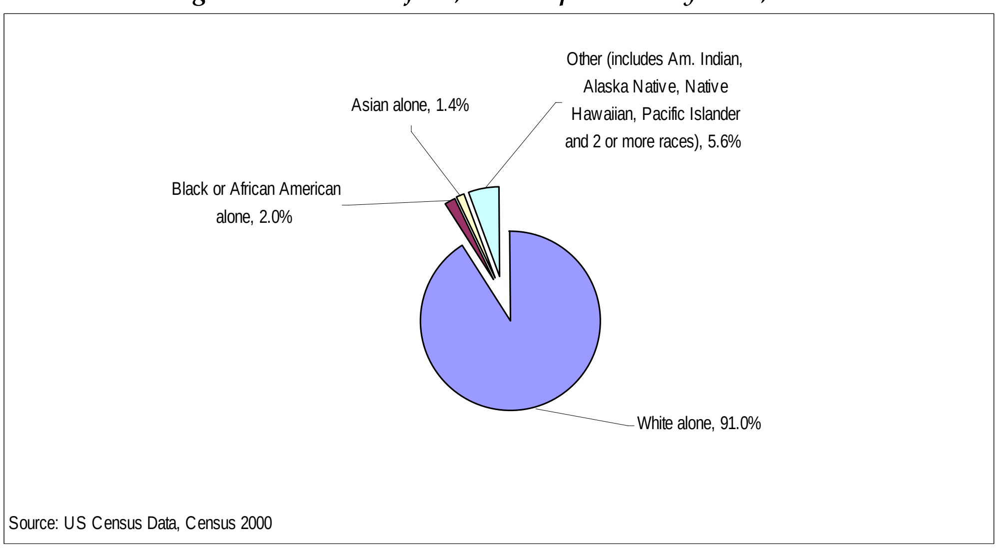


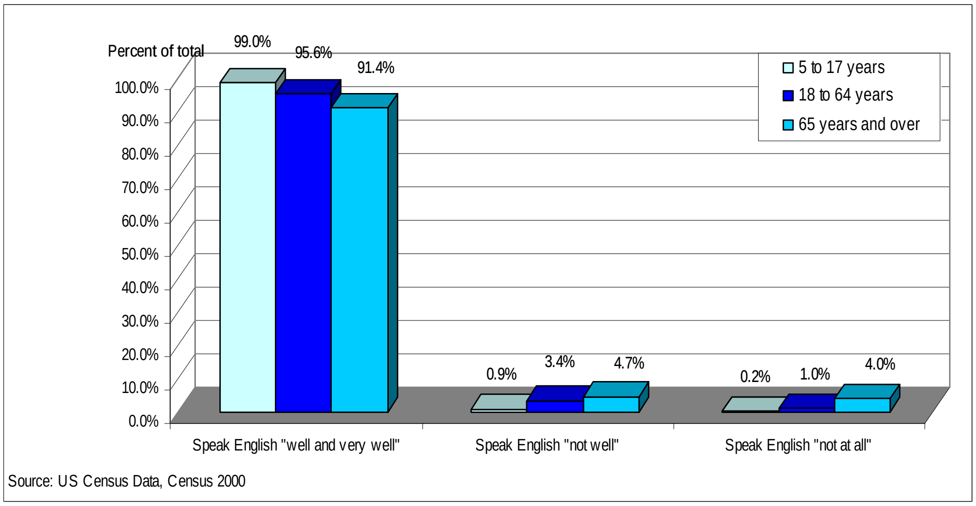
Figure 8-3. New Bedford, MA: Population by Race, 2000



2 US Census Data, Census 2000

It is evident from the data specified in Figure 8-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. However, an estimated 8.7 percent of the population in the age range of 65 years and over, do not dominate the English language completely.

Figure 8-4. New Bedford, MA: Ability to Speak English by Age Group, 2000

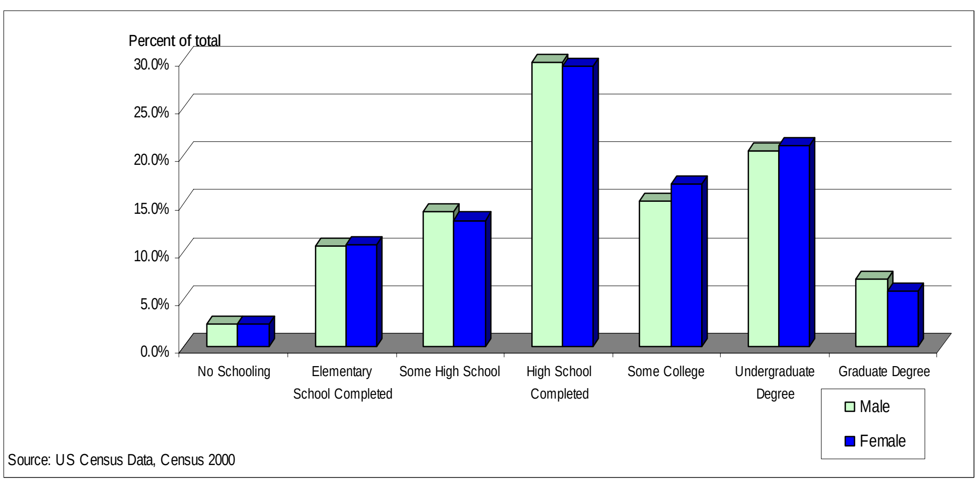


EDUCATION

As is evident from Figure 8-5, almost 30 percent of females and males, ages 25 or over, have completed high school. About 20 percent of both sexes have an undergraduate degree and around 15 percent of both sexes have completed some college.

There are several colleges and universities in Bristol County, MA, among them: Southern New England School of Law, Stonehill College, University of Massachusetts - Dartmouth, Wheaton College and Bristol Community College.

Figure 8-5. New Bedford, MA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



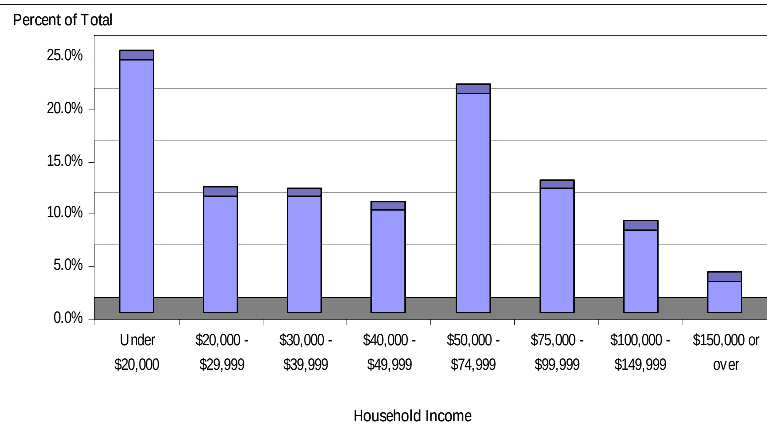
Socio-Economic Characteristics

INCOME

Figure 8-6 clearly portrays that about 25 percent of households in Bristol County, MA have an income of under $20,000. This percentage is closely followed by households in the $50,000 - $74,999 income bracket, which represent about 20 percent of all households. Less than 5 percent of households in the region have incomes of $150,000 or over.

Household median income in 1999 in the area, according to the 2000 US Census, was $43,496 and per capita income was $20,978. The percentage of people under the poverty line in the region was 10 in the year 2000. The average household size in 2000 was 2.54.[3]

Figure 8-6. New Bedford, MA: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

Around 35 percent of females of the employed civilian population in the region ages 16 or over are employed within the educational, health and social services industry; about 17 percent are employed in 'other' industries, such as the arts, entertainment, recreation, food services, public administration and information. About 22 percent of working males are employed in the manufacturing industry, approximately 18 percent are employed in the wholesale and retail trade industry and nearly 17 percent are employed in 'other' industries.

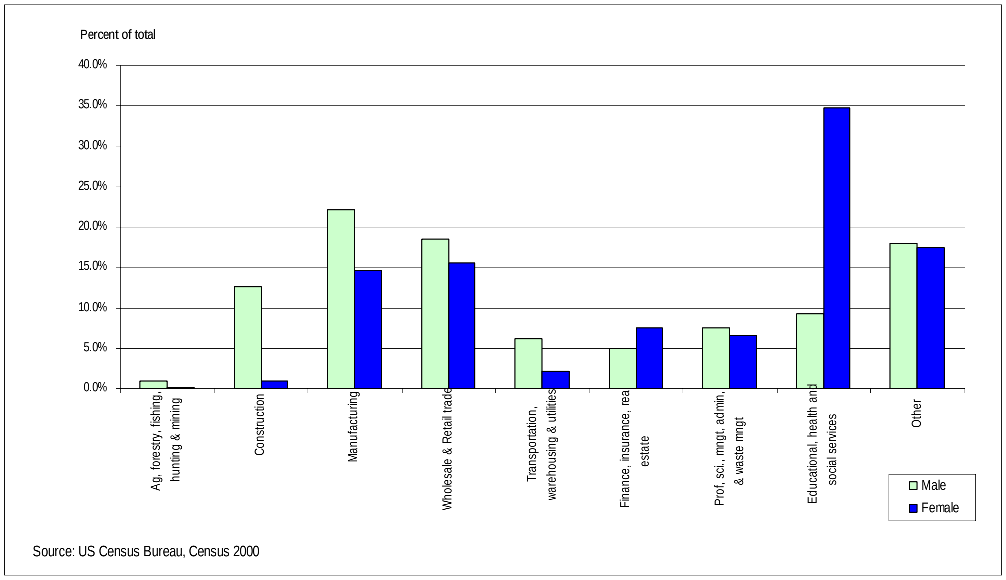
An estimated 6.3 percent of males and 5.2 percent of females were unemployed in Bristol County, MA in the year 2000.[4]

According to the 2000 US Census, an estimated 0.6 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 23.3 percent of males and 11.9 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.05 percent of female's occupations.

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 8-7. New Bedford, MA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

New Bedford Harbor is at the mouth of the Acushnet River, which flows south into Buzzards Bay and the Atlantic Ocean. The entrance to the harbor is only nine nautical miles from the beginning of the Cape Cod Canal shipping channel. The Port of New Bedford is a deep-water port with depths of 30 feet. The harbor features a hurricane barrier that stretches across the water from the south end of New Bedford to the Town of Fairhaven. The barrier's 150-foot opening is closed during hurricane conditions and coastal storms. As a result, the harbor is one of the safest havens on the eastern seaboard.

The port has a history of seafaring traditions that continue today with an active fishing fleet, ferry services, and cruise ship docking. The port is supported by the city's outstanding, multi-ethnic work force and international distribution services, which include an adjacent airport as well as rail and interstate highway connections. With over 950 recreational boat slips, New Bedford Harbor also is an important center for recreational boating.

New Bedford Harbor is one of the nation's major fishing ports. The port has ranked first in the U.S. for the last three years, based on value of product landed (source: National Marine Fisheries Service). The fishing fleet includes more than 250 vessels operating out of the port. These vessels consist mainly of steel hull construction and are rigged for ground fish and scallops, providing the highest quality seafood products worldwide. The harbor's seafood processing industry has grown in recent years to become a nationally and internationally recognized industry center.

Across the harbor, shipyards line the Fairhaven waterfront. Marine service and vessel repair industries in Fairhaven have established reputations along the East Coast. Two major shipyards, D.N. Kelley & Son and Fairhaven Shipyard, are known internationally for quality repair on all types of boats.

Support industries include vessel maintenance and repair conducted at dockside or at repair facilities along the New Bedford Waterfront. Equipment and provisions to support the fishing fleet and other commercial and recreational vessels, such as food, ice, fuel, oils, electronics, and other products, also are available at the port.

The Port of New Bedford is the largest breakbulk handler of perishable items in Massachusetts and adjacent states. Commodities brought by refrigerated vessels from around the world primarily include fresh fruit and fish, as well as substantial volumes of frozen fish. The Port has direct Atlantic service from Norway calling at Maritime International Terminal every two weeks to satisfy the needs of Massachusetts fish processors and distributors. With its waterfront warehouse capacity, Maritime International has one of the largest U.S. Department of Agriculture-approved cold treatment centers on the East Coast for the use of restricted imported fruit. The terminal receives approximately 25 vessels a year. Each vessel carries about 1,000 tons of fish or, if carrying fruit, about 2,000 to 3,000 tons of fruit. Port calls vary between one and two days per discharge.

Ferry services are available in the port, including passenger and cargo service to Cuttyhunk Island and passenger service to Martha's Vineyard. Launch, water taxi, and charter boat services also operate in the port.

Like many modern working ports, New Bedford/Fairhaven Harbor balances maritime interests and local economic needs with environmental concerns. Several economic and environmental designations, such as the Foreign Trade Zone and No Discharge Area, currently apply to the port. Long-term projects, such as the Superfund cleanup and restoration of federal navigation channels, are taking place in the port. These projects and designations will improve the harbor's environmental health and enhance its economic growth.

Designated Port Area (DPA)

The Massachusetts Office of Coastal Zone Management has classified portions of the waterfront in New Bedford and Fairhaven as a Designated Port Area (DPA) under a program to preserve and promote maritime industry. The DPA classification encourages the creation or expansion of water-dependent industrial facilities, such as fish processing plants, in developed harbor areas. DPAs are subject to specific provisions, including land use restrictions, under Massachusetts General Law Chapter 91, which is administered by the state's Department of Environmental Protection. DPAs also are officially identified as priority areas for federal and state funding, including funds available under the Seaport Bond. (Original source: MA Coastal Zone Management Web site: www.mass.gov/czm)

New Bedford Foreign Trade Zone

The Port of New Bedford, New Bedford Regional Airport, and adjacent areas form the New Bedford Foreign Trade Zone (FTZ), which provides duty-free manufacturing opportunities for importers and exporters. The City of New Bedford is grantee or holder of Foreign Trade Zone (FTZ) number 28. An FTZ is a designated area that, for Customs purposes, is considered outside the U.S. Nearly any imported merchandise can be brought into the FTZ for almost any kind of manipulation duty-free, unless it enters the U.S. market. Goods in the FTZ can be assembled, manufactured or processed and final products re-exported without paying Customs duties. If the final products enter the U.S., the duty rate may be lower than the duty applicable to the product itself or its parts.

New Bedford offers international distribution services that support the FTZ. The city is accessible by sea, air, and rail services, as well as interstate highway systems. The port has shipping agencies, freight forwarding and stevedore services, and warehouse and truck-brokering facilities. The New Bedford Regional Airport is located within the FTZ. New Bedford is serviced by the CSX interstate railway. The city is adjacent to the interstate highway system and is within overnight truck delivery distance of most major cities in the Northeast industrial corridor. Long-haul trucking service to Canada and U.S. inland states also is available.

New Bedford Foreign Trade Zone number 28 is a direct port of entry to European and Latin American markets. FTZ number 28 is able to sponsor expanded general purpose sites within a 60-mile radius of the city. In addition, the FTZ has the potential to sponsor qualified subzones anywhere in Massachusetts. The FTZ Corporation recently created a subzone near the port's South Terminal area outside the Hurricane Barrier.

No Discharge Area

The U.S. Environmental Protection Agency (EPA) has designated Buzzards Bay, including New Bedford Harbor, as a No Discharge Area (NDA). In NDAs, the discharge of all boat sewage, even if it is treated, is prohibited. The Coast Guard enforces restrictions in NDAs. To help boaters comply with federal law, pumpout facilities have been established throughout the area. Pumpouts are wet vacuums that draw sewage out of boat holding tanks for proper disposal. Many of these facilities have been funded by federal grants and are available at little or no cost to boaters. (Original source: MA Coastal Zone Management Web site: www.mass.gov/czm)

New Bedford Federal Navigation Project

The restoration of federally authorized channel depths in New Bedford/Fairhaven Harbor is one of the federal navigation - or dredging - projects maintained by the U.S. Army Corps of Engineers/New England District. The main deep-draft channel to New Bedford has an authorized depth of 30 feet, while shallow draft channels for the fishing fleet at Fairhaven have depths of 15 and 10 feet. The shallower channels on the Fairhaven side of the harbor require maintenance dredging of about 70,000 cubic yards of shoal material. The deeper channels serving the New Bedford waterfront would require dredging of about 1.3 million cubic yards to restore the authorized project dimensions.

The Army Corps assisted the Massachusetts Office of Coastal Zone Management (CZM) in preparation of a Dredged Material Management Plan to identify a disposal site for maintenance dredging of navigation channels in New Bedford and Fairhaven. The state study examined the dredging needs of the federal navigation project for New Bedford and numerous state, municipal, and private facility dredging needs for a 20-year period. Environmental permitting on the project has been completed. The New Bedford Harbor Development Commission is working with the Army Corps and Environmental Protection Agency to coordinate implementation of the 20-year maintenance dredging and the Superfund cleanup. (Original source: Army Corps Web site: www.nae.usace.army.mil)

New Bedford Superfund Site Cleanup

The 18,000-acre New Bedford Harbor Superfund site extends from the northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into Buzzards Bay. The site contains sediments that are contaminated with polychlorinated biphenyls (PCBs) and heavy metals. The city's main working port, which houses the fishing fleet and cruise ship terminal, is not affected by the cleanup that is taking place primarily in the far north region of the harbor.

EPA issued a Record of Decision for the upper and lower harbor in 1998. The cleanup includes dredging approximately 450,000 cubic yards of PCB-contaminated sediment from the harbor. The dredged sediment will be contained in shoreline confined disposal facilities (CDFs) or transported offsite to a licensed landfill. Seawater will be removed from the sediments, treated, and discharged back into the harbor. Once completed, the CDFs will be available for reuse as shoreline open space and parks.

Steps taken to date, including posting warning signs, fencing contaminated shoreline areas and dredging the most highly contaminated hot spot sediments, have reduced threats posed by the site. Progress towards the remaining cleanup continues. EPA and the City of New Bedford have agreed on an innovative approach to increase the environmental benefit of the remedy in the north terminal section of the harbor. Once the cleanup is complete, the City will be able to reuse EPA's six-acre shoreline sediment processing facility as part of its working waterfront and intermodal, multi-user transportation facility. Construction and minor dredging to support the main cleanup began in 2002. (Original source: EPA Web site: www.epa.gov).[5]

New Bedford offers international distribution services, including an adjacent airport. The port has its own ship agency, freight forwarding, stevedoring services, blast freezing, warehouse and truck brokering facilities all in one location, providing customers with "one-stop shopping." Deepwater berths and U.S. Customs-bonded refrigerated warehouses enable the port to maintain a "cold chain" for perishable products from ship to refrigerated storage. New Bedford's cold treatment facility is, in fact, the largest of its kind in North America.

The port and adjacent areas form the New Bedford Free Trade Port, which provides manufacturing opportunities for various importers and exporters. Future plans include expansion of the seaport through harbor dredging and construction of additional cold storage facilities. Marketed as a "Real Port" offering full turnkey services, New Bedford will take advantage of these improvements to promote further its capabilities for handling perishable goods.[6]

---

[5] Port of New Bedford website: http://www.ci.new-bedford.ma.us/ECONOMIC/HDC/wtrgeneral.htm

[6] Seaport Advisory Council website: http://www.mass.gov/seaports/newbed.htm

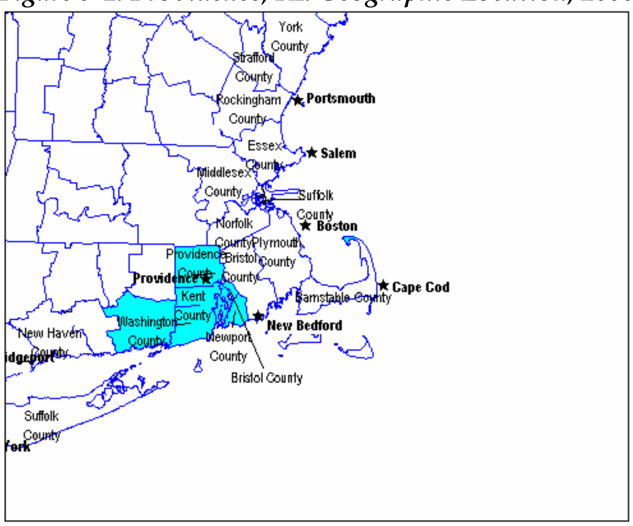
9. Providence, RI

Location and Background Information

The Port of Providence is located in the Providence – New Bedford – Fall River, Rhode Island – Massachusetts Metropolitan Statistical Area (MSA). International commerce started in this port in the 1700's when the Port of Providence first established trade with China. Less than a century later, Providence is New England's third largest city and the Northeast's premiere deep water multimodal facility for international and domestic trade.

The Port of Portland, or ProvPort, was officially founded in 1994 as a fully licensed, bonded Deep Water Port specializing in Bulk and Break Bulk commodities. While China continues to be one of its main trading partners, the port has expanded its partnerships and trading status with Central and South America, Europe, the Far East, Russia, Africa, Australia and New Zealand.[1]

Figure 9-1. Providence, RI: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of this region is 1,048,319 according to the 2000 US Census. Of this total, 503,635 or 48 percent are males and 544,684 or 52 percent are females. The median age in the region is 36.7 years; 35.3 for males and 37.9 for females.[2] As is shown in Figure 9-2, about 25 percent of males and 22 percent of females are between the ages of 0 and 17 years. Nearly 45 percent of the population (15 percent approximately per age group) is between 18 and 49 years old.

---

[1] Providence Port Authority website: http://www.provport.com

[2] US Census Data, Census 2000.

The majority of the population in this MSA is white (85 percent), followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), which represent 8.4 percent of the total population. The Black or African American population represents 4.3 percent, followed by the Asian population, which represents only 2.3 percent of the total population (Figure 9-3). Moreover, in terms of ethnic makeup, 8.6 percent of the total population is considered to be of Hispanic or Latino origin.[3]

Figure 9-2. Providence, RI: Structure of the Population by Age Group, 2000

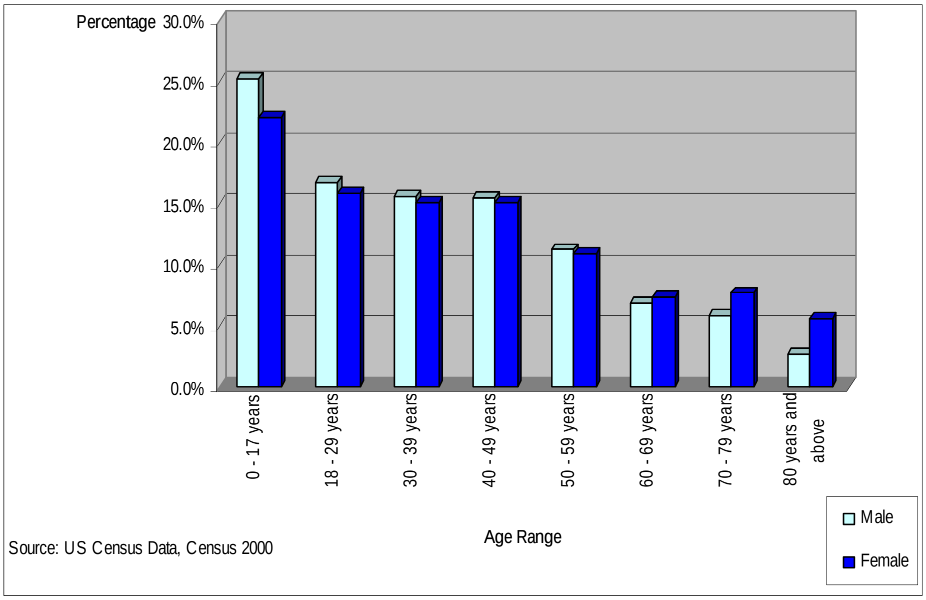
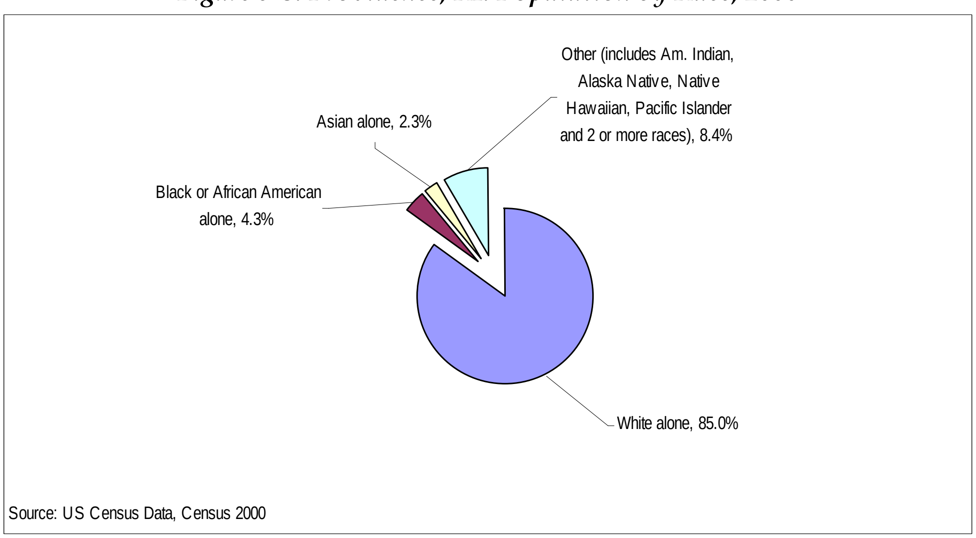


Figure 9-3. Providence, RI: Population by Race, 2000

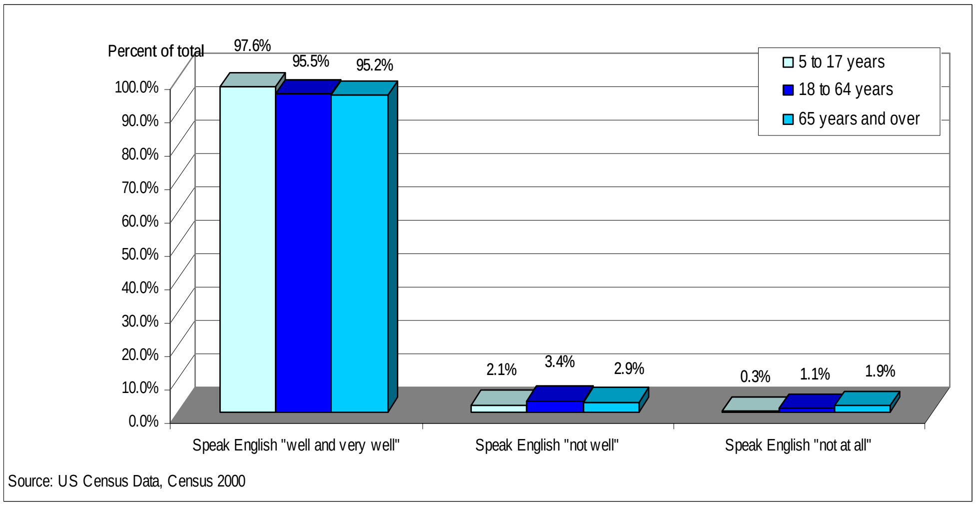


It is evident from the data specified in Figure 9-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. Approximately 2.3 percent of the

[3] US Census Data, Census 2000

population ages 5 – 17, 4.5 percent of the population ages 18 – 64 years and 4.8 percent of the population ages 65 years or older do not speak English well or do not speak English at all.

Figure 9-4. Providence, RI: Ability to Speak English by Age Group, 2000

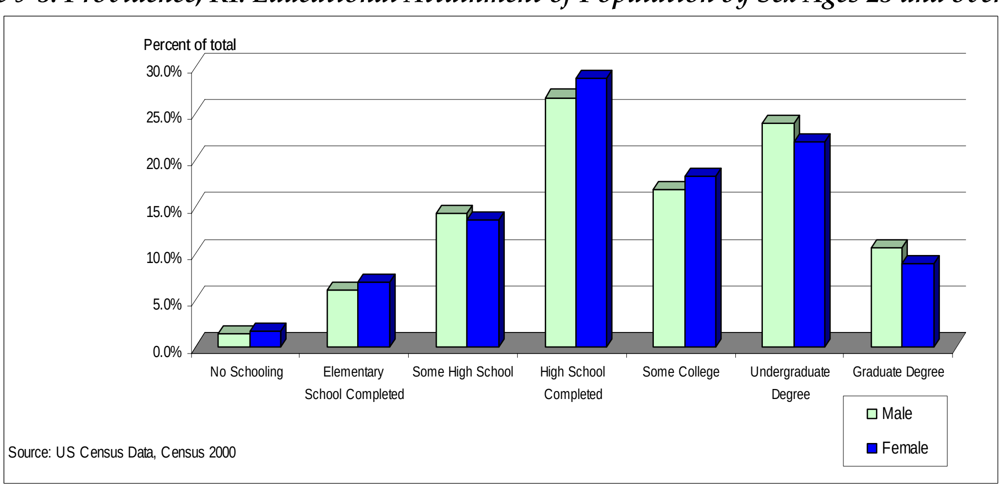


EDUCATION

Around 25 percent of males and 27 percent of females in the region, ages 25 and over, have completed high school. Approximately 23 percent of males and 21 percent of females have obtained an undergraduate degree in this region and less than 10 percent of the population has obtained a graduate degree (Figure 9-5).

There are a number of four year colleges and universities in the region. Some of these institutions include: Brown University, Rhode Island School of Design, Johnson & Wales University, Bryant College, Providence College, New England Institute of Technology and the Rhode Island Hospital Schools of Medical Technology, Nuclear Medicine, Radiologic Technology and Ultra Sonography. [4]

Figure 9-5. Providence, RI: Educational Attainment of Population by Sex Ages 25 and over, 2000



[4] Providence Community Profile: http://www.epodunk.com

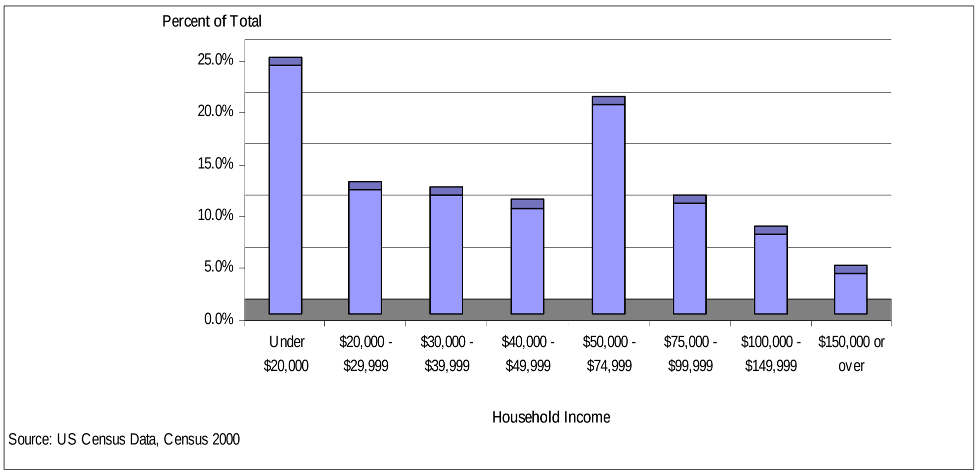
Socio-Economic Characteristics

INCOME

Nearly 25 percent of households in the region had incomes of under $20,000 in 1999; and around 21 percent of households fell within the $50,000 - $74,999 income bracket. About 5 percent of households in the region had incomes of $150,000 or over (Figure 9-6).

Household median income in this MSA in 1999, according to the 2000 US Census, was $42,369.92 and per capita income was $21,687.55. The percentage of people under the poverty line in the region was 11.9 in the year 2000. The average household size in 2000 was 2.47.[5]

Figure 9-6. Providence, RI: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

About 35 percent of females in this region (of the employed civilian population 16 years and over) are employed in educational, health and social services industries and around 20 percent are employed in 'other' industries. These industries include the arts, entertainment, recreation, food services, public administration and information. Males' employment is more evenly distributed among industries, with manufacturing, and 'other' industries as the most dominant ones, representing 20 percent of male's participation; followed by 16 percent participation in wholesale and retail trade (Figure 9-7).

An estimated 5.6 percent of males and females were unemployed in the region in the year 2000.[6]

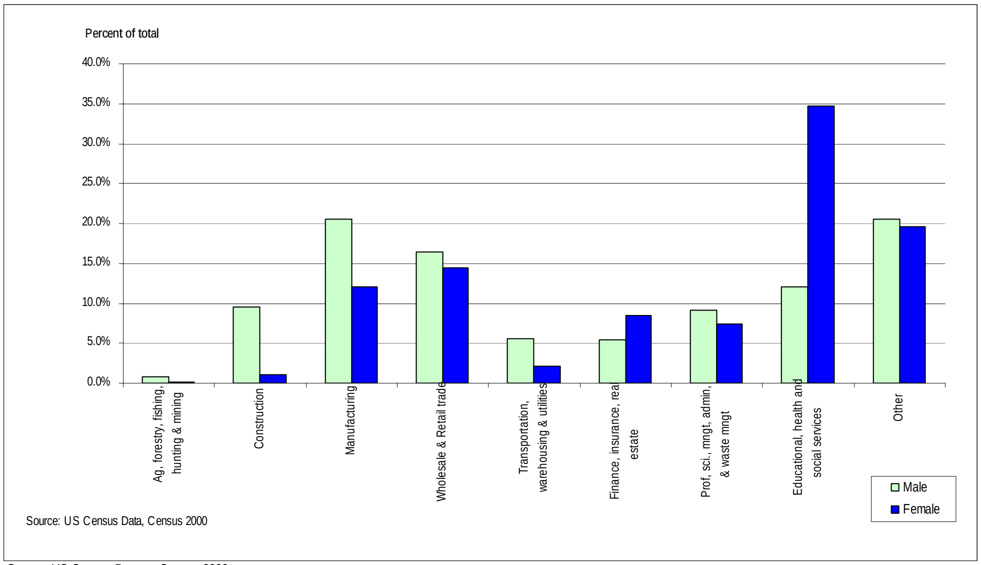
According to the 2000 US Census, an estimated 0.6 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 20.7 percent of males and 9.4 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.05 percent of female's occupations.

---

[5] US Census Data, Census 2000.

[6] US Census Data, Census 2000.

Figure 9-7. Providence, RI: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

ProvPort (the Port of Portland) is centrally located on the Atlantic East Coast shoreline just 150 miles from New York, 50 miles from Boston and 200 miles within major city and ports of Eastern Canada. Located just 1 mile from New England's primary Interstate I-95, ProvPort offers overnight access to all of the Northeast states and Eastern Canada.

ProvPort specializes in the handling of both Dry and Liquid Bulk and Break Bulk commodities for both imports and exports. Over 15 tons of cargo has moved across the facility since its establishment in 1994. ProvPort handles commodities such as cement, chemicals, coal, cobblestone, heavy machinery, liquid petroleum products, lumber, pearlite, salt, scrap, metal and steel products.

ProvPort's premises are 105 acres and include 6 deep water berths totaling 3500 linear feet combined, 3 warehouses totaling 300,000 square feet with 10 loading bay doors, over 20 acres of paved open storage area and on-dock rail access with 3 rail spurs.

Berths
ProvPort completed in January of 2004 its dredging project to deepen its 6 berths to a maximum depth of 40' @ MLW. The project, in conjunction with the U.S. Army Corps of Engineers New England district also involved dredging more than 6 million CY of material in Providence River to return a 7 mile stretch of the authorized Federal navigation project to full authorized dimensions of 40' deep and 600 feet wide. ProvPort offers a total of 3500 L.F. usable dockage space spread over 6 deep water berths as follows:

Petroleum Tank Farm
ProvPort is the owner of its own Petroleum Tank Farm totaling 335,000 barrels / 12 million gallons with storage capacity in 13 above ground storage tanks. In addition, a fuel depot station consisting of

an eight bay loading rack system is available along with a 40 meter operating scale and a secured scale house and operation center.

Cement Storage
With two separate on-dock cement storage facilities, Glens Falls Lehigh Cement has storage capacity of over 55,000 tons of cement. Its most recent investment of $15 million dollars enabled GFLC to create and establish the New England Distribution Center at ProvPort capable of loading and transporting it product by truck or rail to their customer base around the clock.

Warehousing
ProvPort offers 3 separate on dock covered warehouses totaling over 300,000 square feet used for both short and long term storage as well as viable distribution centers for the Northeast corridor. Ranging from 64,000 square feet to 130,000 square feet, ProvPort also has available 10,000 square feet of office space if required, truck bays and rail access for dock side loading/unloading.

The Marine Terminal Building is 116,000 square feet, has 10,000 square feet of office space and 10 truck bays; it is adjacent to berths 1, 2 & 3. The Ace Warehouse is 131,000 square feet, it has dock side loading, and is adjacent to berths 4 & 5. The Terminal Building is 64,000 square feet, it has dock side loading and is adjacent to berths C & 1. [7]

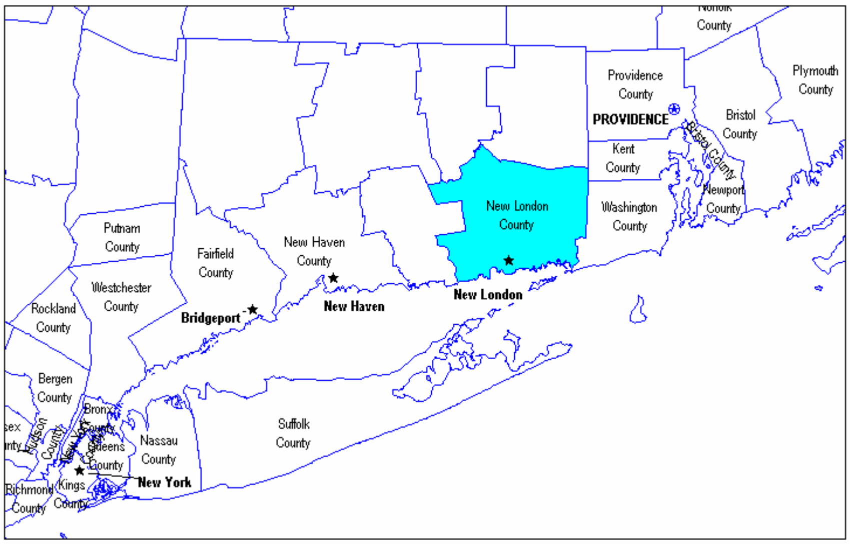
[7] Providence Port Authority website: http://www.provport.com/index.html

10. New London, CT

Location and Background Information

The Port of New London is located in the Norwich – New London, Connecticut Metropolitan Statistical Area (MSA). This MSA is comprised of New London County, CT.

Figure 10-1. New London, CT: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

New London County has a total population of 259,088, according to the 2000 US Census. Of this total, 128,172 or 49.5 percent are males and 130,916 or 50.5 percent are females. The median age in the region is 37 years; 35.9 for males and 38 for females. About 45 percent of males fall within the age brackets of 18 – 29, 30 – 39 and in the 40 – 49 years age range (15 percent approximately in each age group). About 15 percent of females fall within the 30 – 39 and the same percentage in the 40 – 49 years age bracket (Figure 10-2).

The majority of the population in New London county is white (86.9 percent); followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), representing 6.2 percent of the total population. The Black or African American population represents 5.1 percent of the total population, whereas the Asian population represents roughly 1.9 percent of the total population (Figure 10-3). Moreover, in terms of ethnic makeup, 5.2 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000.

Figure 10-2. New London, CT: Structure of the Population by Age Group, 2000

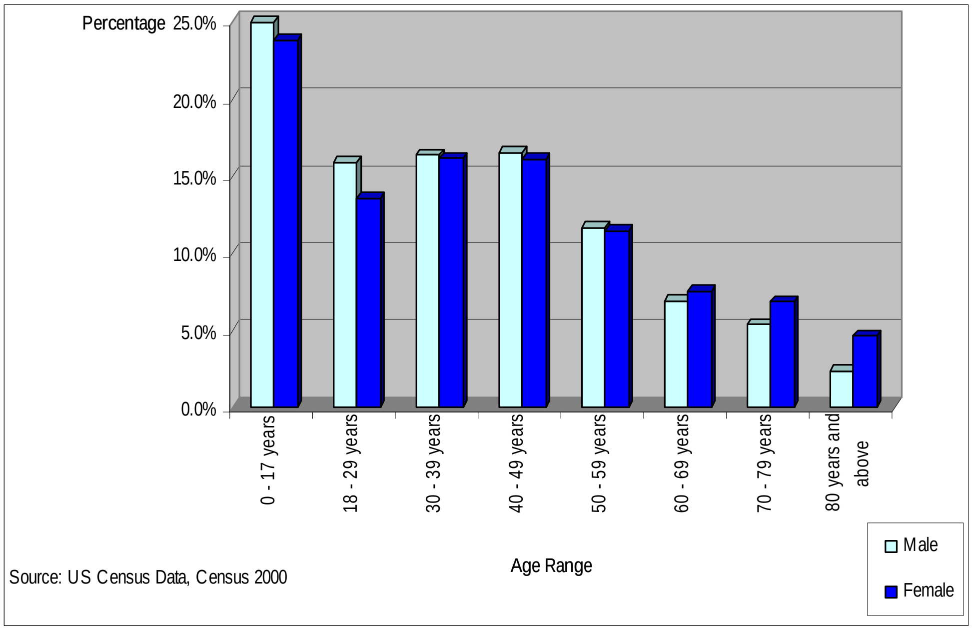
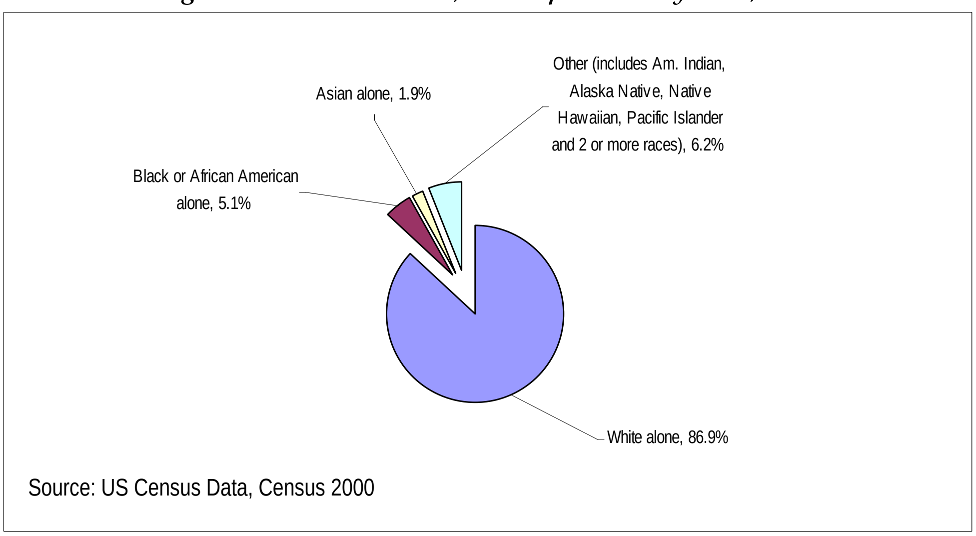
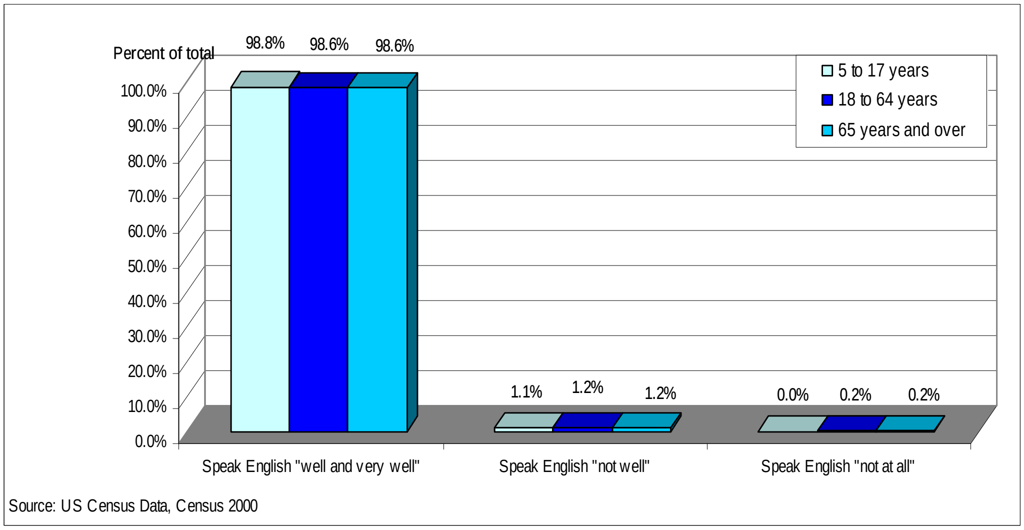


Figure 10-3. New London, CT: Population by Race, 2000



It is evident from the data specified in Figure 10-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 10-4. New London, CT: Ability to Speak English by Age Group, 2000

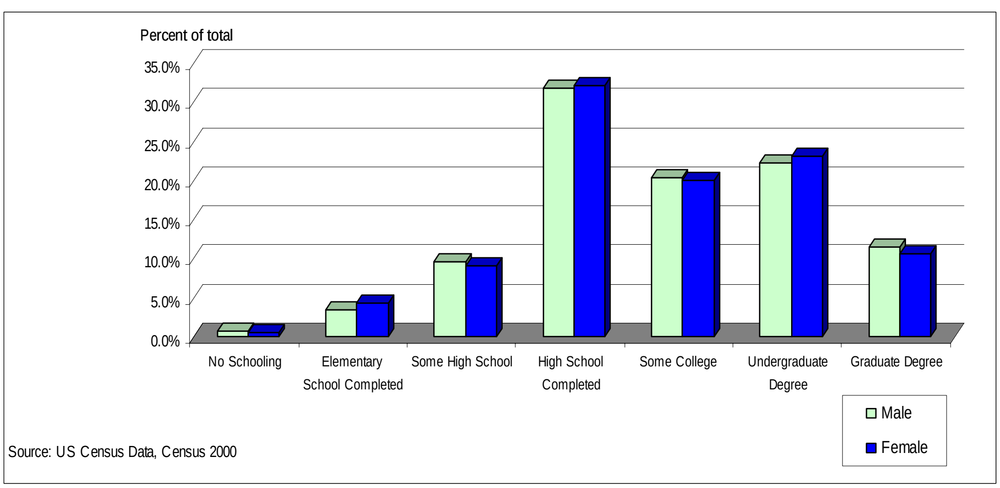


EDUCATION

Of the population in New London County, ages 25 and over, about 30 percent of males and females have completed high school. Nearly 26 percent of males and females have obtained undergraduate degrees. This percentage is very closely followed by the rate of males and females that have finished only some college. About 10 percent of males and females have obtained graduate degrees in the region (Figure 10-5).

There are only three colleges in New London County: Connecticut College, Mitchell College and the U.S. Coast Guard Academy.

Figure 10-5. New London, CT: Educational Attainment of Population by Sex Ages 25 and Over, 2000



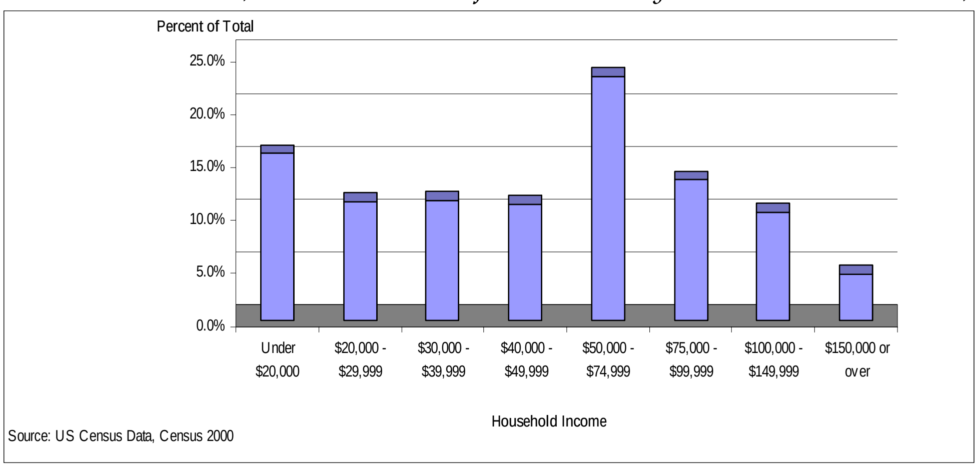
Socio-Economic Characteristics

INCOME

As portrayed in Figure 10-6, nearly 25 percent of households in New London County in 1999 had incomes between $50,000 and $74,999. About 15.8 percent of households had incomes under $20,000 and 13 percent fell within the $75,000 - $99,999 income bracket. About 5 percent of households in the region had incomes of $150,000 or over (Figure10-6).

Household median income in this county in 1999 was $50,646 and per capita income was $24,678. The percentage of people under the poverty line in the region was 6.4 in the year 2000. Average household size in 2000 was 2.4. [2]

Figure 10-6. New London, CT: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

As the data in Figure 10-7 shows, of the employed civilian population in the region, ages 16 or over, nearly 35 percent of working females are employed in the educational, health and social services industries and about 29 percent of them are employed in 'other' industries which include the arts, entertainment, recreation, food services, public administration and information. Males are employed in 'other' industries (25 percent); followed in a smaller proportion by occupations in the manufacturing industry (20 percent) and the wholesale and retail trade industry (15 percent).

An estimated 4.0 percent of males and 3.8 percent of females were unemployed in the area in 2000.[3]

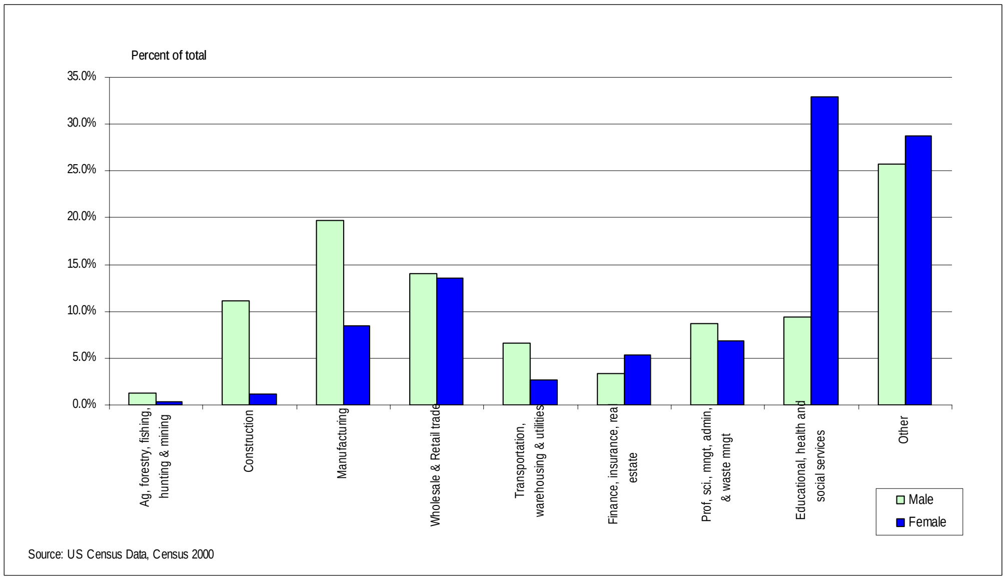
According to the 2000 US Census, an estimated 0.6 percent of males and 0.3 percent of females are employed in farming, fishing and forestry occupations. About 16.1 percent of males and 5.1 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.7 percent of male's occupations and 0.1 percent of female's occupations.

---

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure10-7. New London, CT: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

Picture Source: Connecticut Department of Transportation.[4]

The Port of New London is serviced by the Port of Hartford.[5]

There is a Naval Submarine Base in New London, CT.

---

[4] Connecticut Department of Transportation website: http://www.ct.gov/dot/cwp/view.asp?a=1380&Q=259734&dot PNavCtr=|40046|#40049

[5] US Customs and Border Protection website: http://www.customs.gov/xp/cgov/toolbox/ contacts/ports/ct/0413.xml

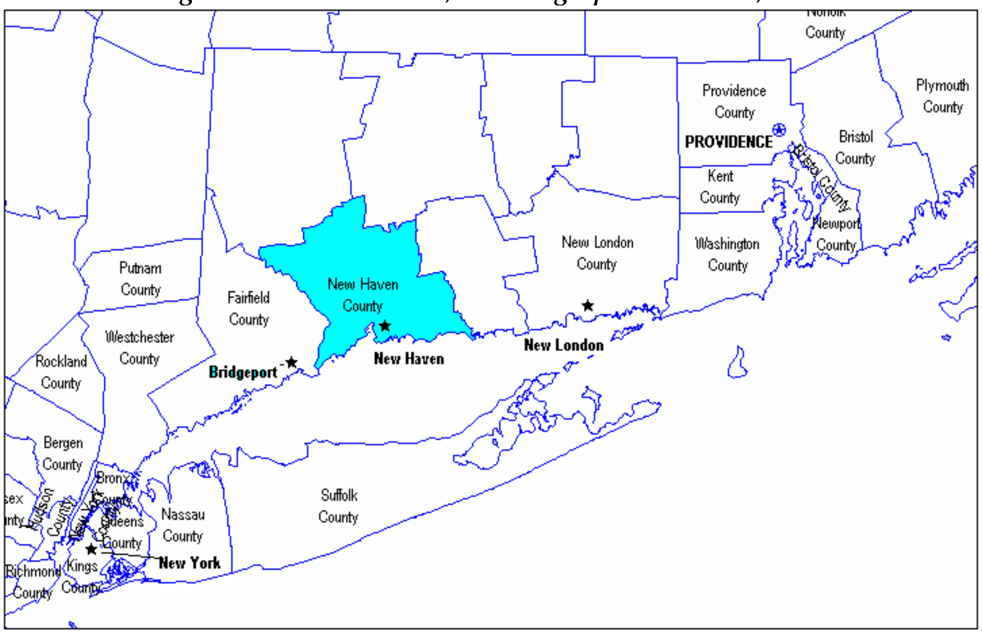
This page intentionally left blank.

11. New Haven, CT

Location and Background Information

The Port of New Haven, Connecticut is located in the New Haven – Milford, Connecticut Metropolitan Statistical Area (MSA). This MSA is comprised of New Haven County, CT.

Figure 11- 1. New Haven, CT: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The population of New Haven County in 2000 was 824,008, according to the 2000 US Census. Of this total, 395,931 or 48.0 percent are males and 428,077 or 52.0 percent are females. The median age for the population in 2000 was 37 years; 35.6 for males and 38.3 for females. As shown in Figure 11-2, about 45 percent of the population is between 18 and 49 years of age (15 percent approximately per age group).

The majority of the population in New Haven County is white (79.3 percent), followed by the Black or African American population, which represents 11.2 percent of the total population. This population is followed by 'others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), who represent 7.1 percent of the population. The Asian population represents 2.4 percent of the total population (Figure 11-3). Moreover, 5 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000.

Figure 11-2. New Haven, CT: Structure of the Population by Age Group, 2000

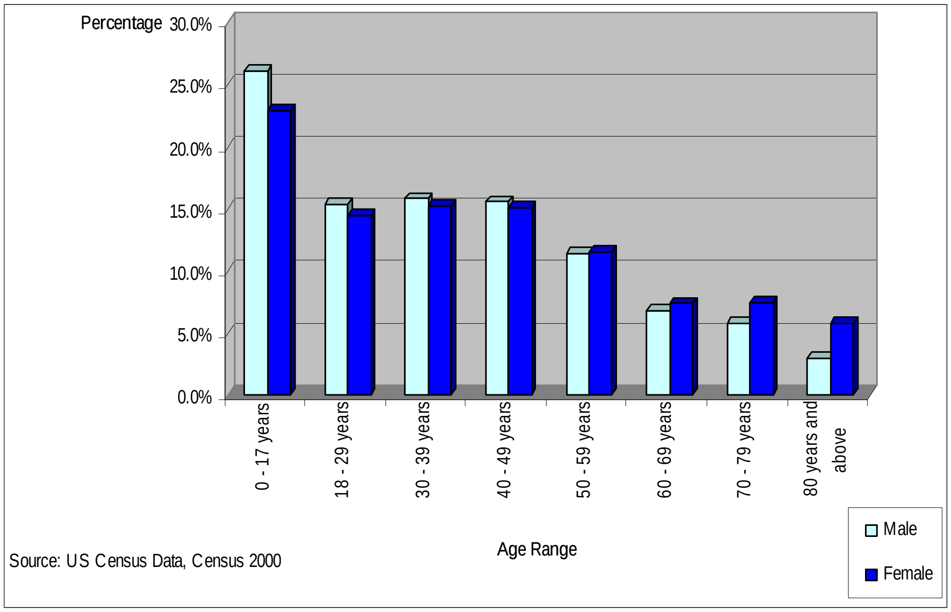
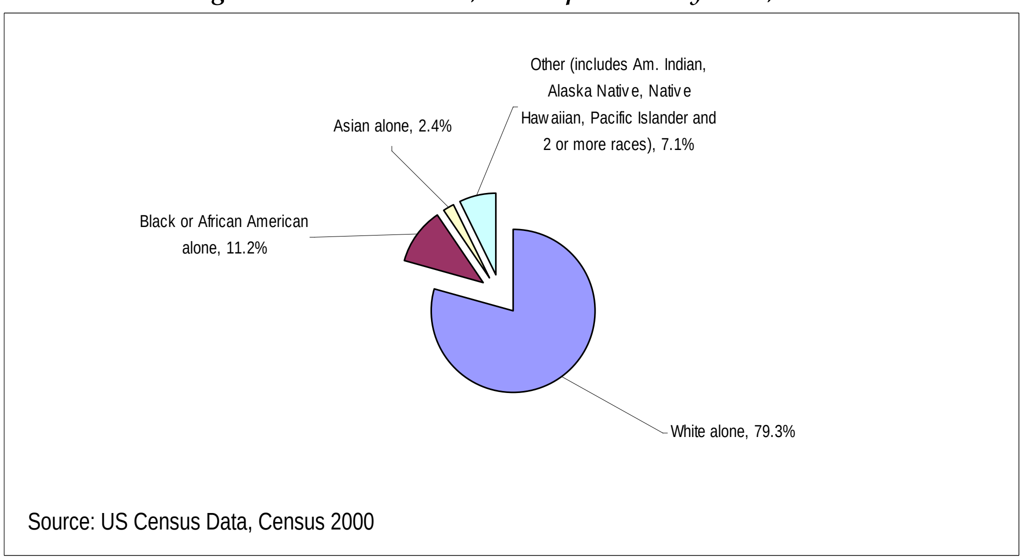
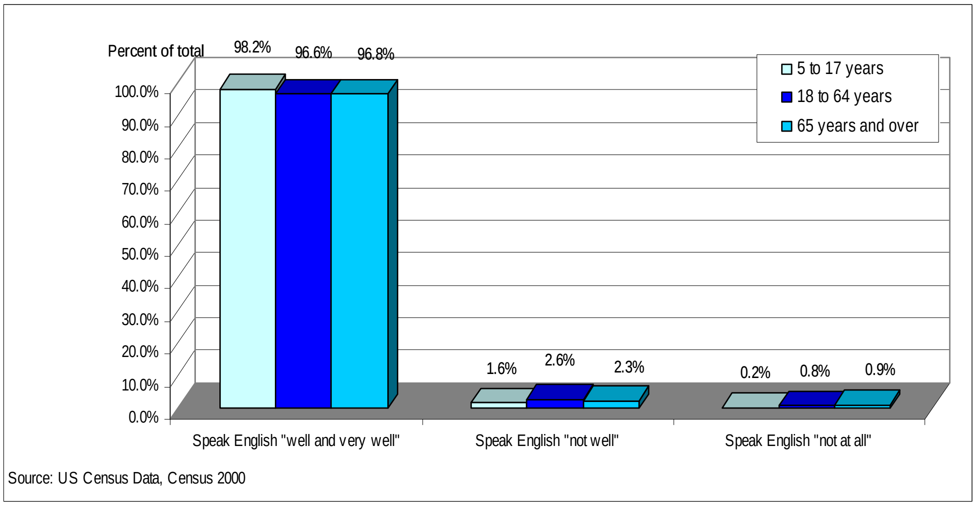


Figure 11-3. New Haven, CT: Population by Race, 2000



It is evident from the data specified in Figure 11- 4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. Around 3 percent of the population in the 18 – 64 age bracket and the 65 years and over age bracket do not speak English well or don't speak English at all.

Figure 11- 4. New Haven, CT: Ability to Speak English by Age Group, 2000

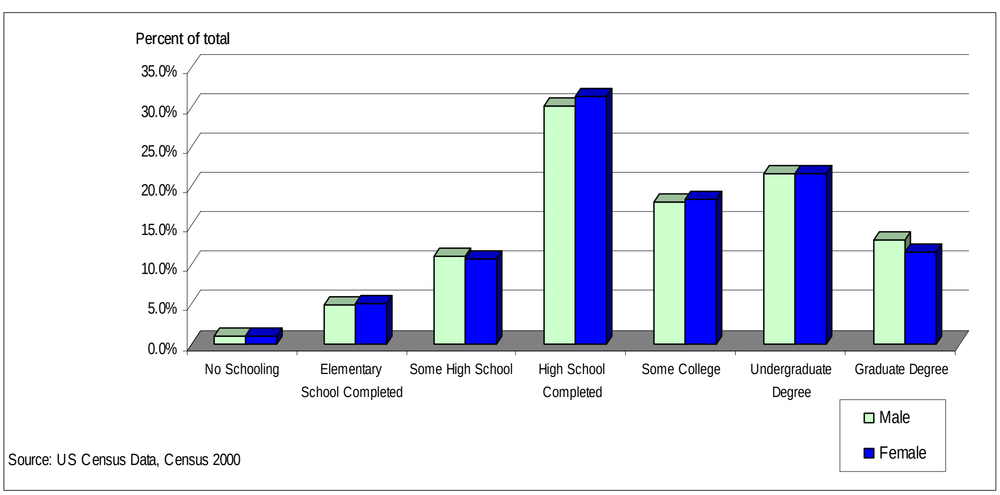


EDUCATION

Of the population in the region, ages 25 and over, nearly 30 percent of males and females have completed high school, and 20 percent have obtained undergraduate degrees. Over 15 percent of the population has completed some college and a little over 10 percent has obtained a graduate degree (Figure 11-5).

There are several universities in New Haven County, among them: Yale University, Southern Connecticut State University, Albertus Magnus College, Gateway Community-Technical College, Quinnipac University and University of New Haven.

Figure 11- 5. New Haven, CT: Educational Attainment of Population by Sex Ages 25 and Over, 2000



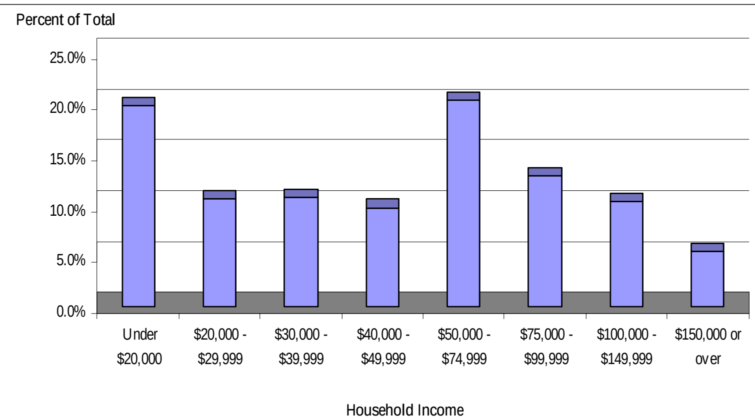
Socio-Economic Characteristics

INCOME

As portrayed in Figure 11- 6, about 20 percent of the households in this area in 1999 had incomes of under $20,000. About 20 percent of households' incomes fell in the $50,000 - $74,999 income bracket. Less than 7 percent of households in the region had incomes of $150,000 or over.

Household median income in New Haven, CT in 1999 was $48,834 and per capita income in the same year was $24,439. The percentage of people under the poverty line in the region was 9.5 in the year 2000. Average household size in 2000 was 2.5.[2]

Figure 11- 6. New Haven, CT: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

Of the employed civilian population in the region, ages 16 or over, nearly 40 percent of females are employed in the educational, health and social services industry, and over 15 percent are employed in 'other' industries, including the arts, recreation, entertainment, food services, public administration and information. Over 20 percent of males are employed in manufacturing and over 17 percent are employed in 'other' industries (Figure 11-7).

An estimated 6.2 percent of males and 5.6 percent of females were unemployed in the county in 2000.[3]

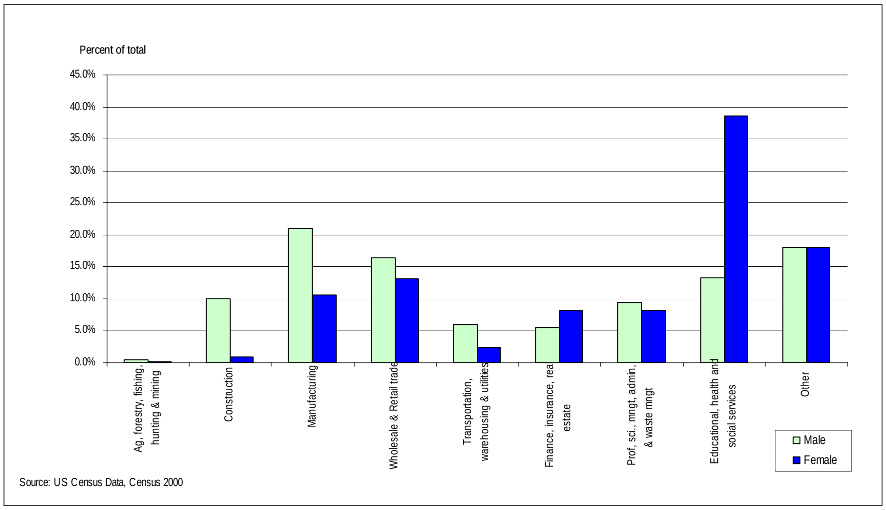
According to the 2000 US Census, an estimated 0.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 19.1 percent of males and 7.8 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.4 percent of male's occupations and 0.1 percent of female's occupations.

---

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 11- 7. New Haven, CT: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The port of New Haven is located on the New Haven Harbor, less than 500 yards from Exit 49 off I-95; with immediate access to I-91 and Route 1. The ports serve vessels, barge, truck and rails. It has three berths, 2 @ 36'. MLW 1 @ 39' MLW

The Port also has capability for loading up to 200 trucks per day from the ground or via loading docks. New Haven port is serviced by the Providence and Worcester railroad, connecting with CONRAIL, New England railroad CN and CP. There is private siding for loading and unloading of box cars, gondolas, flat cars, etc.

There are approximately 400,000 square feet of inside storage and approximately 50 acres of outside storage space, as well as bonded storage available. There is LME approved warehousing available for Zinc, Aluminum, Lead, Tin and Nickel. The port possesses 5 shore cranes up to 250 ton capacity; with 61 forklifts up to 26 tons capacity. The facility currently handles Steel, Copper, Zinc, Aluminum, Tin, Containers, Paper, Woodpulp, Lumber, Heavy lifts, Crane parts and Automobiles; yet facilities are capable of handling any type of Break-Bulk cargo.[4]

[4] Source: Connecticut Department of Transportation http://www.ct.gov/dot/cwp/view.asp?a= 1380&Q= 259730&dotPNavCtr=|40046|#40048

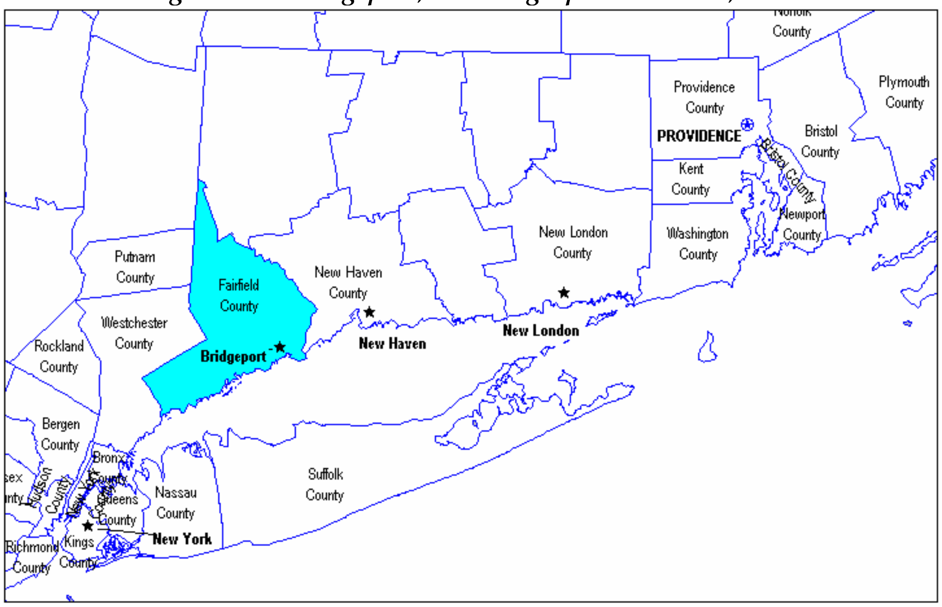
This page intentionally left blank.

12. Bridgeport, CT

Location and Background Information

The Port of Bridgeport is located in the Bridgeport-Stamford-Norwalk, Connecticut Metropolitan Statistical Area (MSA); comprised of Fairfield County, CT. The port is located in Bridgeport Harbor, 1/4 of a mile South of I-95 at Exit 29.

Figure 12-1. Bridgeport, CT: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the MSA in 2000 was 882,567, according to the 2000 US Census. Of this total, 426,127 or 48.3 percent are males and 456,440 or 51.7 percent are females. The average age in the region in 2000 was 37.3 years; 36.1 for males and 38.4 for females. As shown in Figure 12-2, about 30 percent of males and females are between the ages of 18 and 39 years (15 percent approximately per age group).

The majority of the population in the region is white (79.2 percent), followed by the Black or African American population, which represents 10 percent of the total population. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 7.6 percent of the population, whereas only 3.2 percent of the population is Asian (Figure 12-3). Moreover, in terms of ethnic makeup, 11.8 percent of the total population is of Hispanic or Latino origin. [1]

[1] US Census Data, Census 2000.

Figure 12-2. Bridgeport, CT: Structure of the Population by Age Group, 2000

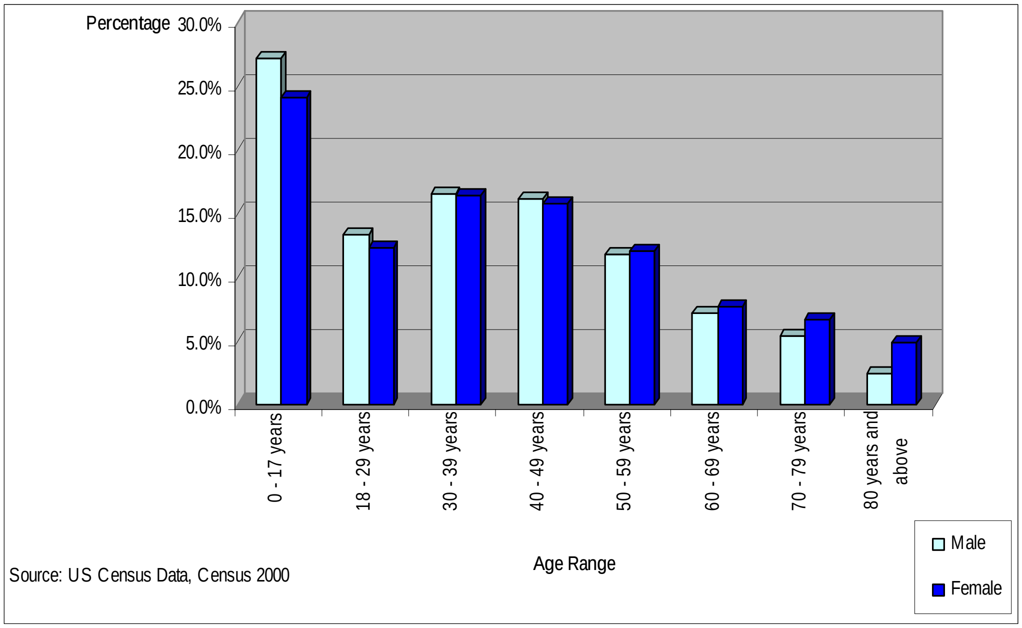
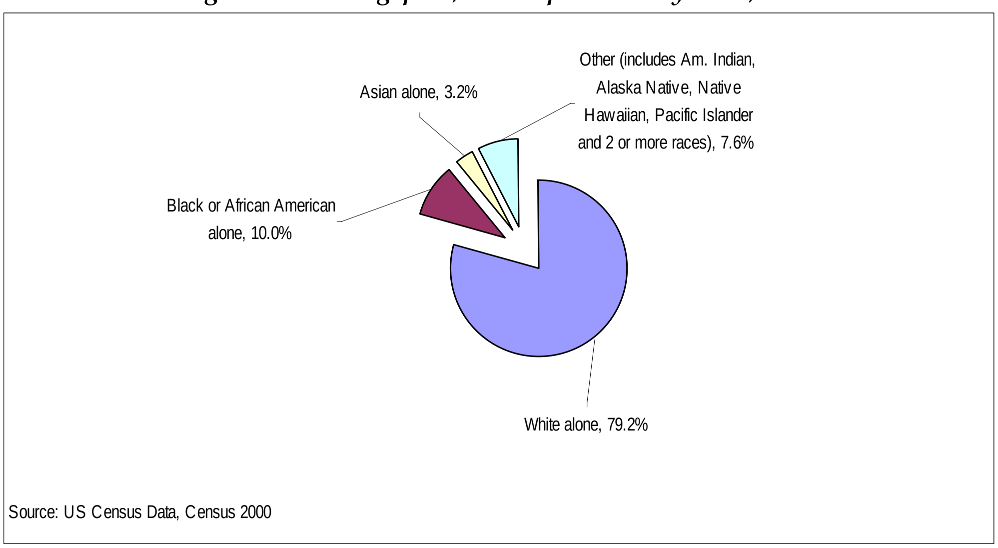
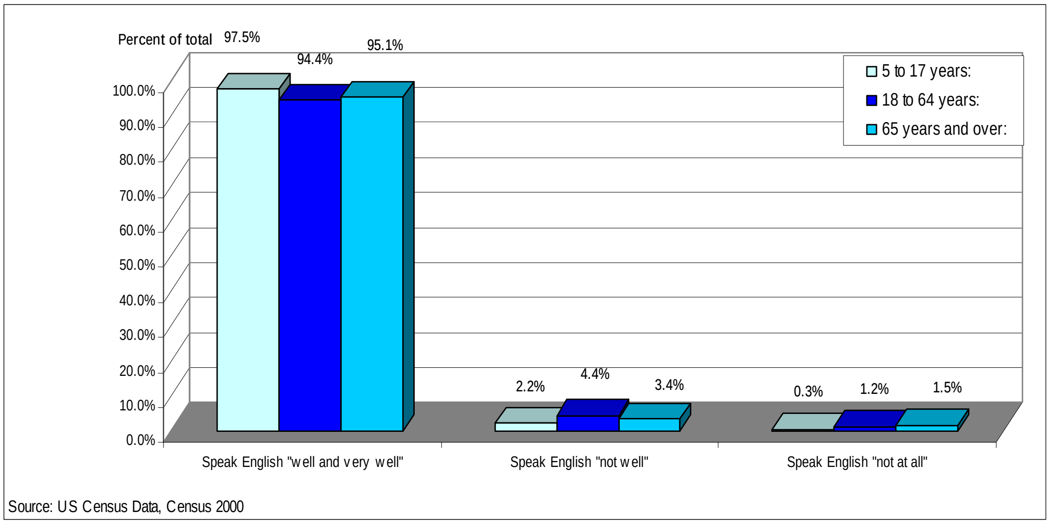


Figure 12-3. Bridgeport, CT: Population by Race, 2000



It is evident from the data specified in Figure 12-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. About 5.6 percent of the population in the 18 – 64 years age bracket does not speak English well and approximately 5 percent of the population 65 years and over cannot speak English at all.

Figure 12-4. Bridgeport, CT: Ability to Speak English by Age Group, 2000

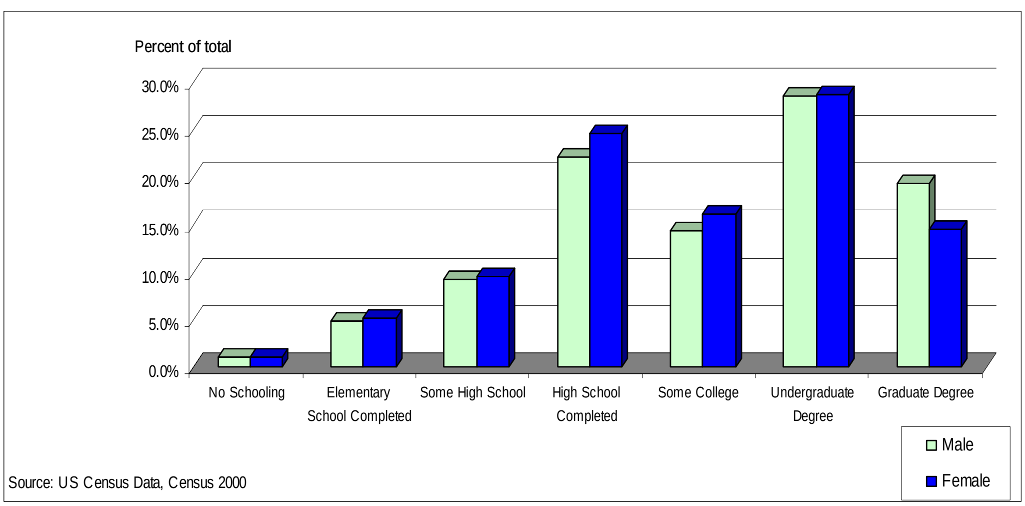


EDUCATION

Nearly 30 percent of males and females, ages 25 or over in Fairfield County, have obtained an undergraduate degree. About 20 percent of males and 25 percent of females have finished high school. Approximately 18 percent of females and 14 percent of males have obtained graduate degrees (Figure 12-5).

There are several universities in Fairfield County; among them: University of Bridgeport, Butler Business School, Fairfield University, Sacred Heart University, Saint Vincent's College and Western Connecticut State University.[2]

Figure 12-5. Bridgeport, CT: Educational Attainment of Population by Sex Ages 25 and Over, 2000



[2] Bridgeport Community Profile: http://www.epodunk.com/

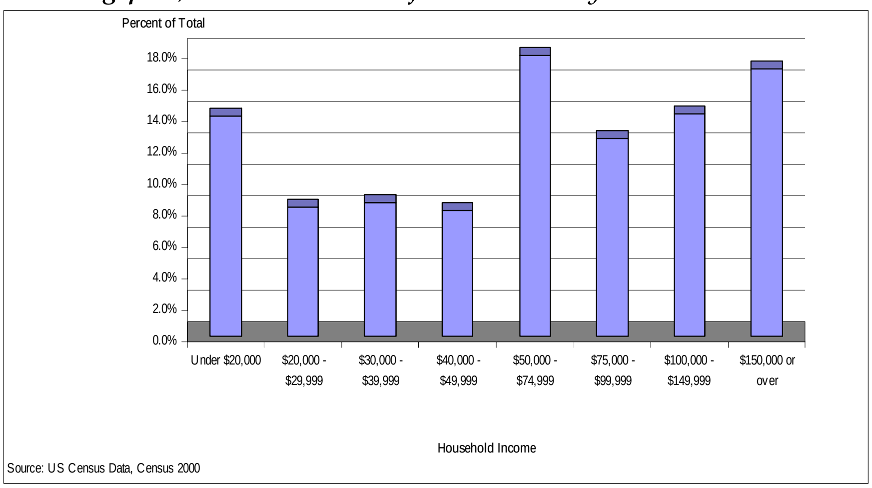
Socio-Economic Characteristics

INCOME

As portrayed in Figure 12-6, about 18 percent of the households in this area in 1999 had incomes in the $50,000 – $74,999 income bracket and 17 percent of households had incomes of $150,000 or over. Around 14 percent of households had incomes under $20,000.

Household median income in the county in 1999 was $65,249 and per capita income in the same year was $38,350. The percentage of people under the poverty line in the region was 6.9 in the year 2000. Average household size in 2000 was 2.67.[3]

Figure 12-6. Bridgeport, CT: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population in the region ages 16 or over, nearly 30 percent of females are employed in the educational, health and social services industry, and almost 20 percent are employed in 'other' industries, including the arts, recreation, entertainment, food services, public administration and information. About 18 percent of males are employed in 'other' industries and nearly 15 percent are employed in the wholesale and retail trade industry. Less than 0.2 percent of the population is employed in forestry, agriculture, mining, fishing or hunting industries (Figure 12-7).

An estimated 4.8 percent of males and 4.7 percent of females were unemployed in the region in the year 2000.[4]

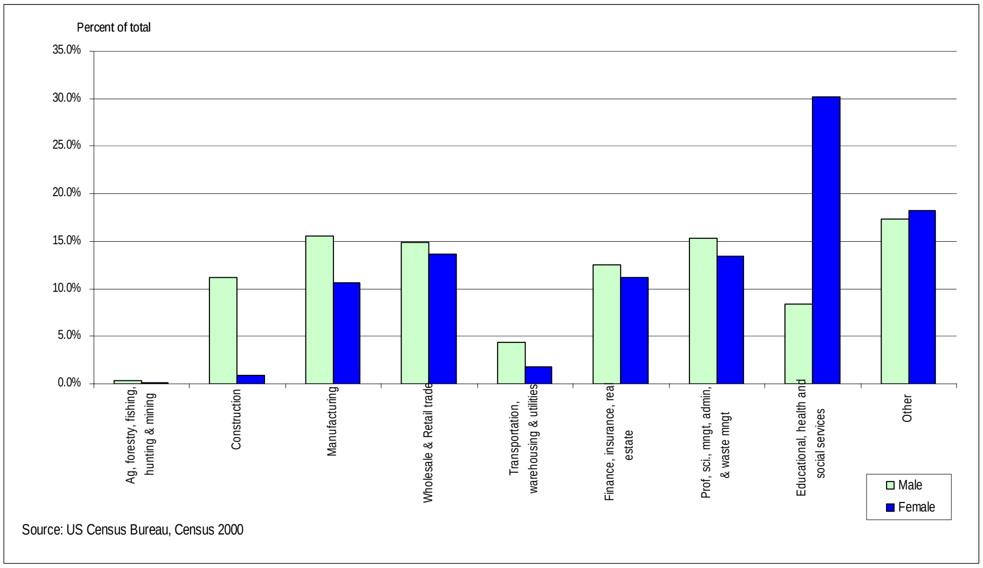
According to the 2000 US Census, an estimated 0.1 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 12.3 percent of males and 5.7 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.2 percent of male's occupations and 0.03 percent of female's occupations.

---

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 12-7. Bridgeport, CT: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The port of Bridgeport is located in Bridgeport Harbor, 1/4 of a mile South of I-95 at Exit 29. The port serves vessels, barge, and trucks. It has 2 Berths @ 33 draft MLW and over 40 pieces of Electric Forklift equipment for handling cargo in refrigerated warehouses/ships. The port has 20 additional pieces of forklift equipment for up to 20 ton capacity. There are approximately 20 acres outside for storage/staging area; 130,000 square feet dry storage space inside; 85,000 square feet of refrigerated warehouse space with temperature capability to 32° F and there is bonded storage available (certified by USDA for Cold Treatment). Bananas, Plantains, Apples, Pears, Citrus, Melons, Forest Products, Miscellaneous General Cargo, Cars/Trucks and Containers are the type of cargo handled. [5]

The Bridgeport Port Authority was created in 1993. The city of Bridgeport transferred ownership of the Water Street Dock and the transfer triggered Connecticut state law forming a Port Authority. The purpose of the transfer was to reconstruct the Water Street Dock and build a ferry terminal on the site. The primary tenant in the port is Bridgeport-Port Jefferson Steamboat Company ("Ferry Co."). It is a year round passenger and vehicular service provided between Bridgeport and the Village of Port Jefferson, Long Island, NY. The train and bus terminals are located within minutes from Bridgeport Harbor (by foot). Bridgeport Harbor is located within 60 miles of New York, and 150 miles of Boston.

[5] Connecticut Department of Transportation website: http://www.ct.gov/dot/cwp/view.asp ?a=1380&Q=259718&dotPNavCtr=|40046|#40047

Bridgeport-Port Jefferson Steamboat Company has been providing ferry services from Bridgeport Harbor to Long Island since 1883.

The Ferry Terminal cost a total of $4.2 million. For the Water Street Dock; the initial repairs and reconfiguration in 2000 – 2001 was $2,092 million. A new access road for boarding vehicles was completed in 1997 – 1998 at cost of 1.535 million. A total of $7,827,000 has been invested in the Water Street Dock facility to date, with additional $6.45 million planned.

Overall crossing traffic has increased 51 percent from 1997 to 2004; passenger only traffic increased 48.36 percent (passengers in 2004 exceeded 900,000); and all vehicle traffic increased 56.43 percent (passenger vehicle traffic in 2004 exceeded 450,000 vehicles). Truck traffic in 2004 exceeded 10,000 (truck traffic increased 19 percent from 2003; since 1997 truck traffic increased over 179 percent).

Ferry services like the Bridgeport-Port Jefferson Ferry provide a local transportation alternative. Passengers typically include business commuters, travelers and those who simply want to enjoy a relaxing ride on the water. Highest passenger only traffic remains from May through September. The typical summer traveler goes to Bridgeport for a ballgame, concert and restaurants and to Port Jefferson for boutique shops and restaurants. In 2004, the ridership was 1.39 million passengers and vehicles. In 1999 a new investment of $14 million was made; for the addition of a vessel; this increased the total fleet number to 3 vessels providing daily route service. In 2003; an aging vessel was replaced (about $15 million); yet 14-16 round trips are made daily (6am-9pm), offering year-round service.

Bridgeport Harbor is underutilized but is growing. Channel depth is 15 feet. New business for the harbor includes Derecktor Shipyards, construction of new vessels, repair and services of all types of vessels. Shipyards include 600 metric ton travel lift. The future for Bridgeport Harbor will include barge feeder service and will operate between Bridgeport and the ports of New York and New Jersey. There is an RFP process underway. There is also a proposal for a High Speed Ferry Service that is planned to operate between Bridgeport, Stamford and New York. [6]

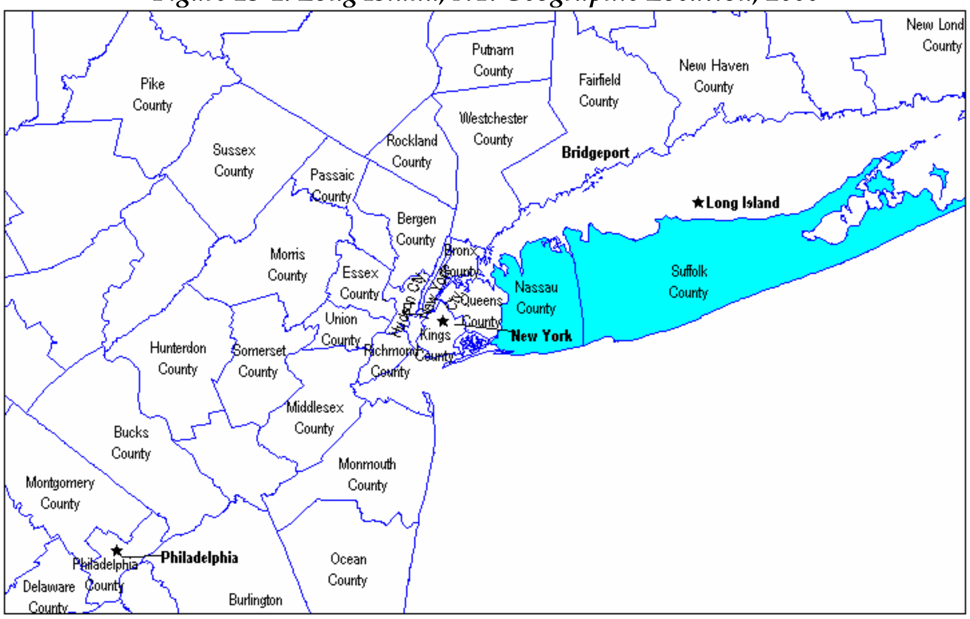
[6] Presentation made by Bridgeport Port Authority Executive Director, Joseph A. Riccio Jr. on February 16, 2005. From American Association of Port Authorities Cruise Workshops: "Niche Markets". URL: http://www.aapa-ports.org/programs/seminar_presentations/05_Cruise/Riccio_Joe.pdf

13. Long Island, NY

Location and Background Information

The Port of Long Island is part of the Nassau-Suffolk, NY Metropolitan Division (comprised by Nassau and Suffolk Counties). This Metropolitan Division is part of the New York - Northern New Jersey - Long Island, New York- New Jersey - Pennsylvania Metropolitan Statistical Area (MSA).

Figure 13-1. Long Island, NY: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of Nassau and Suffolk counties in 2000 was 2,753,913 according to the 2000 US Census. Of this total, 1,337,327 or 48.6 percent were males and 1,416,586 or 51.4 percent were females. The median age for the region in the same year was 37.5 years; 36.3 for males and 38.8 for females. It is evident by Figure 13-2 that 30 percent of the population is located in the 30–39 and 40–49 years age brackets (15 percent approximately in each age group).

As portrayed by Figure 13-3, 82 percent of the population in these counties is white, 8.4 percent is Black or African American. 'Others' constitute 6.1 percent of the total population (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) and the Asian population represents roughly 3.5 percent of the total. Moreover in terms of ethnic makeup, 10.3 percent of the total population is considered to be of Hispanic or Latino origin.[1]

---

[1] US Census Data, Census 2000.

Figure 13-2. Long Island, NY: Structure of the Population by Age Group, 2000

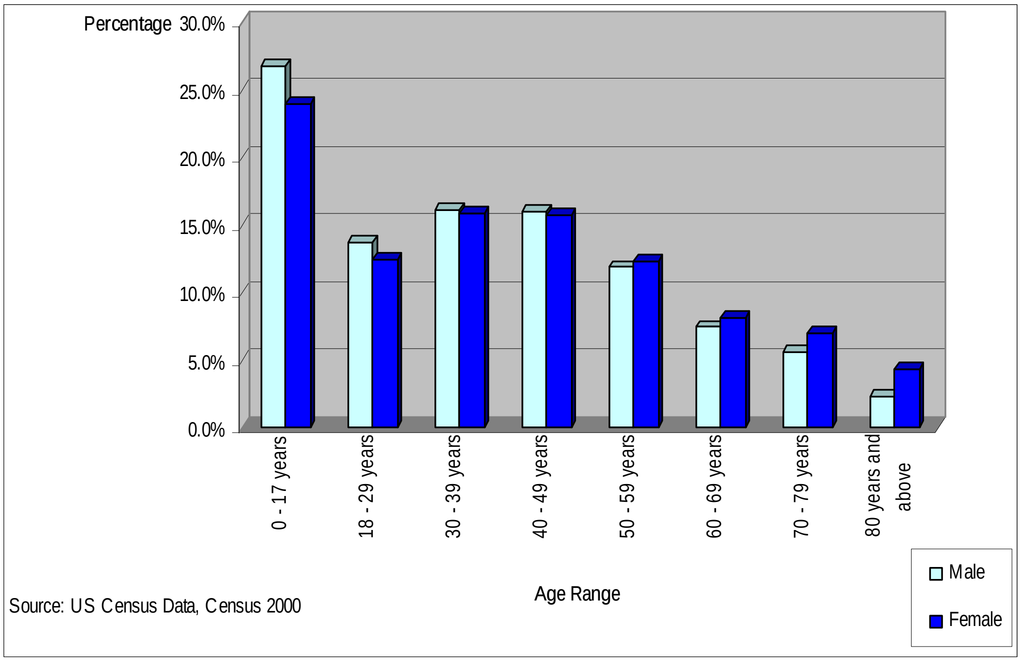
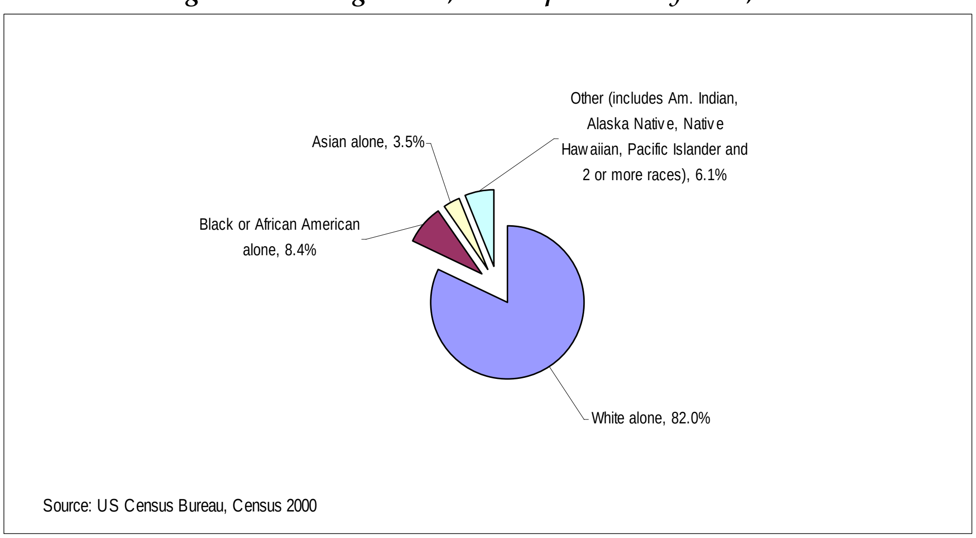
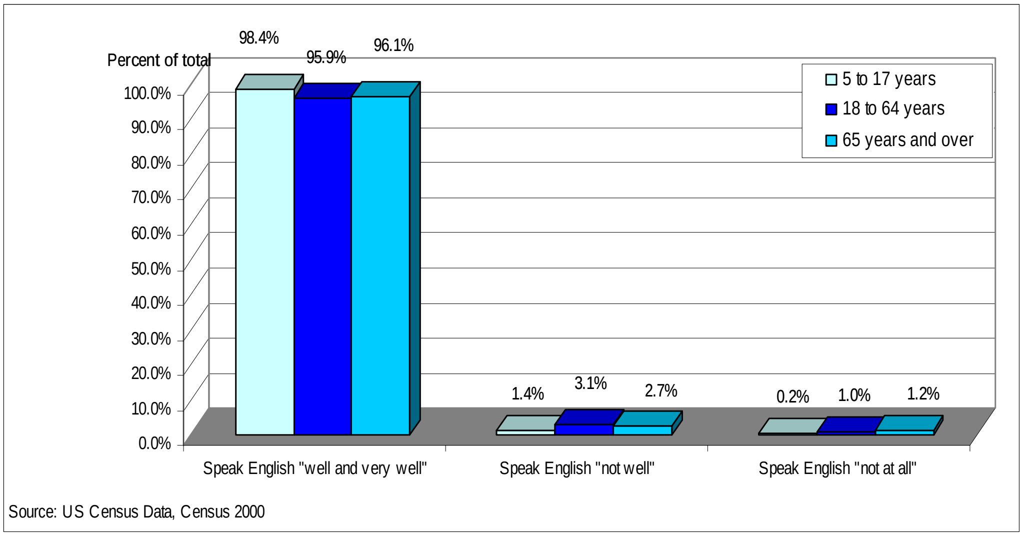


Figure 13-3. Long Island, NY: Population by Race, 2000



It is evident from the data specified in Figure 13-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. About 5.8 percent of the population aged 18 and over does not speak English well and about 2 percent of this population does not speak English at all.

Figure 13-4. Long Island, NY: Ability to Speak English by Age Group, 2000

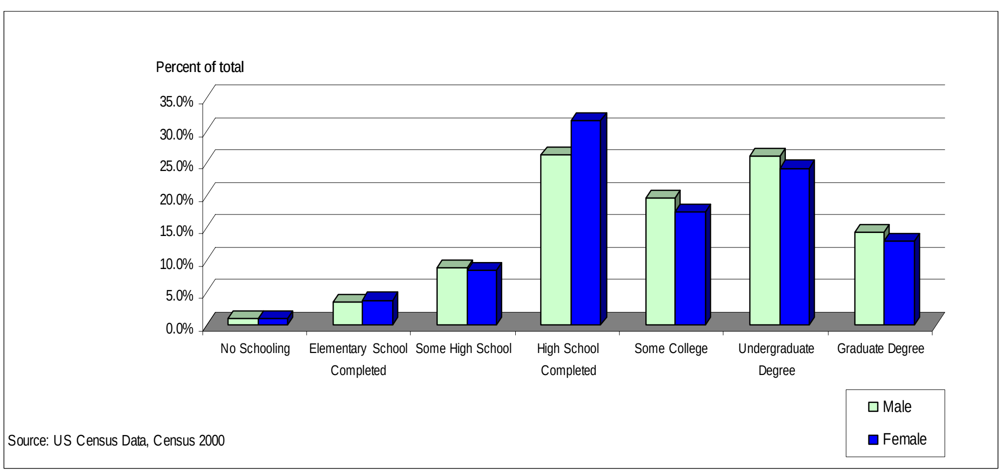


EDUCATION

As shown in Figure 13-5, of the population in Nassau and Suffolk counties, ages 25 and over, about 25 percent of males and 30 percent of females have completed high school and around 25 percent of males and 23 percent of females have obtained an undergraduate degree. Nearly 15 percent of males and females have obtained graduate degrees.

Some of the colleges around the area are: Adelphi University, Molloy College, Nassau Community College, New York College of Health Professions, New York Institute of Technology - New York, United States Merchant Marine Academy, Dowling College, Long Island University and SUNY Stony Brook. [2]

Figure 13-5. Long Island, NY: Educational Attainment of Population by Sex Ages 25 and Over, 2000



---

[2] Nassau and Suffolk Counties community profiles: http://www.epodunk.com/

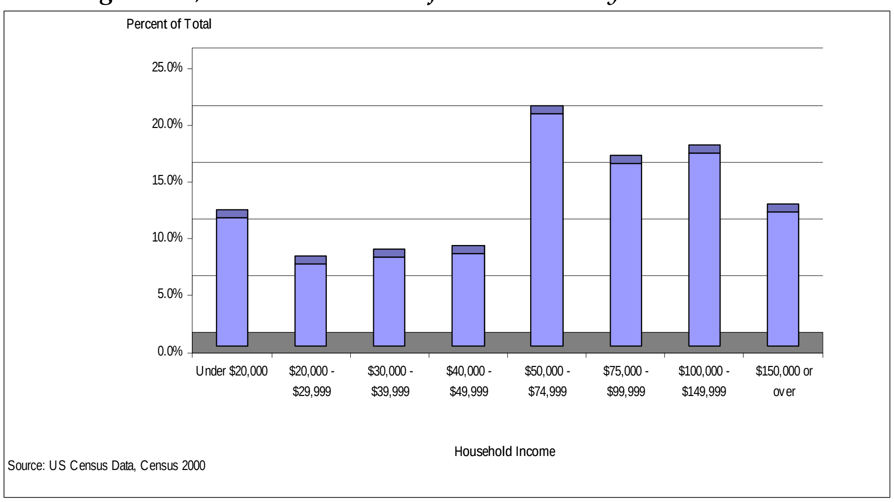
Socio-Economic Characteristics

INCOME

About 20 percent of households in this Metropolitan Division had incomes between $50,000 and $74,000 in 1999. About 17 percent of households had incomes between $75,000 and $99,999 and over 17 percent had incomes between $100,000 and $149,999. More than 10 percent of households in this area had incomes of $150,000 or above (Figure 13-6).

Household median income in Long Island in 1999 was $68,579.14 and per capita income for the same year was $29,278.16. The percentage of people under the poverty line in the region was 5.6 in the year 2000. The average household size in 2000 was 2.95.[3]

Figure 13-6. Long Island, NY: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population in Long Island, 16 years or over, more than 35 percent of females are employed in the educational, health and social services industry, and about 17 percent are employed in 'other' industries, such as the arts, recreation, entertainment, food services, public administration and information. Over 20 percent of males are employed in 'other' industries and over 15 percent are employed in the wholesale and retail trade industry (Figure 13-7).

An estimated 3.7 percent of males and 3.9 percent of females were unemployed in this Metropolitan Division in 2000.[4]

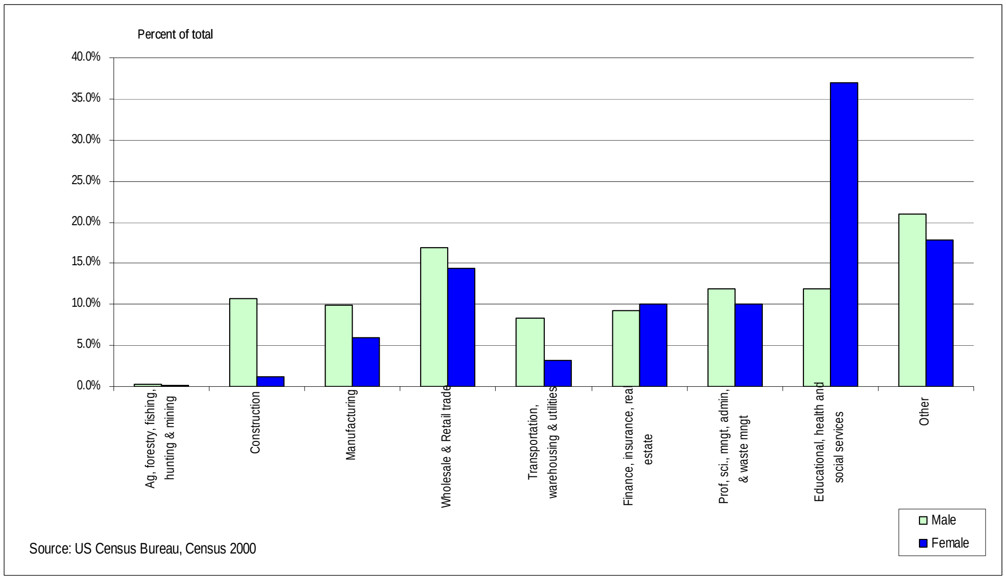
According to the 2000 US Census, an estimated 0.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 13.3 percent of males and 4.7 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.1 percent of female's occupations.

---

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 13-7. Long Island, NY: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



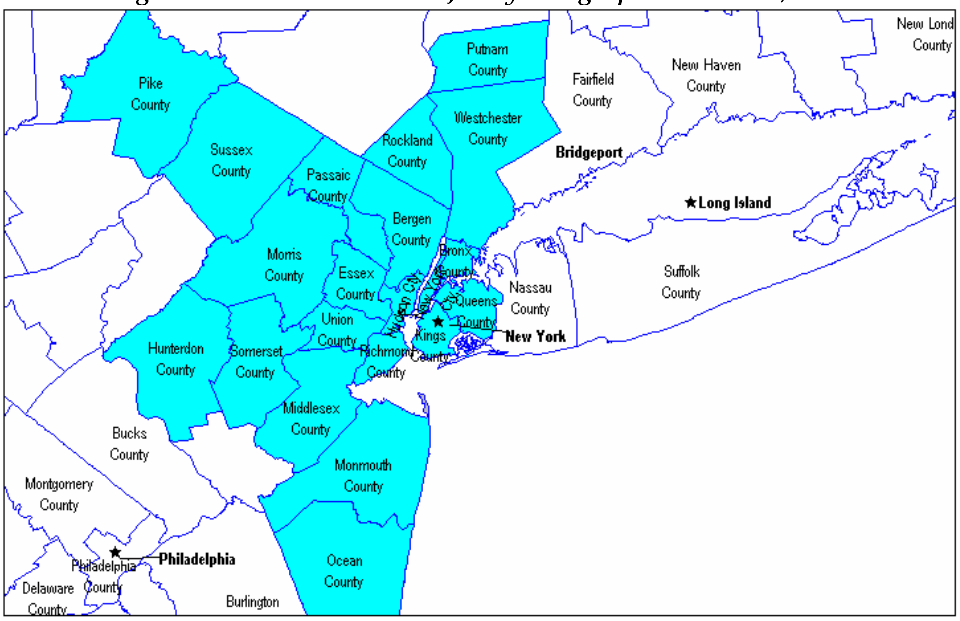
This page intentionally left blank.

14. Ports of New York – New Jersey

Location and Background Information

The Ports of New York and New Jersey are located within the New York – Northern New Jersey – Long Island, NY-NJ-PA Metropolitan Statistical Area (MSA).

Figure 14-1. New York-New Jersey: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The combined total population for this MSA in 2000 was 15,569,089, according to the 2000 US Census. Of this total, 7,453,615 or 47.9 percent are males and 8,115,474 or 52.1 percent are females. The median age for the region in the year 2000 was 35.5 years; 34 for males and 36.8 for females. As is evident through Figure 14-2, about 15 percent of the population is between 18 – 29 years and around 15 percent of the population is between the ages of 30 and 39. Less than 5 percent of the population is 80 or above.

The majority of the population is white in the region (58 percent), followed by the Black or African American population, which represents 19.7 percent of the total population. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent around 14.2 percent of the population. The Asian population represents only 8.1 percent of the total population (Figure 14-3). Moreover, in terms of ethnic makeup, 21.1 percent of the total population is considered to be of Hispanic or Latino origin. [1]

[1] US Census Data, Census 2000.

Figure 14-2. New York-New Jersey: Structure of the Population by Age Group, 2000

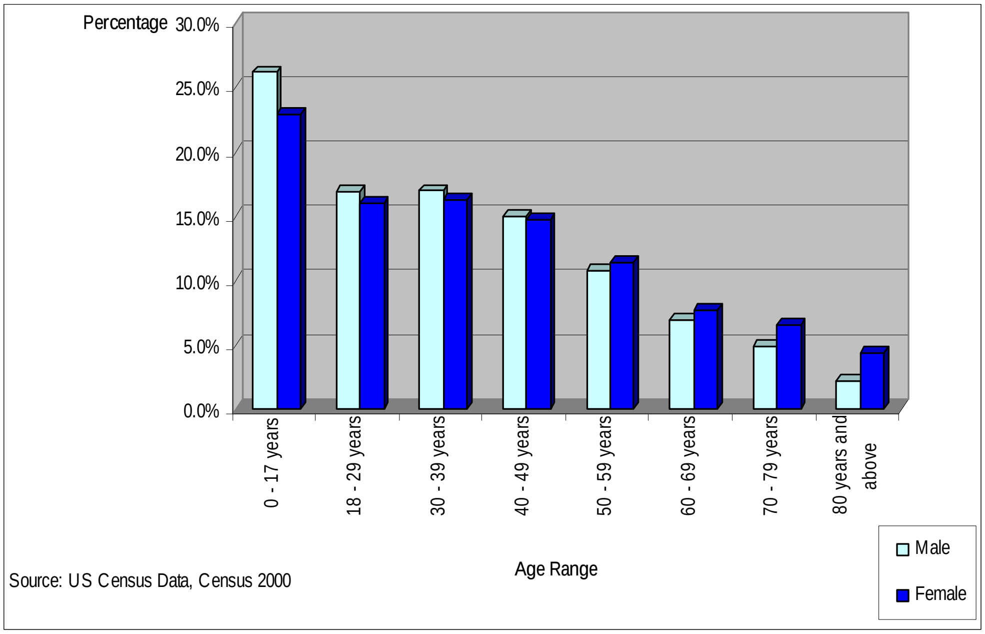
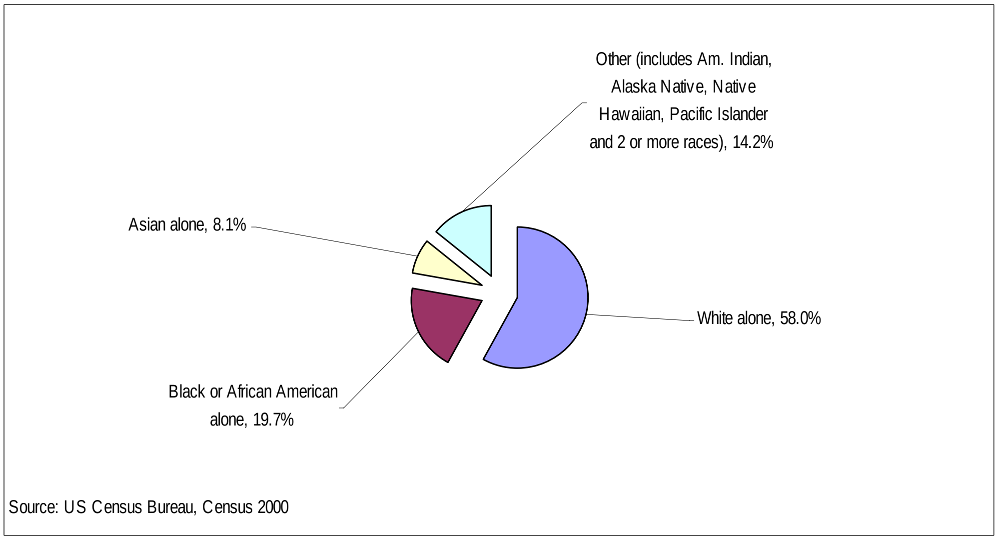
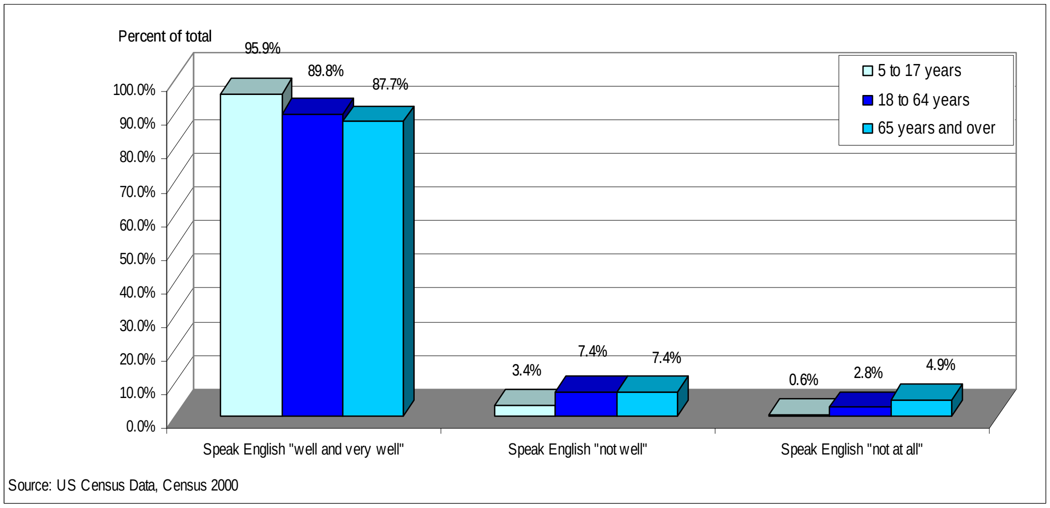


Figure 14-3. New York - New Jersey: Population by Race, 2000



It is evident from the data specified in Figure 14-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'. It is important to note that almost 10 percent of the population in the 18 – 64 years age bracket and 12.3 percent of the population that is 65 years and over do not speak English, or don't speak it well.

Figure 14-4. New York-New Jersey: Ability to Speak English by Age Group, 2000

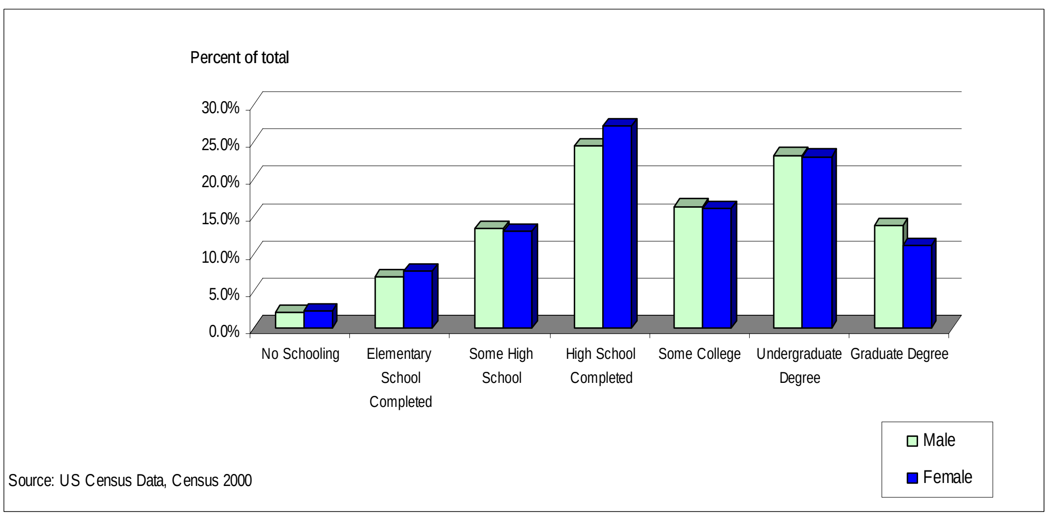


EDUCATION

Of the population in this region, ages 25 and over, about 25 percent of males and females have completed high school, and over 20 percent have obtained an undergraduate degree. About 15 percent of the population has finished only some college. Over 10 percent of the population has obtained a graduate degree (Figure 14-5).

Just New York County has 38 four-year colleges; among them New York University, CUNY, Fashion Institute of Technology, Julliard, Barnard College and Columbia University.

Figure 14-5. New York-New Jersey: Educational Attainment of Population by Sex Ages 25 and Over, 2000



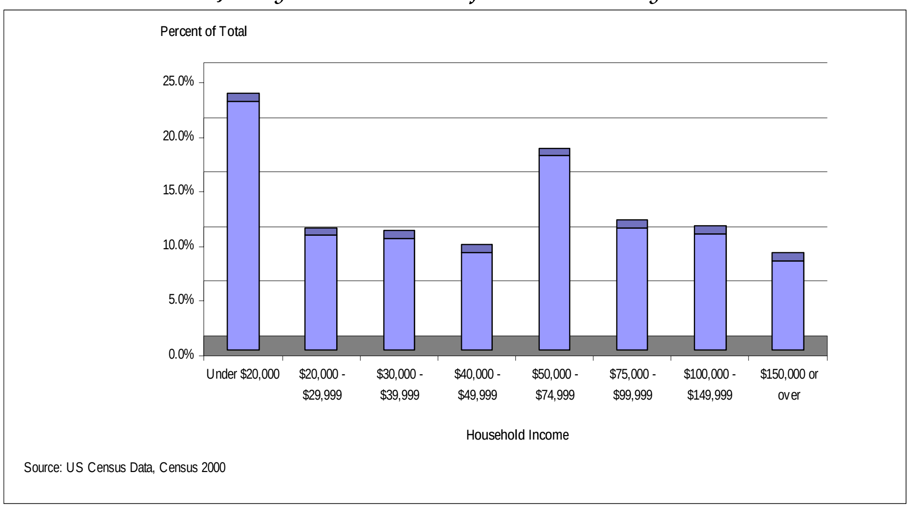
Socio-Economic Characteristics

INCOME

As portrayed in Figure 14-6, about 23 percent of the households in this area in 1999 had incomes of under $20,000. About 17 percent of households' incomes fell in the $50,000 - $74,999 income bracket and almost 10 percent of households in the region had incomes of $150,000 or over.

Household median income in this MSA in 1999 was $48,417.19 and per capita income in the same year was $25,693.16. The percentage of people under the poverty line in the region was 15.1 in the year 2000. Average household size in 2000 was 2.67.[2]

Figure 14-6. New York-New Jersey: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population in the region, ages 16 or over, nearly 35 percent of females were employed in the educational, health and social services industry, and about 20 percent were employed in 'other' industries, including the arts, recreation, entertainment, food services, public administration and information. Over 20 percent of males were employed in 'other' industries and 15 percent were employed in the wholesale and retail trade industry (Figure 14-7).

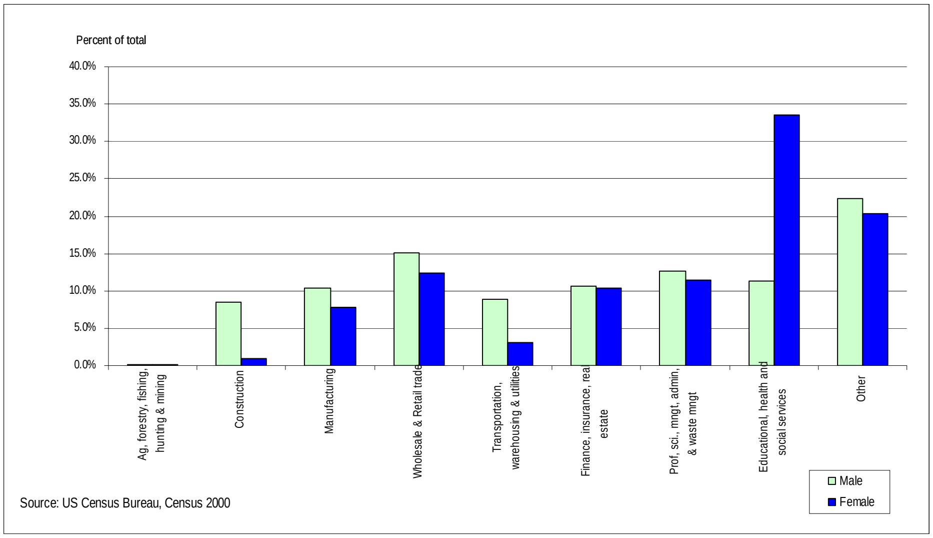
An estimated 7.1 percent of males 7.8 percent of females were unemployed in the region in the year 2000.[3]

According to the 2000 US Census, an estimated 0.1 percent of males and 0.04 percent of females are employed in farming, fishing and forestry occupations. About 15.4 percent of males and 6.0 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.1 percent of female's occupations. Less than 0.2 percent of the population is employed in agriculture, forestry, fishing, farming or mining industries.

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 14-7. New York-New Jersey: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of New York and New Jersey is the gateway to the most concentrated and affluent consumer market in the world. Each year, more than 25 million tons of oceanborne general cargo moves through the port, including 4.5 million TEUs (twenty-foot equivalent units) of containerized cargo. The Port Newark/Elizabeth-Port Authority Marine Terminal complex (NJ), the PA Auto Marine Terminal (NJ), Brooklyn Piers and Red Hook Container Terminal (NY) and Howland Hook Marine Terminal (NY) handle most of the cargo and these facilities are managed by the Port Authority of New York and New Jersey. In addition, there are private operators such as Global Marine Terminal and a number of marine terminals operated by private bulk cargo operators. The Passenger Ship Terminal known as New York Cruise Terminal for passenger ship service is operated by P&O Ports North America for the City of New York.

Port Newark/ Elizabeth
Port Newark and the Elizabeth-Port Authority Marine Terminal operate as one fully integrated marine terminal, forming the largest and most comprehensive collection of maritime cargo handling facilities on the East Coast of North America. The entire complex is part of Foreign-Trade Zone No. 49, operated by the Port Authority of New York and New Jersey.

Auto Marine Terminal
The Port Authority's Auto Marine Terminal covers 130 acres along the Jersey City/Bayonne waterfront on the Port Jersey and Greenville peninsulas in New Jersey. It is dedicated exclusively to the movement of vehicle imports and exports. The terminal includes two ship berths totaling 1,800 linear feet open vehicle storage areas, offices and processing buildings for the facility two tenants,

BMW of America's Port Jersey Vehicle Preparation Center, and Northeast Auto Marine Terminal (NEAT). CSX and Norfolk Southern offer direct service to the facility through its adjacent automobile rail terminal. It is also included in Foreign-Trade Zone No. 49, which is operated by the Port Authority.

PA Auto Marine Terminal:
The PA terminal area covers 130 acres/53 hectares and includes two ship berths; totaling 1,800 feet or 549 meters. The berth space is intermodal, with 32 feet or 10 meters MLW depth at dock.

Brooklyn Piers
The Brooklyn Piers are leased for stevedoring and warehousing primarily breakbulk cargo. Right now, the Port Authority and the New York City Economic Development Corporation are reviewing parts of the property in order to make recommendations for future use. The entrance gates for the piers are at the foot of Atlantic Avenue. The primary cargo types in the piers are bulk and neo-bulk. The terminal area covers 40 acres or 16.2 hectares and the length of the ship berth is 5,000 feet or 1,524 meters; the depth at dock in Piers 6-8 are 32-34 feet MLW (9-10 meters MLW) and in pier 12 is 30-40 feet MLW(9-12 meters MLW).

Red Hook Container Terminal
Red Hook Container Terminal features some of the port's most up-to-date facilities for containerized and non-containerized cargoes. With natural 40-foot depths, Red Hook ideally accommodates fully loaded ships with deep drafts. And, on-dock fumigation facilities make Red Hook the natural entry port for specialized commodities such as coffee and cocoa from Central and South America. Red Hook Terminal is operated by American Stevedoring Inc. The entrance gates to the terminal are at the foot of Hamilton Avenue and the primary types of cargo are containers/ Ro-ro and breakbulk. The terminal area covers 80 acres or 32 hectares. The length of ship berth is 2,080 feet or 634 meters for containers and 3,410 feet or 1039meters for breakbulk. The depth at dock is 42 feet MLW or 12.8 meters MLW. Stuffing and stripping facilities in the terminal are 345,000 square feet and there is a near-dock connection with NY Cross Harbor Railroad and a cross Harbor Container Barge to/from Port Newark. The terminal has 72 reefer plug slots for maintenance and repair and has equipment such as toploaders-45-tons, 3 forklifts-26-ton, 22 Paper clamps-54", and 30 Yard Hustlers-100-ton.

Howland Hook Marine Terminal
Howland Hook Marine Terminal is a key terminal as well as a growing container facility in the Port of New York and New Jersey. Strategically located in the northwest corner of the Borough of Staten Island in New York City, the terminal was developed by the City of New York. Its entrance gate is on North Washington Avenue and Western Avenue. It was leased by the Port Authority of New York and New Jersey in 1985. In 2001, The Port Authority purchased an additional 124 acres, a former Proctor & Gamble property known as Port Ivory for future development.

New York Container Terminal Inc. operates a container terminal on the original 187-acre site. The Port Authority is constructing a 39-acre intermodal rail terminal on a section of the Port Ivory tract, and is currently leasing some of the Port Ivory property for warehousing and distribution uses. The primary cargo types handled in the terminal are containers, general cargo and breakbulk. The length of ship berth is 3,000 feet or 914 meters and the depth at dock is 42 feet MLW or 12.8 meters for 2,300 feet of berth and 37 feet or 10.7 meters for 700 feet of berth. The container cranes are 412,000 square feet and include deep-freeze, refrigeration and have undergone U.S. Customs inspection. The terminal has 47 acres of open container storage and one 64,000 -square foot temperature-controlled storage building.

Global Marine Terminal
The only privately owned and operated container terminal at the Port of New York and New Jersey, the Global Marine Terminal spans 100 acres that includes 1,800 feet of berth space with six container cranes, including four Post-Panamax cranes. Global Marine Terminal is located in Jersey City, NJ,

adjacent to the Port Authority's Auto Marine Terminal and its entrance gate is on Port Jersey Boulevard.

The primary cargo types handled in the terminal are containers-ro-ro and heavy lift. The depth at dock is 40 feet MLW. The terminal has 10 rubber-tired gantry cranes (RTGs equipped with GPS), 8 toploaders-30 ton, 4 sideloadres-8 ton, 52 yard tractors and 24 forklifts-30 ton, 26-ton and 15-ton. The terminal is intermodal, due to its proximity to North Jersey rail yards.

New York Cruise Terminal

The New York City Passenger Ship Terminal, owned by the City of New York and operated by P&O Ports North America, provides five 1,000-foot-long berths suitable for servicing the world's largest cruise vessels at a convenient location on the Hudson River only a few blocks west of Times Square in the heart of Manhattan. The terminal occupies the West Side of 12th Avenue between 46th and 54th streets. P&O Ports North America customers include Carnival, Celebrity, Costa, Crystal Cruises, Cunard, Holland America, Norwegian, P&O Cruises, Princess, Radisson Seven Seas, Royal Caribbean, Seabourn and Silversea. The terminal is also home to an array of trade shows and special events managed by P&O Ports North America.

Other Terminals

In addition to terminals owned and operated by the Port Authority of New York and New Jersey, the Port of New York and New Jersey depends on the stewardship of private operators to help manage the port terminal network. Private operators such as Global Marine Terminal, the City of New York's South Brooklyn Terminal, and a number of marine terminals operated by private oil companies along the southern New Jersey coastline, handle loads such as imported liquid bulk crude oil. The NYC Passenger Ship Terminal is operated by P&O Ports North America for the City of New York. Private operators like Global Marine Terminal help augment the facilities developed and managed by the Port Authority.

Port and Waterways Development

To meet the demands of growing industry, a $1 billion investment is already underway to reconfigure existing terminals, deepen the harbor's channels and berths, and improve inland access by rail and barge — all to create the most efficient and cost-effective port possible. The improved port will feature new high-capacity, environmentally friendly cranes that can load and unload containers more quickly, and an improved transportation infrastructure that will alleviate traffic and port congestion. At the same time, deepened channels and berths will allow for the more cost-efficient and environmentally friendly transport of cargo.

Dredging

Right now, the largest dredging fleet since World War II is at work in the New York/New Jersey Harbor. The Port Authority of New York and New Jersey, working together with the US Army Corps of Engineers, the States of New York and New Jersey, and the City of New York, has developed the dredging initiative as a long-term solution to address the navigational needs of the new deep-draft containerships. At the same time, this initiative is stimulating economic growth and investment in maritime uses throughout the port region. By consolidating resources, the deepening project will be completed with less environmental impact, and businesses will benefit from 45 to 50-foot channels in the more nearer future.[4]

[4] New York and New Jersey Port Authority webpage: http://www.panynj.gov/

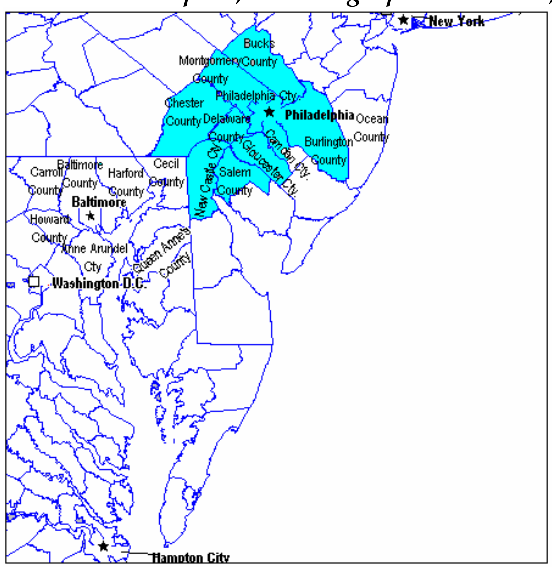
This page intentionally left blank.

15. Philadelphia, PA

Location and Background Information

The Port of Philadelphia is located in Delaware Bay and is part of the Philadelphia-Camden-Wilmington, Pennsylvania- New Jersey- Delaware- Maryland Metropolitan Statistical Area (MSA). For more than 300 years Philadelphia has been an important port city and a major center for international commerce. Only a few short years after William Penn's vessel "The Welcome" landed on the shores of the Delaware River, heralding the establishment of Penn's "City of Neighborhoods", Philadelphia became the New World's leading center for trade and commerce, a title it held for more than a hundred years. Even today, with major port complexes serving major metropolitan centers throughout the country, Philadelphia and its international seaport maintain a preeminent position in several areas of trade, such as the importing of perishable cargoes from South America and high-quality paper products from Scandinavia.[1]

Figure 15-1. Philadelphia, PA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

Total population of this MSA in 2000 was 5,687,147 according to the 2000 US Census. Of this total, 2,731,176 or 48 percent were males and 2,955,971 or 52 percent were females. The median age in the region in 2000 was 36.2 years; 34.8 for males and 37.5 for females. As shown in Figure 15-2, about 45 percent of the population is evenly distributed among the 18 – 29, 30 – 39 and 40 – 49 age brackets (around 15 percent per category).

The majority of the population in the region is white (72.6 percent), followed by the Black or African American population, which represents 19.7 percent of the total population. 'Others' (include

[1] Philadelphia Regional Port Authority: http://www.philaport.com/history.htm

American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) constitute 4.5 percent of the population. The Asian population represents only 3.3 percent of the total population (Figure 15-3). Moreover, in terms of ethnic makeup, 5.0 percent of the total population is considered to be of Hispanic or Latino origin.[2]

Figure 15-2. Philadelphia, PA: Structure of the Population by Age Group, 2000

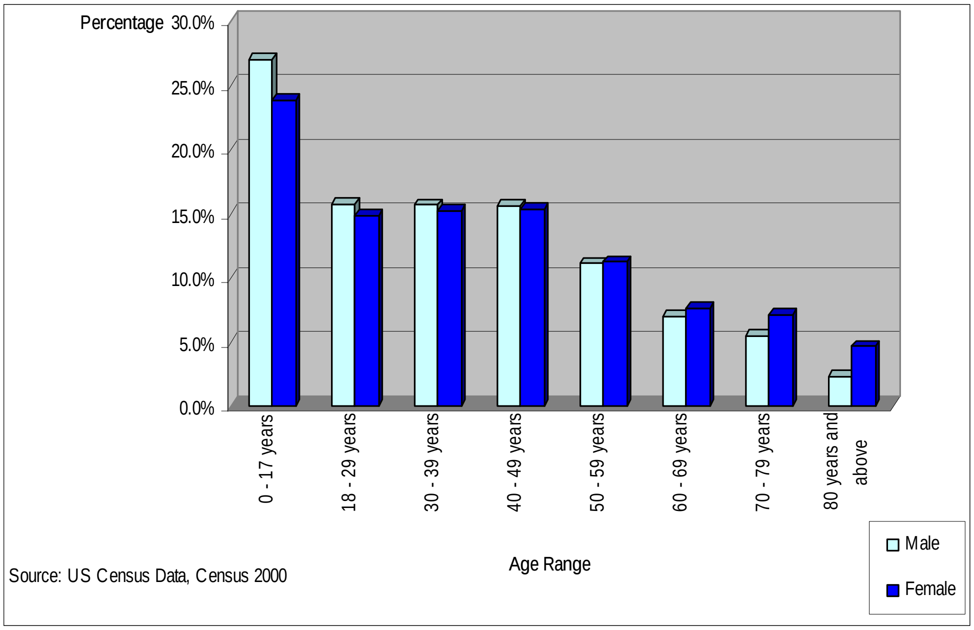
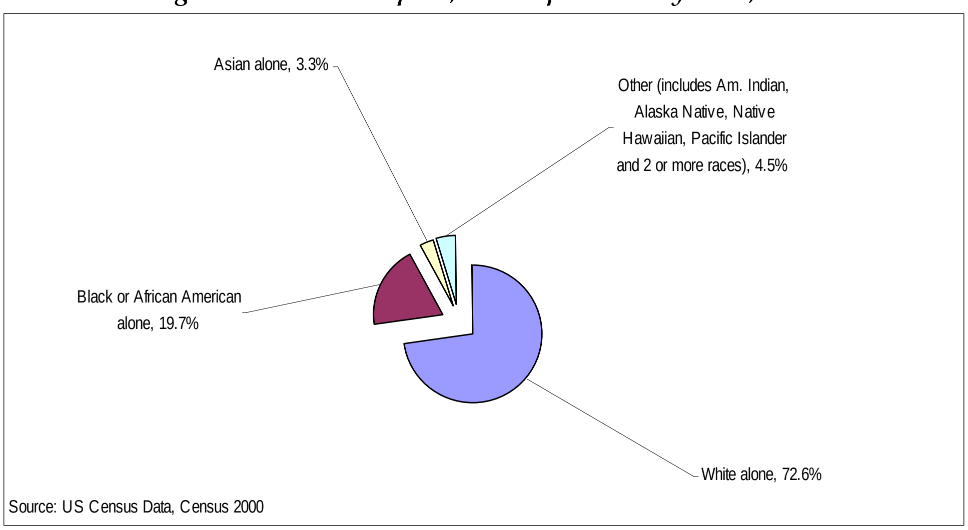


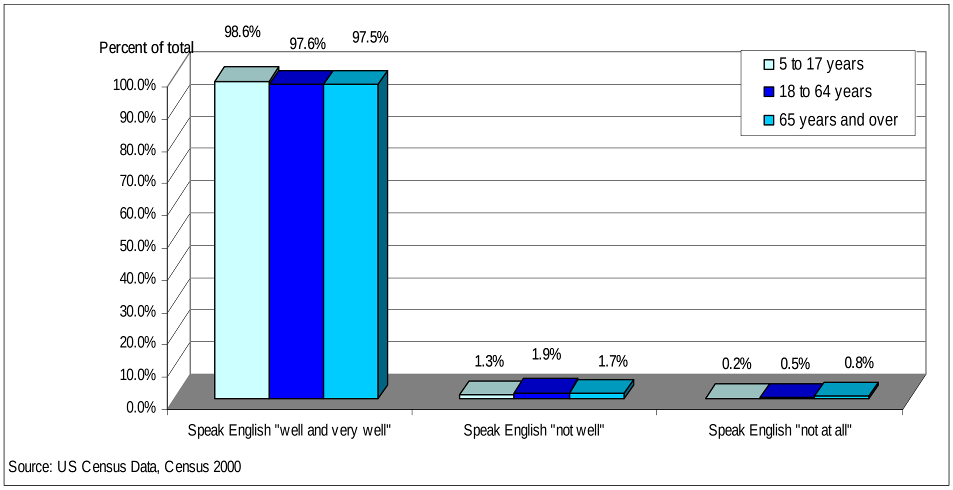
Figure 15-3. Philadelphia, PA: Population by Race, 2000



[2] Source: US Census Data, Census 2000.

It is evident from the data specified in Figure 15-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 15-4. Philadelphia, PA: Ability to Speak English by Age Group, 2000

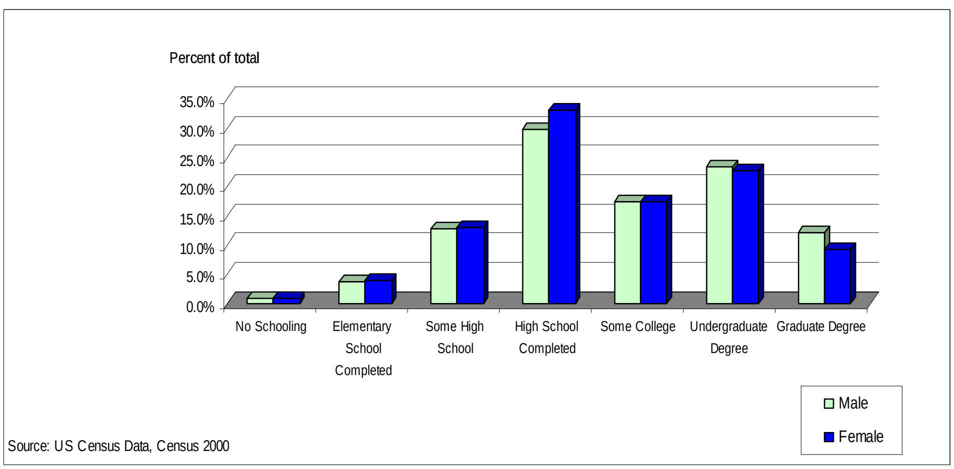


EDUCATION

As shown in Figure 15-5, of the population ages 25 or over, about 30 percent of males and females have completed high school and around 20 percent have obtained an undergraduate degree. Only 10 percent of males and around 8 percent of females have obtained graduate degrees.

There are several colleges and universities in this MSA, the following are some of these institutions: University of Pennsylvania, Temple University, Philadelphia University, Bryn Mawr College, Manor College, Penn State, Swarthmore College and Villanova University.

Figure 15-5. Philadelphia, PA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



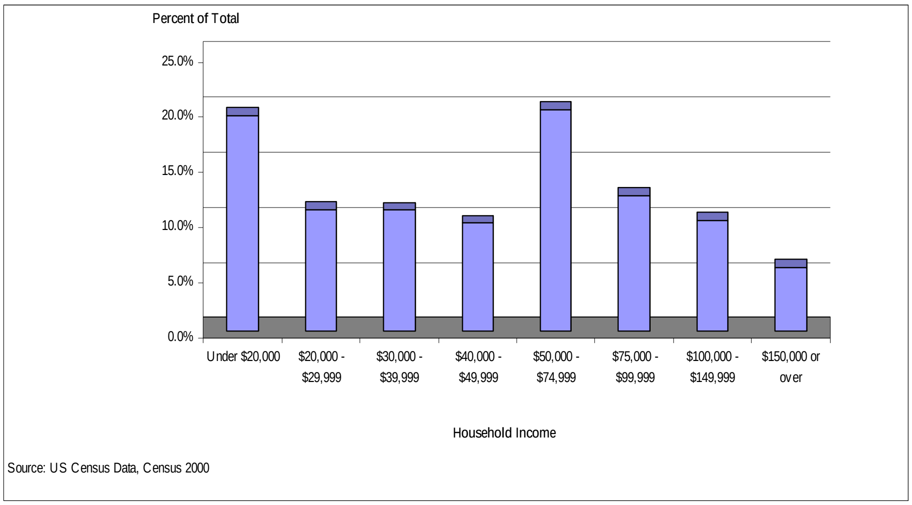
Socio-Economic Characteristics

INCOME

Nearly 20 percent of households in the area in 1999 had incomes between $50,000 and $74,999 and about 20 percent had incomes under $20,000. Almost 10 percent of households in the area had incomes of $150,000 or over (Figure 15-6).

Household median income in 1999 in the MSA was $49,076.83 and per capita income was $23,971.86. The percentage of people under the poverty line in the region was 10.8 in the year 2000. The average household size in 2000 was 2.59.[3]

Figure 15-6. Philadelphia, PA: Distribution of Households by Household Income, 1999



EMPLOYMENT

Of the employed civilian population in the region, ages 16 or over, nearly 35 percent of females are employed in the educational, health and social services industry and nearly 20 percent are employed in other industries. These industries include the arts, entertainment, recreation, food services, public administration and information. Nearly 20 percent of males are employed in 'other' industries, about 15 percent are employed in the manufacturing industry and around 17 percent are employed in the wholesale and retail trade industries (Figure 15-7).

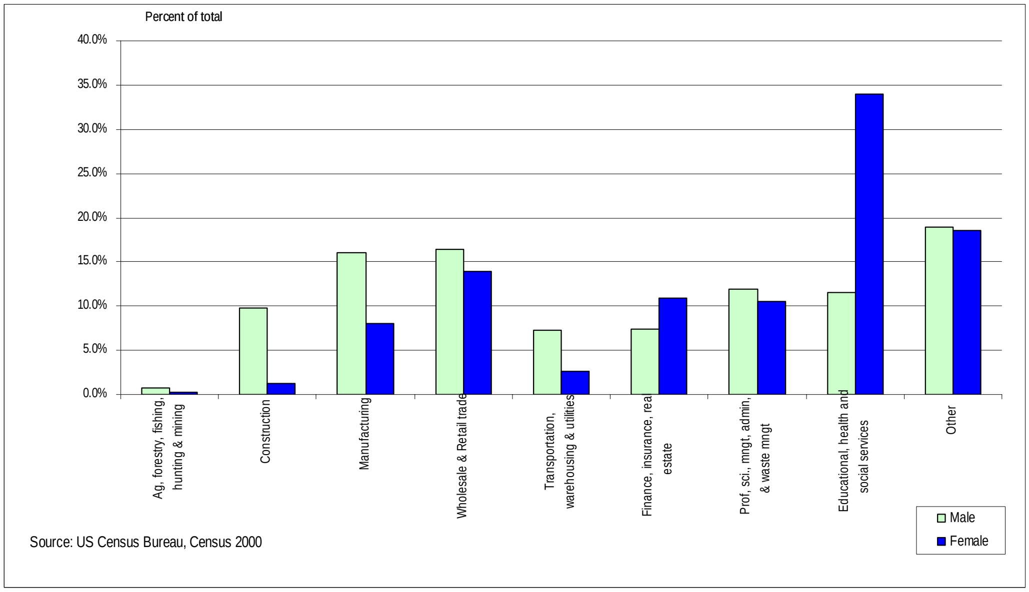
An estimated 6.1 percent of males and 6 percent of females were unemployed in the region in the year 2000.[4]

According to the 2000 US Census, an estimated 0.3 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 17.0 percent of males and 5.5 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.049 percent of female's occupations.

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 15-7. Philadelphia, PA: Employed Civilian population by Sex and Industry 16 years and over, 2000



MARITIME INFORMATION

For most of its early history, the Port of Philadelphia thrived and expanded without major guidance from a central governing authority or organization. Rather, disparate private concerns built and maintained piers and waterfront warehouses, moving a wide variety of imported and exported goods through those facilities. It was during these initial years that all manner of breakbulk cargoes moved over the city's docks, establishing early on Philadelphia's reputation for the fast, expert handling of any cargo imaginable. Ultimately, city government took a more active hand in the organization of the city's waterfront, and municipally-owned piers and warehouses sprang up amidst the privately-owned facilities.

For most of the early years of the 20th century, the Philadelphia waterfront was overseen and managed by the Department of Wharves, Docks, and Ferries, a division of the City of Philadelphia's Department of Commerce. The Department of Wharves, Docks, and Ferries oversaw the construction and maintenance of municipally-owned piers and port facilities, and had some regulatory power for the overall Philadelphia waterfront.

In 1965, the non-profit, quasi-public Philadelphia Port Corporation was established. The corporation had the power to issue municipal bonds to raise funds for port improvements. Revenue to pay the bonds' debt service was realized primarily through leasing the agency's port facilities to private operating companies. These private companies operated their respective port facilities on a day-to-day basis, with marketing assistance from the Philadelphia Port Corporation. Major port improvements were made in the 1960s and 70s under the auspices of the Philadelphia Port Corporation. These included the construction of the 106-acre Packer Avenue Marine Terminal (still the Port of Philadelphia's largest facility) and the Tioga Marine Terminal in the 1970s.

Like many ports throughout the United States (and especially competing ports along the East Coast) the capital-intensive requirements to maintain and improve the Port of Philadelphia eventually outgrew the funding capabilities of the City of Philadelphia and its port agency. The Commonwealth of Pennsylvania recognized the vital importance of its seaport asset and it agreed to assist in the maintenance, expansion, and promotion of its international seaport in Philadelphia. The first step was the creation of the Philadelphia Regional Port Authority (PRPA), an independent state agency, in 1990. It immediately replaced the Philadelphia Port Corporation.

Along with creating PRPA, the state purchased all publicly-owned port facilities from the City of Philadelphia, charging PRPA with the mission of managing and maintaining them. A major state capital budget was also established, which allowed PRPA to make an initial round of needed capital improvements during the early 1990s, such as the addition of on-dock warehouse space at Tioga Marine Terminal and new warehouse space and refrigeration at Pier 82.

Since its inception more than ten years ago, PRPA has overseen other major improvements to the Port, as well as aggressively assisting its terminal operators in marketing the Port around the world. PRPA also works with other port agencies and port-related concerns along the Delaware River on issues of mutual concern, such as maintaining sufficient channel depth and monitoring regulatory issues.

PRPA and its 11-member Board of regional business leaders have recently overseen a variety of notable developments at the Port of Philadelphia. In October of 2002, PRPA was named the nation’s 14th Strategic Military Port by the U.S. Defense Department, making it one of only 14 U.S. ports permitted to handle our nation’s military cargoes destined for different points around the globe. Shortly after that, in January 2003, PRPA was selected as a homeport for two U.S. Navy Large, Medium Speed Roll On/Roll Off (LMSR) ships. These Naval supply vessels, docked at PRPA’s Tioga Marine Terminal, are often utilized to deliver the military cargoes now handled by PRPA as a result of its Strategic Military Port designation.

On the commercial front, 2002 and 2003 also saw the advent of dramatic new cargo services at the Port. With the establishment of P&O Nedlloyd’s “Around the World” service at the Packer Avenue Marine Terminal, PRPA now offers regular service to North Europe and Mediterranean ports for the first time in more than a decade, as well as significantly enhanced service with longtime trading partners Australia and New Zealand. With new carrier Bertling Line now calling the Tioga Marine Terminal, that facility’s already excellent South American services have been enhanced by regular calls by this major carrier of finished wood cargoes and other breakbulk products.

With many challenges on the horizon, 2004 and beyond will be a challenging time for the Philadelphia Regional Port Authority. A current major initiative is to finally bring the Delaware River Channeling Deepening Project to fruition, so our main artery of commerce can finally be deepened from 40 to 45 feet. PRPA’s Southport Development Project, which aims to be the first major expansion of the Port of Philadelphia in more than a generation, is also a priority. And, of course, there are the usual ongoing concerns of securing new customers and keeping PRPA’s facilities efficient and modern. The Philadelphia Regional Port Authority (PRPA) is the grantee of Free Trade Zone number 35 which covers Southeastern Pennsylvania

FACILITIES:
Packer Avenue Marine Terminal
Located in South Philadelphia, Pennsylvania; this terminal handles containers, steel, meat, fruit, heavy lift/project. The terminal area is 106 acres and has 6 berths with a length of 3,800 linear ft.; 1 RO/RO, 40 foot depth; dry, heated and reefer warehouses; container cranes, heavy lift cranes, rail services. The terminal has 4 storage warehouses: 1 dry/heated - 100,000 sq. ft., 1 dry - 90,000 sq. ft., 1 dry - 100,000 sq. ft. and 1 refrigerated - 2,200,000 cu. ft.

Pier 96 & Pier 98 Annex
The piers are located in South Philadelphia and have a combined area of 56 acres. Pier 96 has an area of 9.7 acres and Pier 98 Annex has an area of 45.2 acres. It has 2 berths with a length of 1,320 linear ft. (402.3 m.) each and 32 foot depth. The piers specialize in cargo such as automobiles, project, trucks and heavy equipment. The piers have two sheds: an auto-washing shed - 15,000 sq. ft. and a service building - 80,000 sq. ft. The accessory shop accommodates 125 vehicles and the auto-washing system handles 125 vehicles per hour (a computer tracking system follows the entire process). They are also designated as a Foreign-Trade Zone.

Pier 82
The pier is a fruit-handling facility and it is located in South Philadelphia; handles fruits and vegetables, other breakbulk, project. It has an area of 18.4 acres, and has 2 berths of 1,139 linear ft. and 855 linear ft. and that are 32 foot in depth. The pier has 1 warehouse that is heated/chilled and has an area of 130,000 sq. ft. with a humidification system. The pier has 12 loading docks (6 canopied), 24 reefers and loading platforms for 17 trucks.

Pier 84
The pier is located in South Philadelphia and handles cocoa beans and cocoa products. It has an area of 23 acres and has 1 berth of 855 linear ft. in length and 32 feet in depth. The pier has two storage warehouses for dry & heated storage: a dry storage facility that is 500,000 sq. ft. and a dry storage facility that is 40,000 sq. ft. It also has canopied loading platforms for over 40 trucks. Value added services offered at the pier include de-bagging, super sacking, weighing and testing.

Piers 78 & 80
Located in South Philadelphia, these piers are a forest products distribution center. They handle newsprint, coated paper, wood pulp, lumber and other forest products. The terminal area is 39.8 acres and has 6 berths. Pier 78 has 2: 1 that is 900 linear ft., the other is 854 linear ft. Pier 80 has 4 berths, 2 berths with RO/RO ramps; one that is 994 linear ft. in length, and another one that is 1,144 linear ft. in length. All berths are 35 ft in depth. The piers have direct to storage/truck/rail and RO/RO capabilities. It has over 100 customized lift trucks with advanced pressure-controlled paper handling capabilities; 5 fifth wheels; 40 tractors; 35 flatbeds and 30 vans. It has 40 truck bays and accommodations for 50 rail cars. The piers are a designated Foreign-Trade Zone.

Piers 38 & 40
The piers are part of the Forest Products Distribution Center and are located in Philadelphia's central waterfront district. They handle newsprint, coated, wood pulp and other forest products. The terminal has an area of 12 acres and has 3 berths that are 550 linear ft, 551 linear ft. and 620 linear ft in length and are 35 foot deep. The terminal has 2 dry warehouses, each 180,000 sq. ft. The terminal also has 16 truck bays and accommodations for 10 rail cars. It has 25 forklifts equipped with paper roll and/or pulp clamps; 30 tractors; 35 flatbeds and 20 vans.

Tioga Marine Terminal
The terminal is located in Northeast Philadelphia and handles containers, refrigerated fresh fruit, paper, plywood, cocoa beans, autos, palletized, project, breakbulk, steel and automobiles. The terminal has an area of 96.5 acres and has 6 berths that are 3,822 linear ft in length and 36 feet deep and 1 RO/RO. The terminal has 4 sheds: 1 compartmented 300,000 sq. ft. warehouse: 150,000 sq. ft. refrigerated, 150,000 sq. ft. heated; 1 cold storage - 90,000 sq. ft. with racked storage for 6,000 pallets; 1 heated storage - 97,500 sq. ft. and 1 dry - 40,000 sq. ft. The terminal has 180 reefer outlets, and 2 kocks container gantry cranes: each 45 short tons (40.9 metric tons); with hydraulic and mechanical mobile cranes available container cranes. It also has canopied loading platforms for 100 trucks and 8 T.I.R. lanes for truck gates; 3 with scales. The terminal has fumigation capabilities for 800,000 fruit boxes a day; trailer offices for customers and 2,000 ft. of rail siding for intermodal COFC transfer.[5]

[5] Philadelphia Regional Port Authority: http://www.philaport.com/history.htm

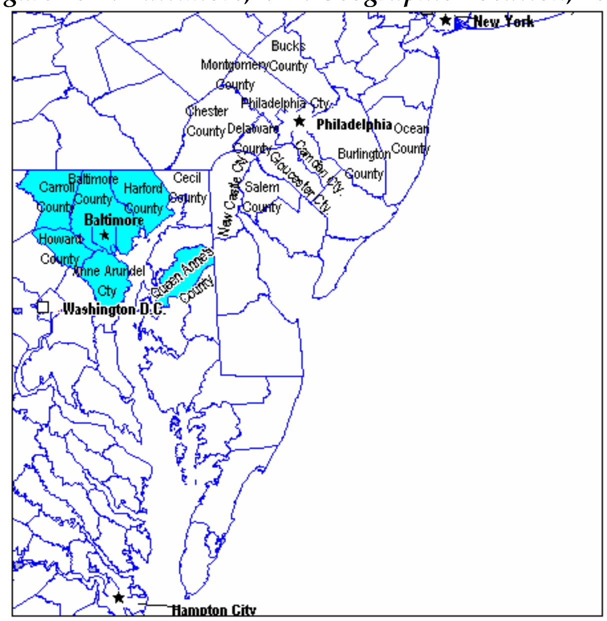
This page intentionally left blank.

16. Baltimore, MD

Location and Background Information

The Port of Baltimore is located in the Baltimore-Towson, Maryland Metropolitan Statistical Area (MSA). Strategically located in the Mid-Atlantic region of the U.S. east coast, Baltimore sits in the center of the enormous Washington/Baltimore Common Market. This inland location makes it the closest Atlantic port to major Midwestern population and manufacturing centers and a day's reach to 1/3 of U.S. households. The port provides immediate access to the 6.8 million people in the Washington/Baltimore region, the nation's fourth-largest and one of the wealthiest consumer markets in the U.S. [1]

Figure 16-1. Baltimore, MD: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Baltimore-Towson, MD Metropolitan Statistical area is 2,552,994 according to the 2000 US Census. Of the total population, 1,228,231 or 48.1 percent are males and 1,324,763 or 51.9 percent are females. The median age for the population is 36.3 years; 35.1 for males and 37.4 for females. The majority of the population is located between the 30 – 39 and 40 – 43 age range brackets; this in the case of males and females (Figure 16 -2).

The majority of the population in this area is white (67.4 percent), followed by the Black or African American population, which represents 27.2 percent of the total population. The Asian population represents 2.7 percent of the total population, and 'others' (which include American Indians, Alaska

[1] Source: Maryland Department of Transportation. URL: http://www.mdot.state.md.us

natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) constitute 2.7 percent of the population as well (Figure 16-3). In terms of ethnic makeup, only 2.0 percent of the population of this MSA is of Hispanic or Latino origin.[2]

Figure 16-2. Baltimore, MD: Structure of the Population by Age Group, 2000

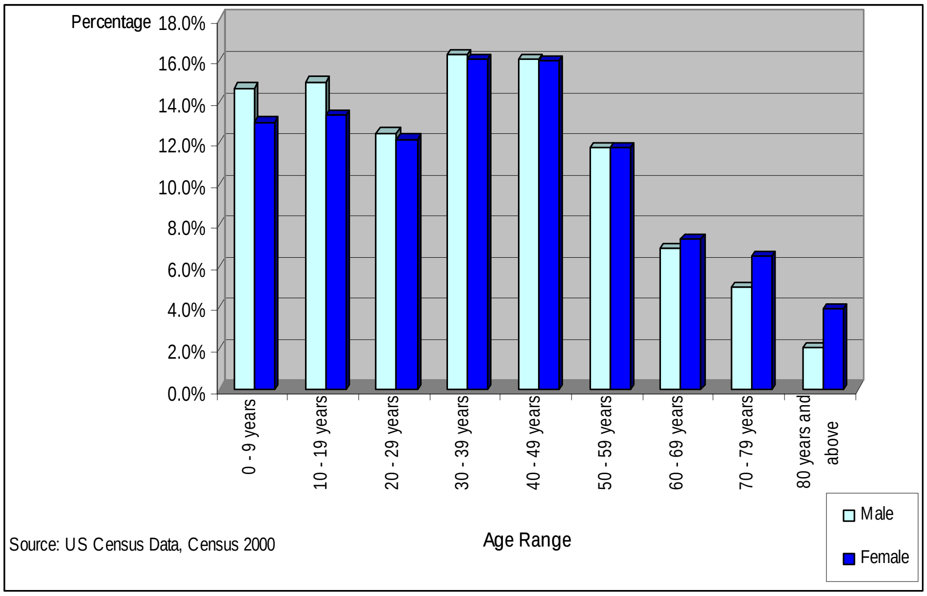
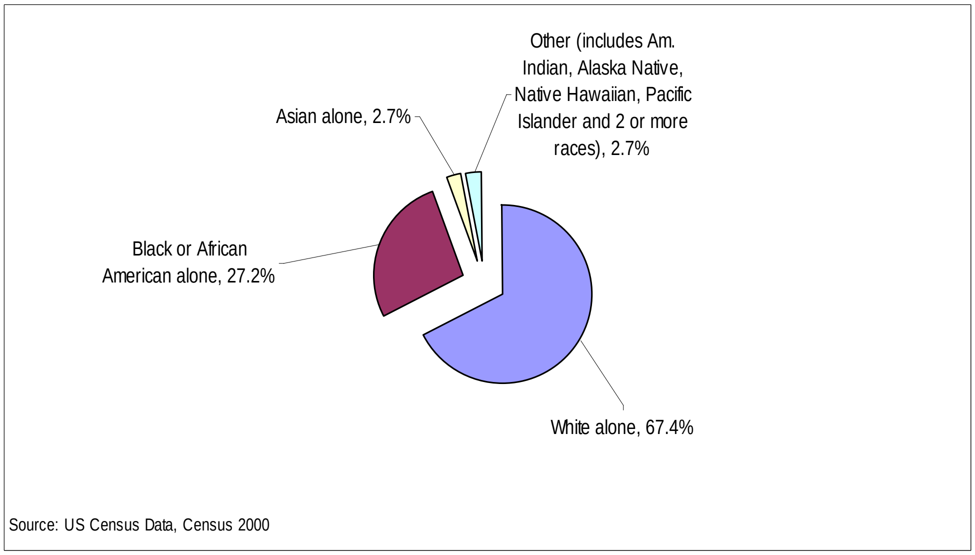


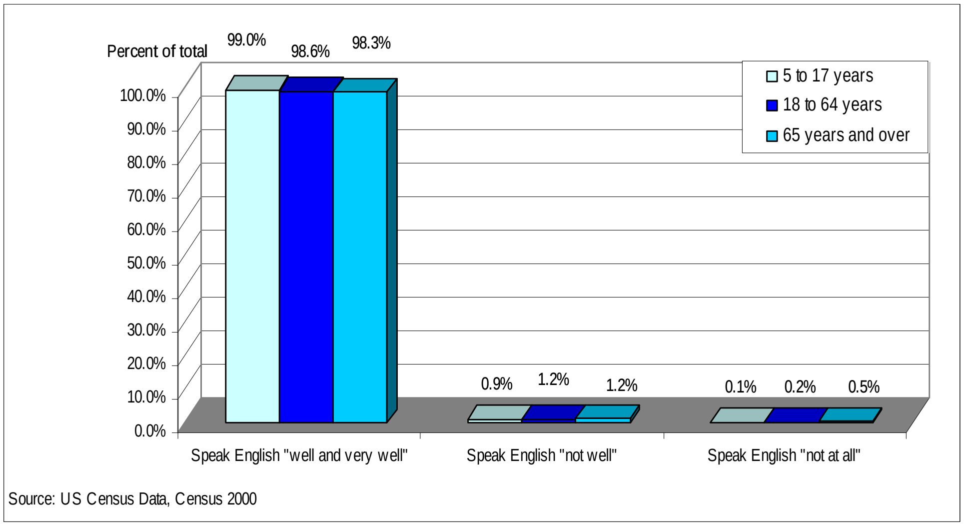
Figure 16-3. Baltimore, MD: Population by Race, 2000



[2] Source: US Census Data, US Census 2000

It is evident from the data specified in Figure 16-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 16-4. Baltimore, MD: Ability to Speak English by Age Group, 2000

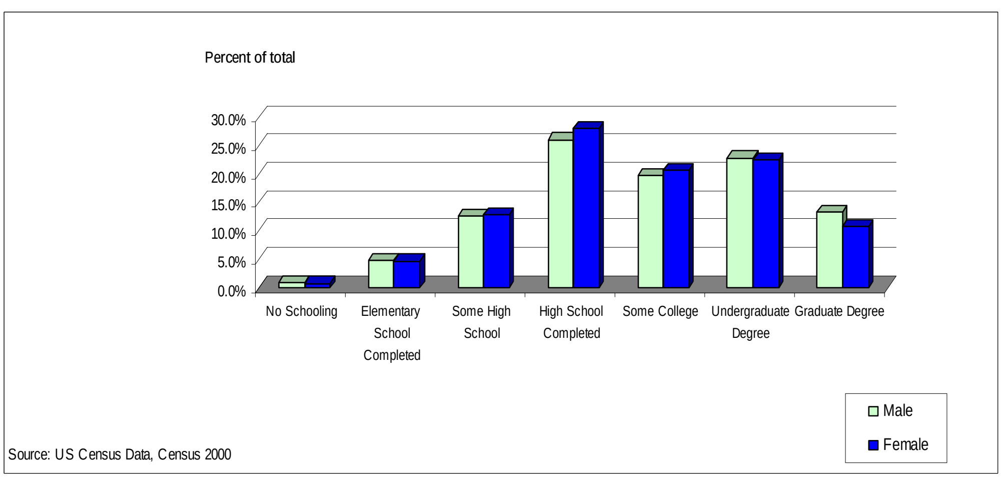


EDUCATION

Of the population in the region, ages 25 and over, about 25 - 27 percent of the population has completed high school and a high percentage has also either completed some college or obtained an undergraduate degree. Approximately 10 – 15 percent of the population has obtained a graduate degree; males more so than females, but only by a small percentage (Figure 16-5).

Maryland has 24 four-year colleges and universities, 4 two-year colleges and 120 private career schools approved by the Maryland Higher Education Commission.[3] About half of the four-year colleges are located within the Baltimore-Towson, MD MSA. One of the best known universities in the area is Johns Hopkins University, especially known for its excellent medical school.

Figure 16-5. Baltimore, MD: Educational Attainment of Population by Sex Ages 25 and Over, 2000



---

[3] Source: Maryland State Archives. URL: http://www.mdarchives.state.md.us

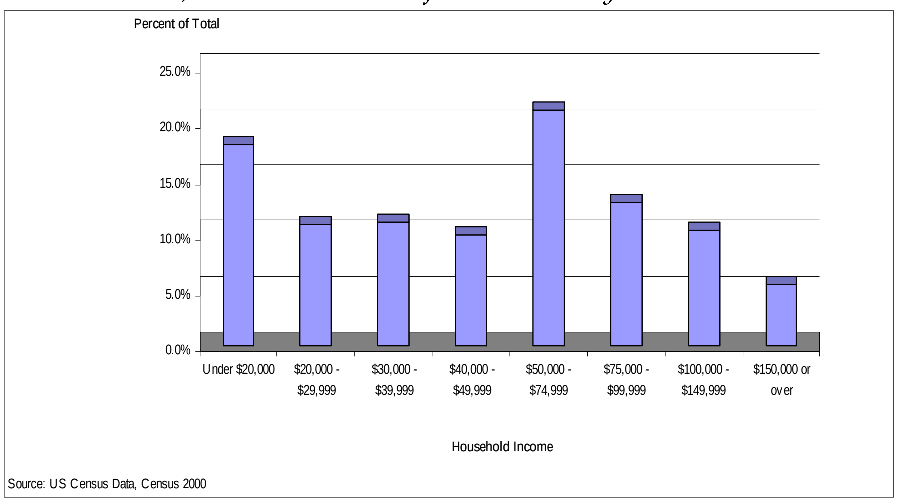
Socio-Economic Characteristics

INCOME

As portrayed in Figure 16-5, about 22 percent of the households in this area in 1999 had incomes between $50,000 and $74,999. Nearly 20 percent of households had incomes under $20,000. Less than 7 percent of households in the region had incomes of $150,000 or over (Figure 16-6).

Household median income in Baltimore, MD in 1999 was $50,572.21 and per capita income in the same year was $24,398.48. The region is considered to be among the country's wealthiest. Maryland has the second highest household income in the nation.[4] The percentage of people under the poverty line in the region was 9.8 in the year 2000. Average household size in 2000 was 2.6.[5]

Figure 16-6. Baltimore, MD: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population in the Baltimore-Towson, MD MSA, ages 16 or over, nearly 35 percent of females were employed in the educational, health and social services industry and almost 25 percent were employed in 'other' industries, including the arts, recreation, entertainment, food services, public administration and information. Nearly 25 percent of males are employed in 'other' industries and 15 percent are employed in the wholesale and retail trade industry (Figure 16-7).

An estimated 4.8 percent of males and 5.1 percent of females were unemployed in the region in 2000.[6]

According to the 2000 US Census, an estimated 0.2 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 15.6 percent of males and 4.5 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.1 percent of female's occupations.

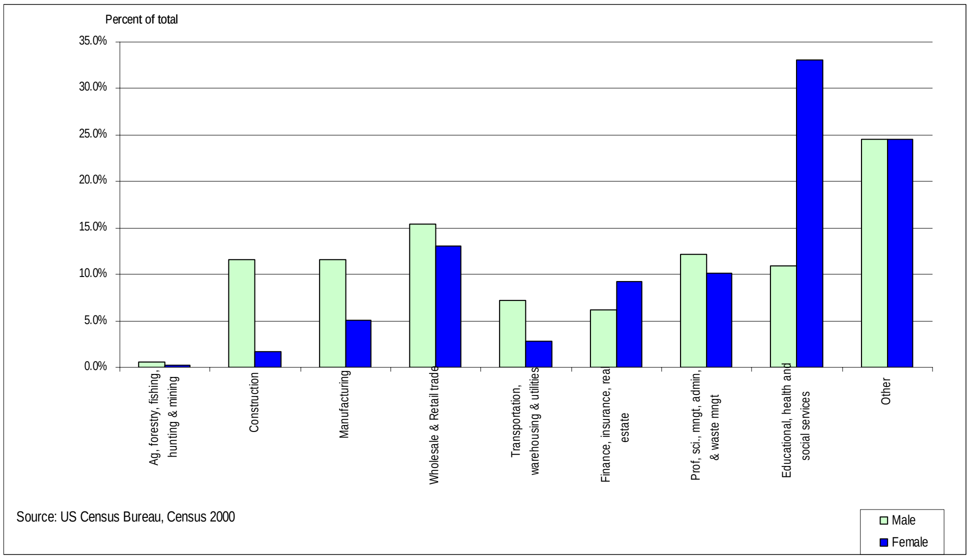
---

[4] Source: Maryland Department of Transportation. URL: http://www.mdot.state.md.us

[5] Source: US Census Data, Census 2000

[6] US Census Data, Census 2000

Figure 16-7. Baltimore, MD: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of Baltimore is regarded as one of America's top container terminals, providing technological advances that have transformed port operations from clipboard to keyboard. The port boasts computerized gate complexes, hand held computers and scanners and the use of Electronic Data Interchange (EDI)- all which greatly increase the port's efficiency and cost-effectiveness.

The Port of Baltimore is a significant economic engine for the entire region, generating $1.5 billion in revenue annually and employing 16,100 Marylanders in direct jobs, and another 17,600 in Induced and Indirect jobs. Port-related jobs are diverse and include everything from truck drivers, longshoremen, tugboat operators, and rail yard workers, to employees of the Maryland Port Administration (MPA). The MPA is charged with stimulating the flow of waterborne cargo through the entire port community, maintaining the terminals, and marketing the Port of Baltimore worldwide.

Other governmental agencies, such as U.S. Customs and the Army Corps of Engineers, along with the private sector with its variety of businesses, play a vital role in making the Port of Baltimore successful. From freight forwarders to bay pilots to warehouse operators- all contribute to making the Port of Baltimore efficient, cost effective and easy to use.

The port of Baltimore has six public terminals and seven private terminals. The public terminals are the following:

Seagirt Marine Terminal
The Seagirt Marine Terminal stands as a working monument to the Port of Baltimore's innovative and progressive spirit. Opened in 1990, Seagirt features the latest in cargo-handling equipment and systems. The design behind this high-tech facility system stems from one simple principle: keep the cargo moving. The computerized gate complex serves as the nerve center for the 275-acre container terminal. Seagirt's automated system consolidates the steps necessary to generate the Trailer

Interchange Report (TIR). When trucks enter Seagirt, an electronic sign-bridge over 13 of the 14 inbound lanes directs the drivers to the appropriate lane, where a remote intercom system allows them to quickly exchange information with clerks in the gate house.

Seagirt's hours and 14 portals make ingress for trucks quick and easy. The newly-enhanced NAVIS system allows truckers, forwarders, and brokers to access the exact status of their container and will even send an email notifying them when it is ready for pick-up. The Seagirt computer system's electronic data interface capabilities automatically receive and send information to the terminal's steamship line customers. With just a few keystrokes, the carriers receive instantaneous information on the cargo and equipment, helping them generate timely reports that can boost their efficiency.

The $220-million terminal's seven 20-story high-speed computerized cranes dominate the port's skyline. In the hands of the port's skilled International Longshoremen's Association (ILA) operators, these 100-foot gauge, post- Panamax cranes are among the most productive in the industry, averaging 33 to 35 containers an hour.

Three of the cranes feature the latest dual-hoist systems, which lift two containers simultaneously to expedite the loading and discharge of the vessel. Capable of handling 150,000 containers a year, Seagirt's practical yard layout places the storage area directly behind the berths, further increasing the productivity of the vessel loading and discharge operations.

Further enhancing Seagirt's efficiency is the adjacent Intermodal Container Transfer Facility, which brings the railhead to within 1,000 feet of the bulkhead and makes the Seagirt complex the port's intermodal hub. The port's progressive labor-management approach complements Seagirt's advanced equipment, technology and systems to further its reputation as one of the nation's most productive terminals.

Dundalk Marine Terminal
With 13 berths, 9 container and two gantry cranes and direct rail access, the 570-acre terminal remains the Port of Baltimore's largest and most versatile general cargo facility. Dundalk handles cargo equipment such as containers, automobiles, farm, construction, wood pulp, steel, breakbulk, project cargo and other Roll On/Roll Off (RO/RO) equipment.

APM Terminals, Inc. operates a private terminal within Dundalk, further enhancing the port's efficiency. Opened in 1993, this private terminal features many of the same automated efficiencies first introduced to the port in 1990 at the Seagirt Marine Terminal, which is generally regarded as the finest container terminal in the country. Maryland International Terminals (M.I.T.) also operates a private container terminal within Dundalk.

Approximately 135 acres, these “terminals within a terminal” (APM and MIT) includes computerized gate complexes that consolidate and improve the Trailer Interchange Report (TIR) process. Using remote intercom systems, truck drivers can communicate directly with clerks in the gatehouse, who instantaneously type the necessary information into a computer. The enhanced NAVIS system also enables truckers, forwarders, and brokers to access the status of specific containers, for up-to-the-minute information.

Over the past several years, Baltimore ranked as one of the nation's top three automobile handling ports. Several auto processors maintain operations at Dundalk, which offers 152.2 acres of storage. Dundalk's direct rail access also allows unit trains to routinely deliver dozens of units of farm and/or construction equipment to the terminal at once. Combined with rail access provided by Norfolk Southern and CSXT, Dundalk's size makes it ideal for handling large breakbulk and project cargo. The terminal's expansive covered storage space can easily house weather-sensitive cargoes such as high-quality steel coils, raw rubber, and wood pulp, one of the fastest-growing cargoes at the port.

The Port of Baltimore recently invested $21 million on crane upgrades at Dundalk. A container crane with a top capacity of 40 containers per hour. Improvements to the speed and capacity of existing cranes. Outreach was increased to 126 feet, so the outermost container row on a Panamax ship can now be reached at full trolley speed. A new heavy lift crane. The truck-mounted Manitowoc M-250T boasts a maximum capacity of 300 long tons, and its mobility makes it available at any of the Port of Baltimore's terminals on an as-needed basis.

N. Locust Point
Over the past century, North Locust Point has adapted and changed to meet the varied needs of the port. It has welcomed immigrants, served as a cargo pier for the Baltimore & Ohio Railroad, and handled many different types of breakbulk and liquid and drybulk cargoes. Today, the 90-acre terminal has been redeveloped to enhance the port's forest products capabilities. The addition of a 45 long ton (45.7 M.T.) container crane, coupled with on-dock rail access, allows for the smooth loading and discharge of steel directly between vessel and rail car. The addition of the container crane boosts the efficiency of the terminal's container operations, while two 75-ton (68 M.T.) gantry cranes provide the heavy-lift capability needed for large breakbulk and project shipments.

North Locust Point provides water access for one of the port's grain elevators, and is home to several latex importers. The terminal has ample storage capacity. With 19 acres (7.9 ha) of outside space and two sheds with a combined 365,206 square feet (33,275 square meters), North Locust Point can easily accommodate the storage of steel, breakbulk and project cargoes. While North Locust Point has changed many times in its proud history, one constant remains: its ability to meet the varied needs of the port's customers.

S. Locust Point
While all of the port's general cargo terminals enjoy excellent highway access, South Locust Point has Interstate 95 -- the "Main Street" of the East Coast -- literally running past its front door. From South Locust Point, trucks can travel almost anywhere in the country without hitting a single traffic signal. The Maryland Port Administration (MPA) opened South Locust Point in 1979 to meet the growing needs of the port's customers. South Locust Point can handle any type of general cargo.

The MPA completed a major expansion of South Locust Point in 1988, doubling the size of the terminal to almost 80 acres and creating four general cargo berths. The multi-million-dollar project increased the terminal's productivity and efficiency by developing another container berth and adding a third container crane. South Locust Point features three 40-long ton (40.6 M.T.) container cranes, as well as a 100-short ton (90.7 M.T.) revolving gantry crane for handling heavy breakbulk and project cargoes. The facility's size and versatility make it ideally suited to handle the needs of medium-sized steamship lines, multi-purpose vessels and any cargo that needs to hit the road in a hurry.

Fairfield Auto Terminals
Together with automobiles and light trucks, tractors, agricultural vehicles, trucks, wheeled cranes, and the like make Baltimore the number one port in the United States for handling “Ro/Ro.” The “Fairfield” area of the port includes four specialized terminals for handling and processing autos, light trucks and similar ro-ro cargo.

Currently, an MPA facility exists, 44.1 acres in size with 50,000 square ft. of modern building space, for processing autos and light trucks. Typically, this includes accessorizing, minor repair operations and final dealership preparation. The terminal is adjacent to a public berth, also owned by MPA. A vessel discharging new vehicles can berth within a few hundred feet of the facility. A second facility, owned by MPA and leased to ATC Logistics of Maryland, is Masonville Marine Terminal. This state-of-the-art facility consists of nearly 50 acres, with a 94,000 sq. ft. building, also designed for processing automobiles. Access is a mere half mile from the vessel. Plans are underway to add an additional berth to the site.

Amports owns and operates two other terminals in this area. These are the Atlantic Terminal, 55 acres with its own pier facility, and Chesapeake Terminal, 70 acres with an additional 26 planned for development. The Port's famous QCHAT Program, Quality Cargo Handling Action Team, is based at the Atlantic facility.

Intermodal Container Transfer Facility
The Port of Baltimore's Intermodal Container Transfer Facility (ICTF) moves cargo between bulkhead and railhead in record time. Adjacent to Baltimore's modern Seagirt Marine Terminal, the 70-acre ICTF allows cargo to catch a train to almost anywhere. CSX Intermodal (CSXI) operates the port's on-dock railyard, which has steadily increased its volume since opening in 1988. Baltimore's ICTF has quickly emerged as an integral link in CSXI's impressive nationwide intermodal system.

With six trains daily, CSXI offers direct service to the Southeast and Midwest, and connections to the rest of the continental United States and Canada. CSXI also operates a service between the ICTF to Montreal and Toronto. The Seagirt ICTF offers double-stack capability, as well as providing shippers and steamship lines with reverse landbridge opportunities to the rest of the country.

The dedicated truck entrance of the automated pre-check system speeds the pick-up and delivery process for cargo. The facility features a separate gate for domestic shipments. The Seagirt ICTF uses the latest in intermodal equipment and a skilled labor force to keep the ICTF running efficiently. Two transtainers -- rubber-tired gantry cranes which straddle the rail tracks -- facilitate the rapid loading and discharge of two trains simultaneously. Toploaders are used to mount and dismount containers to and from chassis.

With its location adjacent to the Seagirt Marine Terminal, cargo flows effortlessly between the two facilities, while the intra-terminal Colgate Creek Bridge connects the Seagirt, the port's largest general cargo facility. In 1992, the International Longshoremen's Association, whose members supply the facility's labor force, and the Steamship Trade Association of Baltimore agreed to an unprecedented five-year agreement contract that adds a third shift, allowing the ICTF to operate 24 hours a day, seven days a week.

Private Terminals:
The Rukert Marine Terminal specializes in metals, ores, fertilizers, alloys; the Sparrows Point Terminal is a bulk and breakbulk loading & unloading facility; the Baltimore Metal & Commodities Terminal specializes in metals, soft commodities & project cargo; Highland Marine Terminal; the CNX Marine Terminals, Inc. specialize in bulk, breakbulk, project and general cargo, stevedoring and lay berthing; the Terminal Corporation has more than a century of experience handling unitized, break bulk and project cargoes and the Westway Terminal Company, Inc. specializes in the handling of agricultural products, molasses products, and chemicals.

The City of Baltimore Foreign-Trade Zone (FTZ) number 74 was established in 1982. Since its establishment, the growth of the FTZ in Baltimore has caused both expansion and modification due to a number of requests and in response to the tremendous benefits to certain industries. This growth, in turn, has created job, additional cargo tonnage for the port and increased the tax base of the community. Zone space was originally 60,000 sq. ft. in 1982 and presently contains over 1,400 acres at 11 sites in the city of Baltimore. As documented in the 2000 Annual Report, the General Purpose Zone and Sub-Zone of FTZ #74 provided over 970 jobs and served 92 users during fiscal year 2000; handling 37 different commodities from 45 countries of origin with a value in excess of $15 million. [7]

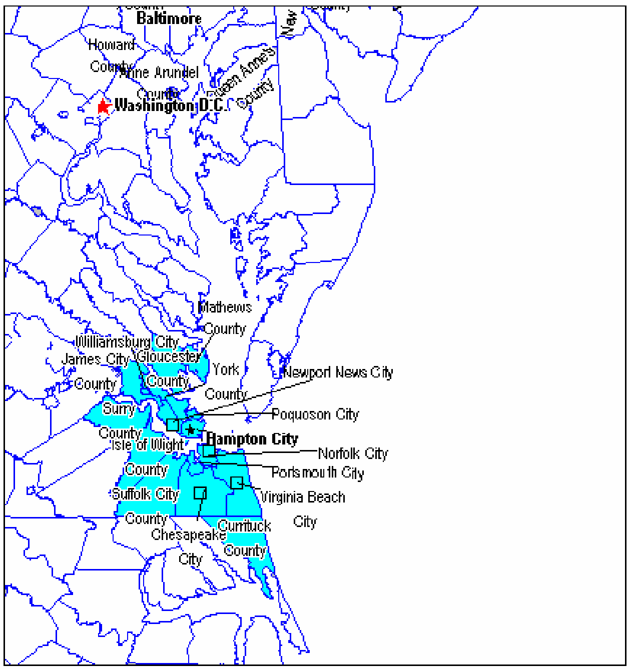
[7] Source: Maryland Department of Transportation website: http://www.marylandports.com/

17. Hampton Roads, VA

Location and Background Information

The Port of Hampton Roads is located in the Virginia Beach-Norfolk-Newport News, Virginia- North Carolina Metropolitan Statistical Area (MSA).

Figure 17-1. Hampton Roads, VA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of this MSA in the year 2000 was 1,576,370, according to the 2000 US Census. Of this total, 776,342 or 49.2 percent were males and 800,028 or 50.8 percent were females. The median age for the population in the same year was 33.5 years; 32.1 for males and 35 for females. As shown in Figure 17-2, almost 20 percent of males and over 15 percent of females are between the ages of 18 and 29. Around 15 percent of males and females are between the ages of 30 and 39.

About 62.4 percent of the population in the region is white, 30.9 percent is Black or African American, 4.0 percent are considered 'others' (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), and 2.7 of the population is Asian (Figure 17- 3). In terms of ethnic makeup, 3.1 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000.

Figure 17- 2. Hampton Roads, VA: Structure of the Population by Age Group, 2000

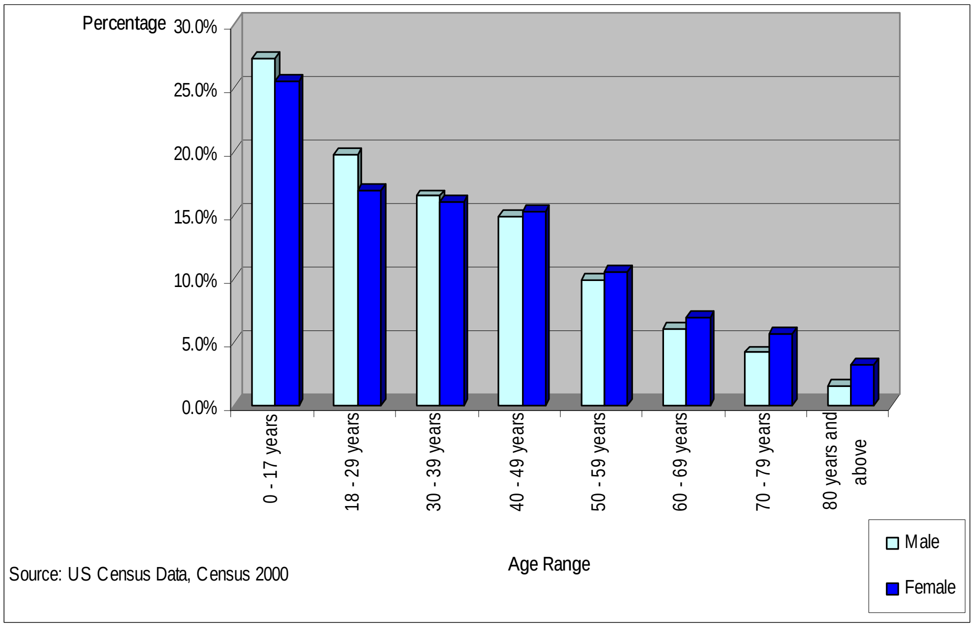
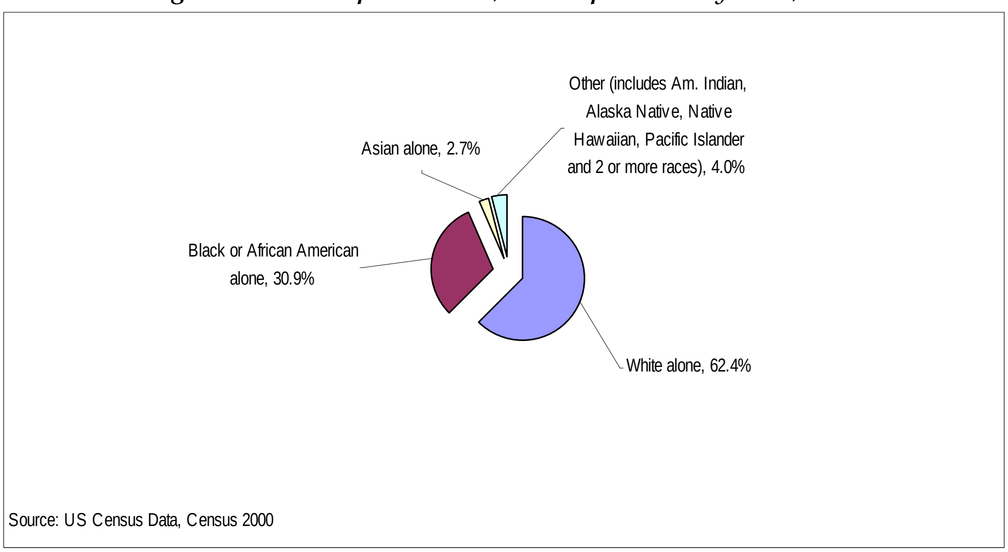
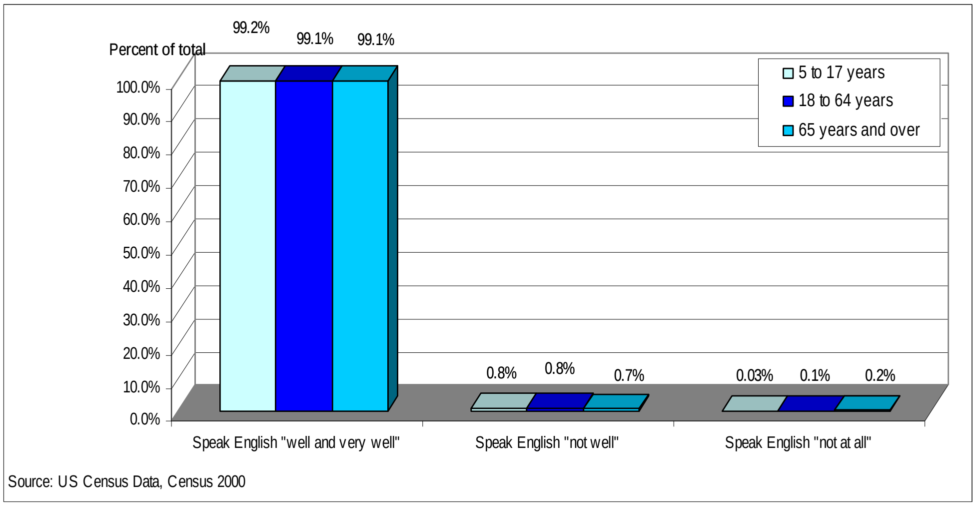


Figure 17- 3. Hampton Roads, VA: Population by Race, 2000



It is evident from the data specified in Figure 17- 4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 17- 4. Hampton Roads, VA: Ability to Speak English by Age Group, 2000

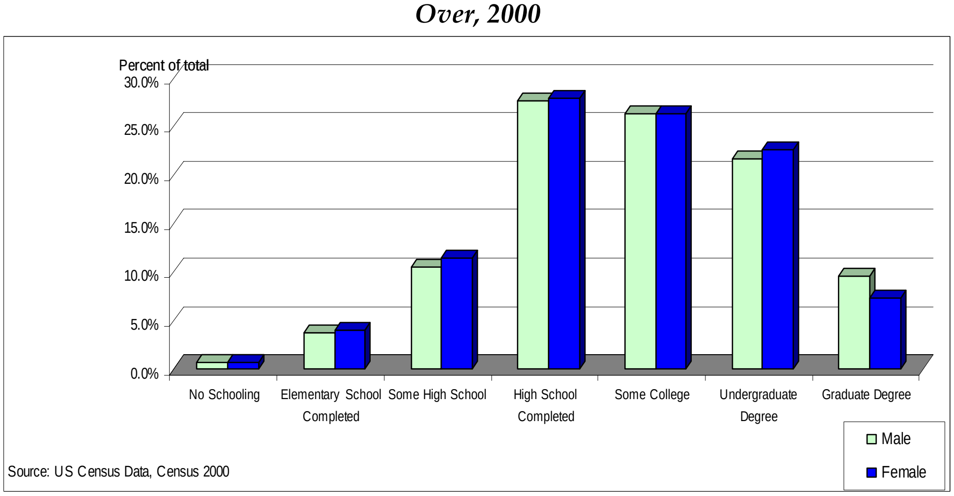


EDUCATION

Of the population in the region, ages 25 and over, over 25 percent of males and females have completed high school, and about 25 percent have completed some college. Around 20 percent of males and females have obtained an undergraduate degree. Less than 10 percent of the population has obtained a graduate degree (Figure 17-5).

Some of the colleges and universities around the area are: Atlantic University, College of William and Mary, Eastern Virginia Medical School, Hampton University, Johnson & Wales University, Norfolk State University, Regent University and Virginia Wesleyan College. There are four military bases in the area: Fort Monroe, Fort Eustis, Langley AFB, Naval Station Norfolk. [2]

Figure 17- 5. Hampton Roads, VA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



---

[2] Hampton Roads, VA Community Profile: http://www.epodunk.com

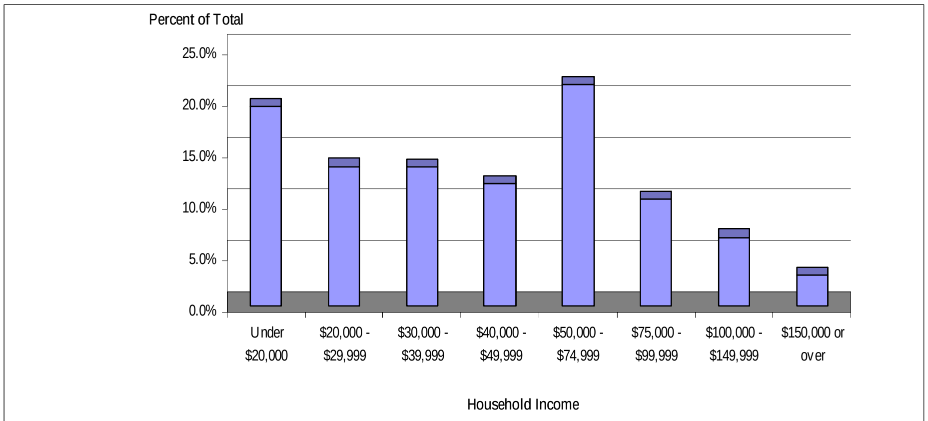
Socio-Economic Characteristics

INCOME

As portrayed in Figure 17-6, about 23 percent of the households' incomes in this area in 1999 fell in the $50,000 - $74,999 income bracket. Around 20 percent of households had incomes of under $20,000. Less than 5 percent of households in the region had incomes of $150,000 or over.

Household median income in Hampton Roads in 1999 was $43,085.86 and per capita income in the same year was $20,312.54. The percentage of people under the poverty line in the region was 10.6 in the year 2000. Average household size in 2000 was 2.61.[3]

Figure 17- 6. Hampton Roads, VA: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

Of the employed civilian population in the region, ages 16 or over, over 35 percent of females are employed in the educational, health and social services industry, and nearly 20 percent are employed in 'other' industries, including the arts, recreation, entertainment, food services, public administration and information. Twenty-five percent of males are employed in 'other' industries, 15 percent are employed in the manufacturing industry and 15 percent are employed in the wholesale and retail trade industry (Figure 17-7).

An estimated 4.4 percent of males and 5.8 percent of females were unemployed in the region in 2000.[4]

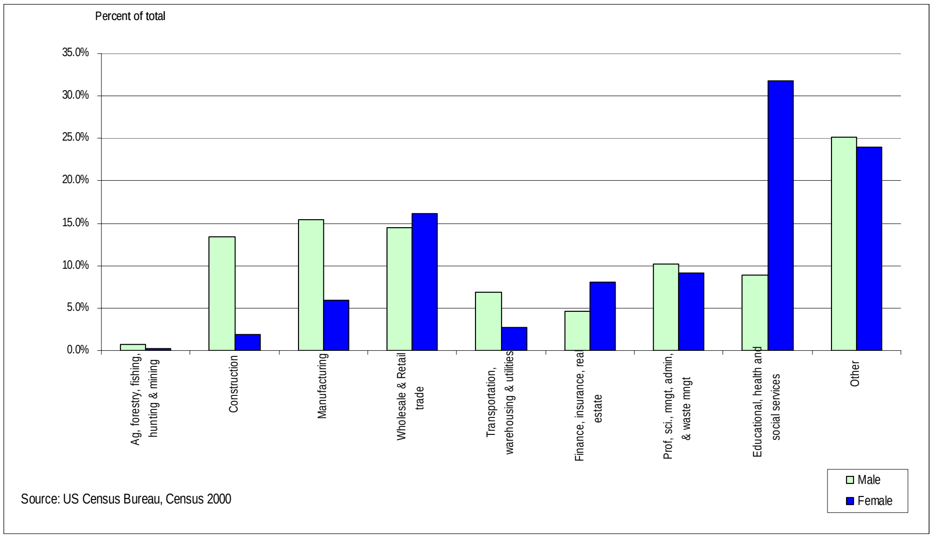
According to the 2000 US Census, an estimated 0.4 percent of males and 0.2 percent of females are employed in farming, fishing and forestry occupations. About 17.5 percent of males and 6.4 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.9 percent of male's occupations and 0.1 percent of female's occupations.

---

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 17-7. Hampton Roads, VA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Virginia Port Authority is an agency of the Commonwealth of Virginia, reporting to the Secretary of Transportation. It is the state's leading agency for international transportation and maritime commerce, charged with operating and marketing the marine terminal facilities through which the shipping trade takes place. The agency owns four general cargo terminals: Norfolk International Terminals, Portsmouth Marine Terminal, Newport News Marine Terminal, and the Virginia Inland Port in Front Royal; which are operated by its affiliate, Virginia International Terminals, Inc.

Hampton Roads is served by the Port and its three Marine Terminals located in Norfolk, Newport News and Portsmouth. More than 95 percent of the world's shipping lines call on the Port of Hampton Roads, linking Virginia to more than 250 ports in over 100 world-wide locations. It is the second busiest general cargo port on the East Coast, handling over 39 million tons of cargo annually 50 feet of deep ice-free harbor. The Port purchased 8 of the world's largest and fastest cranes, each capable of moving up to 40 fifty-ton containers per hour. During the past 12 years, general cargo handled by the port increased by more than 30 percent, and it is forecasted to further increase 300 percent by 2010.[5]

Virginia's strategic mid-Atlantic location and unparalleled transportation infrastructure offer steamship lines and shippers unbeatable access to two-thirds of the U.S. population with more than 75 international shipping lines and one of the most frequent direct sailing schedules of any port. Virginia has the best natural deepwater harbor on the U.S. East Coast. Fifty-foot-deep, unobstructed channels provide easy access and maneuvering room for the largest of today's container ships. Virginia ports are located just 18 miles from the open sea on a year-round, ice-free harbor and have long maintained a reputation for efficient and uncongested intermodal service. As the largest intermodal facility on the U.S. East Coast, Virginia offers six direct-service trains to 28 major cities each day. More than 50

[5] http://www.hreda.com/research/Port032005.pdf

motor-carrier companies offer full freight-handling and load-consolidation services. A modern network of interstate and local highways permits fast, direct inland motor-freight transportation to any point in the United States.

The Port of Virginia has been a boon to Virginia and the world for nearly four centuries. From the early founding as "America's First Port" at Jamestown in 1607 through the era of the great clipper ships to the present day sophistication of computerized intermodal technology, Virginia has been at the forefront of every major change in the shipping industry.

In addition to the advantages offered by easy access to the open sea, the Port of Virginia is served by one of the nation's more efficient inland transportation networks. Cargo is transported with speed and efficiency by 30 miles of on-dock rail. Over 130 trucking companies and two of the nation's largest railroads, CSX and Norfolk Southern, enable the Port of Virginia to serve two-thirds of the U.S. population within 24 hours.

The Port of Virginia consistently ranks as one of the leading ports in the United States in terms of total foreign waterborne commerce. In terms of general cargo (containerized and break bulk cargo), our port is the second largest port on the U.S. East Coast, just behind New York/New Jersey. Between 1982 and 2001, general cargo tonnage at Virginia's state-owned ports increased from 2.5 million tons in 1982 to 11.5 million tons in 2001, an unmatched growth record among U.S. ports. In terms of total cargo (which includes container, break bulk and bulk cargo), the Port handled over 37 million short tons.

Many factors have contributed to the Port's phenomenal growth, but none is as important as unification of the ports in the Hampton Roads harbor. In 1981, the Virginia General Assembly passed landmark legislation designed to unify the ports under a single agency, the Virginia Port Authority, with a new single operating company, Virginia International Terminals, Inc. In the years preceding unification, ports in the Hampton Roads harbor were privately operated by competing companies, which caused sporadic, sustained growth and splintered marketing efforts. Unification has made the Port of Virginia the fastest growing port complex in the United States.[6]

Newport News Marine Terminal
Newport News Marine Terminal (NNMT) has gained a reputation as the premier steel and project cargo handling port on the U.S. East Coast. NNMT boasts various heavy-lift crane capabilities, warehouse space, and container cranes. And NNMT now offers the advantages of a fully dedicated, on-terminal paper distribution facility, the Lydall Paper Distribution Center. The facility is operated by Lydall Distribution Services, Inc., a company with an outstanding reputation for its expertise in understanding the special nature and requirements of paper cargoes. The 100,000 square foot distribution warehouse will offer the transportation advantages of The Port of Virginia's on-dock rail and its competitive transportation infrastructure.

The terminal has an area of 140.64 acres with direct rail access and has on-pier trackage for direct cargo loading on and off ships to and from rail. The main Channel Depth is 45 feet. Pier B on the North side is 990 feet long and includes 170-foot mooring dolphins/catwalk. The south side is 620 feet long and 550 feet wide. It has three berths handling RO/RO cargo and breakbulk cargo and 34-foot aprons. The water depth on the north side is 32 feet; on the south side is 32 feet and offshore is 33 feet. The pier deck elevation (MLW) is 15.0 feet. Pier C on the North side is 935 feet long and 540 feet wide with 184-foot aprons for handling breakbulk cargo, serviced by two PACECO cranes; the water depth is 40 feet. The south side is 935 feet long, 540 feet wide, with 184-foot aprons for handling RO/RO and container cargo, serviced by one PACECO portainer crane and one CMI crane capable of a 182-LT heavy lift. The water depth is 36 feet and the pier deck elevation (MLW) is 14.5 feet. The terminal has covered Pier Storage: Pier B with 270,000 square feet and Pier C with 124,000 square feet; it has256,000 square feet for dry storage. Its container storage has stacked capacity for 790 containers (two high) and

[6] Hampton Roads Maritime Association webpage: http://www.portofhamptonroads.com

chassis capacity for 1,210 containers. The terminal has 43 acres for open yard storage. The terminal's roadway access is via Interstates 64 and 664 and U.S. Route 17; rail service provided by CSX

Norfolk International Terminals

Norfolk International Terminals (NIT) is the largest terminal. NIT is home to the world's largest container cranes. These Suez-class container cranes, each measuring 219 feet are the largest in the world. They can work ships with containers stacked 22 across, moving as many as forty 50-ton containers in an hour. Recently completed, NIT North has effectively doubled the cargo handling capacity of the terminal.

Portsmouth Marine Terminal

Portsmouth Marine Terminal (PMT) is the second largest terminal with respect to containership berth space. Among PMT's many cranes is the fourth Kone supercrane with lift capacity of 40 LT. PMT's versatility makes it excellent for handling containers, RO/RO and breakbulk cargo. Features of this terminal include refrigerator hook-ups, specialized warehouse space, fumigation facilities and straddle-carrier container stacking.

Virginia Inland Port

Operated as an intermodal container transfer facility, the Virginia Inland Port (VIP) provides an interface between truck and rail for the transport of ocean-going containers to and from The Port of Virginia. Containers are transported by truck to the VIP for immediate loading upon a rail car or for short-term storage prior to loading. Containers arriving from Hampton Roads terminals are unloaded from the train and dispatched by truck to inland destinations. Land is available to steamship lines for container storage and ancillary service companies.

The Port of Virginia is Foreign Trade Zone number 20. [7]

---

[7] Virginia Port Authority webpage: http://www.vaports.com

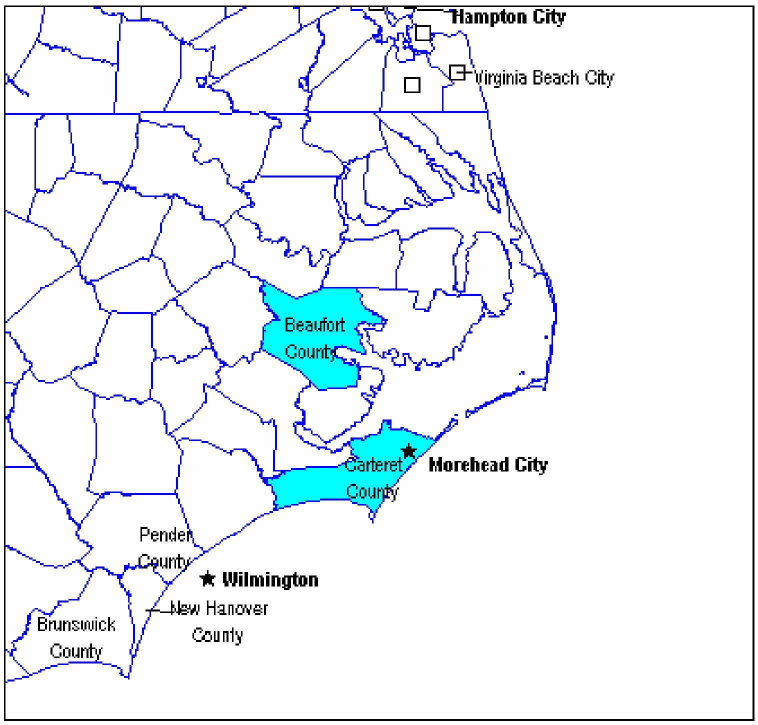
This page intentionally left blank.

18. Morehead City and Beaufort, NC

Location and Background Information

The Port of Morehead City and Beaufort, is part of the Morehead City, North Carolina and the Washington, North Carolina Micropolitan Statistical Areas.

Figure 18-1. Morehead City and Beaufort, NC: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of both Micropolitan Statistical Areas combined is of 104,341, according to the 2000 US Census. Of this total 50, 595 or 48.5 percent are males and 53,746 or 51.5 percent are females. The median age for the region is 41.4 years; 39.9 for males and 42.7 for females. A little over 15 percent of the population falls within the 40-49 years age bracket, and about 14 percent falls within the 50 – 59 age bracket (Figure 18-2).

As portrayed by Figure 18-3, the majority of the population in the region is white (80.7 percent), followed by the Black or African American population (16.7 percent). 'Others' (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 2.3 percent of the population. The Asian population represents only 0.4 percent of the total population. Moreover, in terms of ethnic makeup, 2.1 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data: Census 2000.

Figure 18-2. Morehead City and Beaufort, NC: Population by Race, 2000

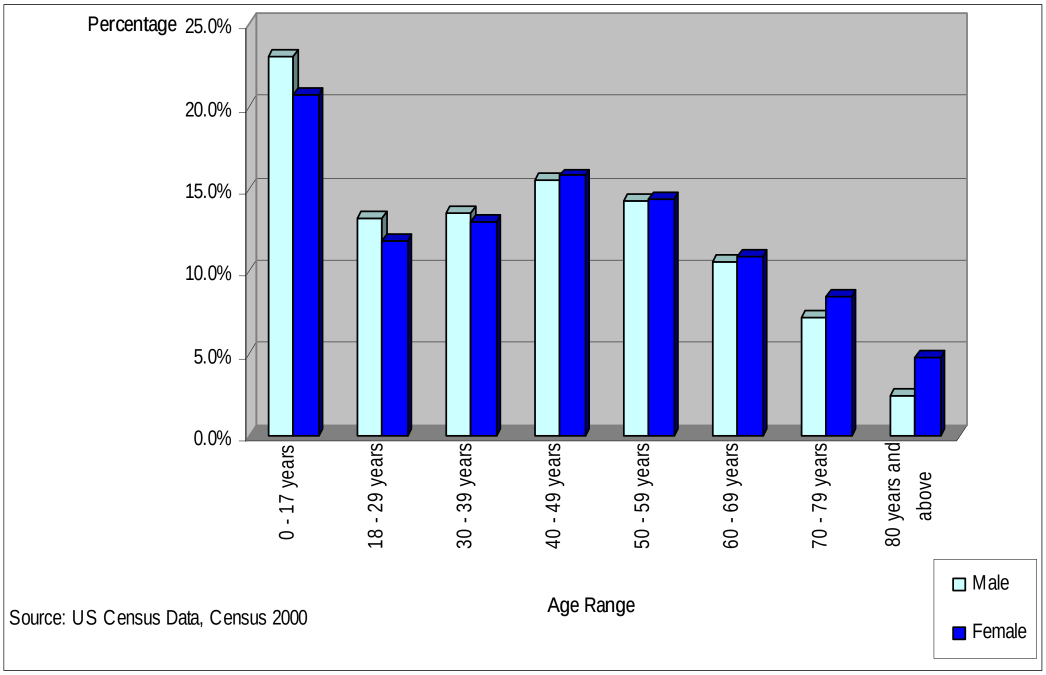
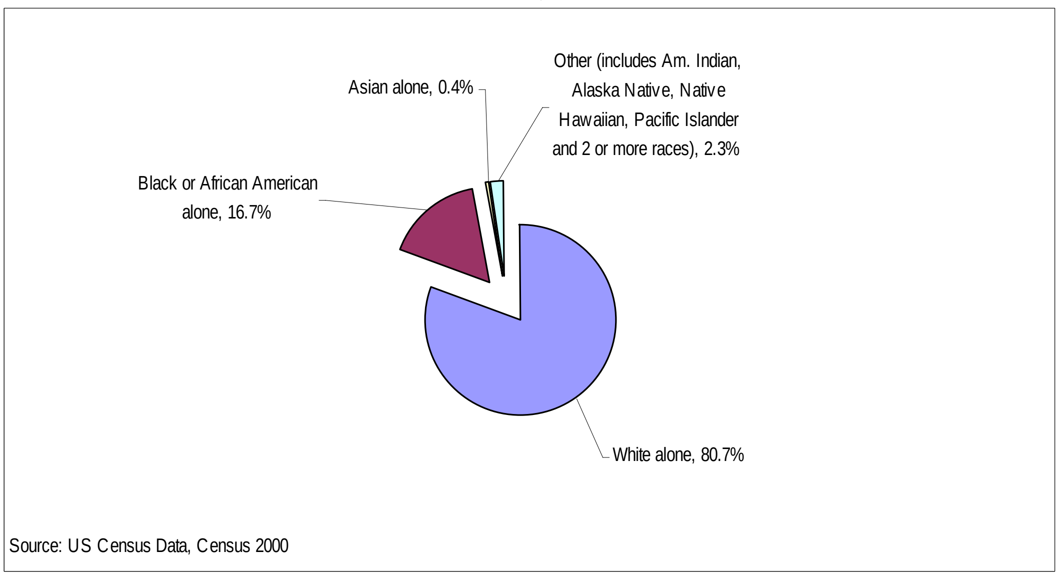
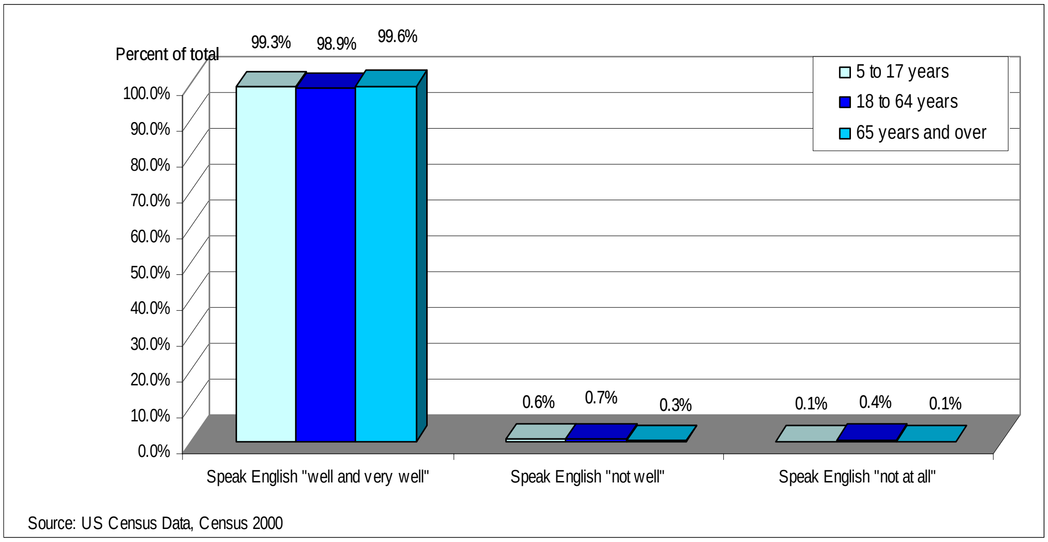


Figure 18-3. Morehead City and Beaufort, NC: Population by Race, 2000



It is evident from the data specified in Figure 18-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

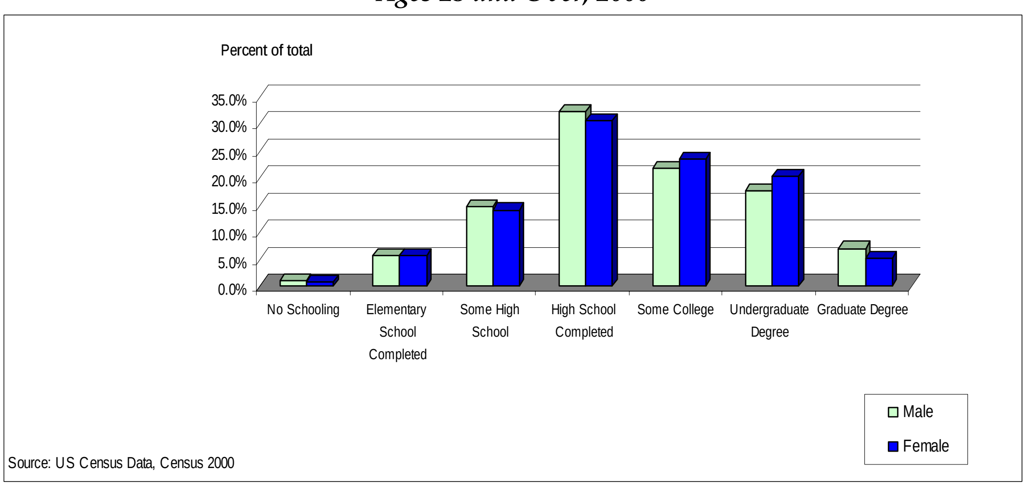
Figure 18-4. Morehead City and Beaufort, NC: Ability to Speak English by Age Group, 2000



EDUCATION

It is evident by Figure 18-5, that of the population ages 25 and over, 35 percent of males and nearly the same percentage of females have completed high school. Around 25 percent of males and a bit over that percentage of females have finished some college and approximately 21 percent of males and 24 percent of females have obtained an undergraduate degree in the region. The only college in the area is Carteret Community College.

Figure 18-5. Morehead City and Beaufort, NC: Educational Attainment of Population by Sex Ages 25 and Over, 2000



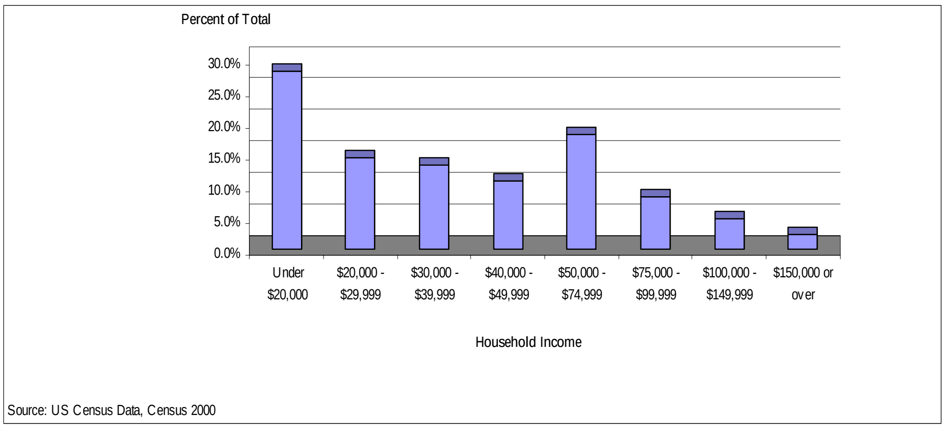
Socio-Economic Characteristics

INCOME

As revealed by Figure 18-6, 30 percent of households in these Micropolitan statistical areas have incomes of under $20, 000 and nearly 20 percent of households have incomes in the $50,000 - $74,999 income bracket. Less than 5 percent of households had incomes of $150,000 or over.

Household median income in the region in 1999 was $35,284.46 and per capita income for the same year was $19,304.69. The percentage of people under the poverty line in the region was 14.5 in the year 2000. The average household size in 2000 was 2.36.[2]

Figure 18-6. Morehead City and Beaufort, NC: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population aged 16 years or over in the region, 35 percent of working females are employed in the educational, health and social services industry. Nearly 24 percent of females are employed in other industries; these include the arts, entertainment, recreation, food services, public administration and information. The same percentage of males are employed in other industries as well. About 17 percent of males are employed in the construction industry, followed by males' participation in the manufacturing and wholesale and retail trade industries, which represent 15 percent each (Figure 18-7).

An estimated 4.9 percent of males and 6.1 percent of females were unemployed in the region in the year 2000.[3]

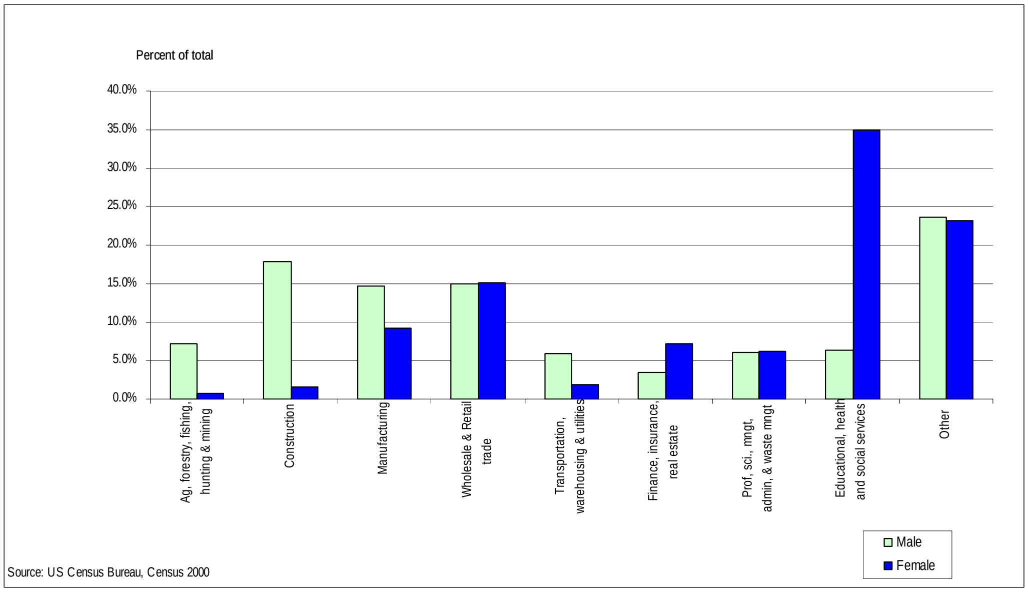
According to the 2000 US Census, an estimated 4.3 percent of males and 0.3 percent of females are employed in farming, fishing and forestry occupations. About 19.6 percent of males and 9.1 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 1.8 percent of male's occupations and 0.1 percent of female's occupations.

---

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 18-7.Morehead City and Beaufort, NC: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The 45-foot channel at the Port of Morehead City makes it one of the deepest ports on the U.S. East Coast. Only 4 miles from the ocean, the port handles breakbulk and bulk cargo with access to Interstates 95 and 40 via U.S. Highways 70 and 17 and daily train service from Norfolk Southern. Across the Newport River from the port is Radio Island, a prime site for development. The Ports Authority is offering approximately 150 acres - suitable for port industrial development, complete with municipal water and sewer and an NC-approved Environmental Impact Statement for marine terminal development.

With the volume of international trade expected to double by 2020, forward-looking businesses and industries can get ahead of the curve by taking advantage of the services offered by the North Carolina State Ports Authority. North Carolina's Ports of Wilmington and Morehead City, plus inland terminals in Charlotte and in the Piedmont Triad at Greensboro, are "ready, willing and able" to serve as competitive alternatives to ports in neighboring states for competitive access to the global markets. Owned and operated by the Ports Authority, North Carolina's port system combines modern facilities and abundant capacity with the commitment to excel in service to customers.

The Ports' central Eastern seaboard location is closest to the center of the southeast US market -- the fastest growing region in the country. The Ports Authority, along with the North Carolina Department of Commerce, is actively recruiting retail distribution centers to the state. Excellent sites are available for distribution center placement, as well as a labor pool well suited to fill materials handling positions. The North Carolina community college system has developed a course of study specifically for retail distribution center training. Current and planned improvements in the regional transportation network provide a new platform for distribution when combined with upgraded capabilities at the Port of Wilmington to handle large quantities of imported goods. A unique NC Ports tax credit is also available to port users.

The seaport town of Morehead City is located on Bogue Sound on the coast of North Carolina and has become a popular fishing resort as well as the state's only deepwater port north of Wilmington. Across the Atlantic Intracoastal Waterway is the colonial fishing town of Beaufort and Atlantic Beach, Fort Macon, and Theodore Roosevelt Natural Area State parks are on Bogue Banks offshore. Inland you can explore the Croatan National Forest.

Morehead City was founded in 1853 by John Morehead, governor of North Carolina to be the projected terminus of the Atlantic and North Carolina Railroad, which duly arrived in 1858. It was captured by Union troops in 1862. The colonial seaport town of Beaufort, the third-oldest town in North Carolina, lies on Port Royal Island in the Barrier Islands on North Carolina's Outer Banks, just west of Cape Hatteras National Seashore. This picturesque seaside city, founded in 1715 on the site of an Indian village, was named after the 2nd Duke of Beaufort. Apart from its beautiful gardens, sights of interest include more than 100 colonial houses in the 21 block historic district, the town's Old Burying Ground and the Mariner's Museum which emphasizes the natural history of this coastal region. Spanish explorers first noted the harbour in 1520. In 1562, Jean Ribaut and his band of French Huguenots settled here and established the first Protestant colony in America. Like other settlements along the southeast coast, Beaufort was laid claim to by the Spanish, English, Scots, and Native Americans at one time or another. Beaufort Harbor was also the base of the pirate Edward Teach (Blackbeard) and his ship Queen Anne's Revenge.[4]

Facilities

The port is four miles from the open sea and is situated along the Newport River and Bogue Sound. It has 5,500 feet of continuous wharf and has two berths served by modern ship-loader and maximum loadout rate of 3,000 tons per hour of bulk cargo. It has a dry-bulk facility (used mainly for phosphate) with 225,000-ton capacity warehouse, conveyor system and shiploader and an open storage dry-bulk facility which can outload 1,000 tons per hour with a 2 million-ton annual capacity. The terminal has a concrete capped sheet pile bulkhead, solid fill with 1,000 psf concrete deck with rubber and/or timber fender system. The deck height averages 10 ft. above mean low water and apron widths from unrestricted to 45 ft. opposite transit sheds. It has Roll-on/Roll-off ramp and a well-lit terminal and 24-hour security provided by North Carolina State Certified Port Police, as well as a Barge Fleeting Area and 150 acres available for port industrial development on Radio Island.

There are two sites in the port approved as Foreign Trade Zone 67. Site One is 190,374 square feet of warehouse space within main terminal and Site Two is a 40-acre tract of undeveloped land, four miles west of the port. It [provides for storage, manipulation, exhibition and limited manufacturing operations and can lower, defer or avoid import duties; and can accommodate special purpose subzones.

The port has 457,564 sq.ft. of covered, sprinklered warehouse storage and 353,765 sq.ft. of transit shed storage; as well as rail access to warehouses and transit sheds and 14 acres of paved, open storage. There is a switching railroad operated by Carolina Rail Services and Norfolk Southern access. The berths are served by two surface tracks, two platform level tracks, and two depressed tracks at the rear of the transit sheds and covered railcar loading. There is additional railhead and railcar storage on Radio Island and west of Morehead City

Morehead City's first major port development came during the 1850's with a pier, warehouse and rail facility known as Pier No.1. Following the North Carolina tradition, it handled mostly naval stores and

---

[4] URL: htp://www.choosingcruising.co.uk/cruiseweb/Cruises_Calling.asp?nCall=Morehead+City&nCat=P)

salt. Takeover by Federal troops during the Civil War and a damaging storm in 1876 further hampered the development of the Morehead City port for many years.

The argument for state-owned ports began in the 1920's, when North Carolina's economic development was handicapped because of higher freight rates than those charged by Virginia competitors - a situation partly due to the state's notable lack of adequate ports and water transportation. A referendum on spending $8.5 million to improve the situation was defeated in 1924, with most of the Piedmont counties voting against it.

The value of deepwater ports was recognized by the state legislature in 1945 with the creation of the NC State Ports Authority. Its job: to create two competitive ports through the sale of revenue bonds. Its ultimate mission: to create a better atmosphere for the development of North Carolina industry.

The General Assembly in 1949 approved the issue of $7.5 million in bonds for construction and improvement of seaports to promote trade throughout the state. Terminals equipped to handle oceangoing vessels were completed at Wilmington and Morehead City in 1952.

Their positions nearly midway between major competing ports in Virginia and South Carolina have made them more accessible to North Carolina traders. In fact, it was the Wilmington harbor's location near some of the state's earliest businesses - pine tar, rice and tobacco - that helped make the city the largest in the state until the early 1900's.

With ships came rail, and up until the 1960's, Wilmington was the headquarters of the Atlantic Coast Line Railroad - now part of CSX. During World War II, Wilmington was the site of major shipbuilding efforts - including an operation that built vessels out of concrete.

Now, times have changed, and so have the methods of shipping. And that has meant some major changes to keep the ports competitive. In the mid 1970's the Ports Authority bought two container cranes, eventually locating both at Wilmington. This multi-million dollar purchase of cranes the size of skyscrapers was deemed necessary because more and more cargo was being shipped in "boxes" - containers the size and shape of small mobile homes.

Morehead City has become a major port for phosphate products. And it can handle containers using its larger cranes in tandem. Wilmington, meanwhile, has acquired a total of five container cranes even as it ships wood products and other bulk and breakbulk commodities. To facilitate the growth in container traffic, two inland terminals were opened in the mid 1980's in Greensboro and Charlotte. The Ports Authority continues to remain competitive, with major projects planned at both facilities. At Morehead City, planning continues for expansion onto Ports Authority property on Radio Island. The Wilmington Harbor Deepening Project brought 42-foot deep water the entire length of the Cape Fear River navigational channel, from the ocean near Southport to the Port - readying the port for the larger ships of the future.[5]

[5] North Carolina Ports website: http://www.ncports.com

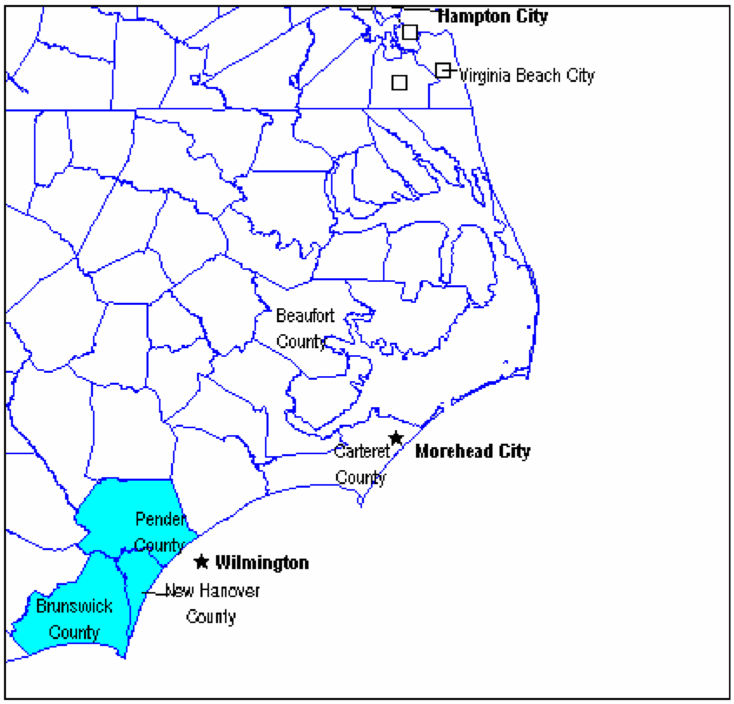
This page intentionally left blank.

19. Wilmington, NC

Location and Background Information

The Port of Wilmington is part of the Wilmington, North Carolina Metropolitan Statistical Area (MSA).

Figure 19-1. Wilmington, NC: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of this MSA is 274,532, according to the 2000 US Census. Of this total, 133,999 or 48.8 percent are males and 140,533 or 51.2 percent are females. The median age in the region is 38.2 years; 37.0 for males and 39.5 for females. As portrayed in Figure 19-2, over 15 percent of males and females are between 18 to 29 years old and nearly 15 percent fall in the 40 – 49 years age range.

The majority of the population is white (79.5 percent); followed by the Black or African American population, which represents 17 percent of the total population. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 2.8 percent of the total population. The Asian population represents only 0.6 percent of the total population (Figure 19-3). Moreover, in terms of ethnic makeup, 2.5 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000.

Figure 19-2. Wilmington, NC: Structure of the Population by Age, 2000

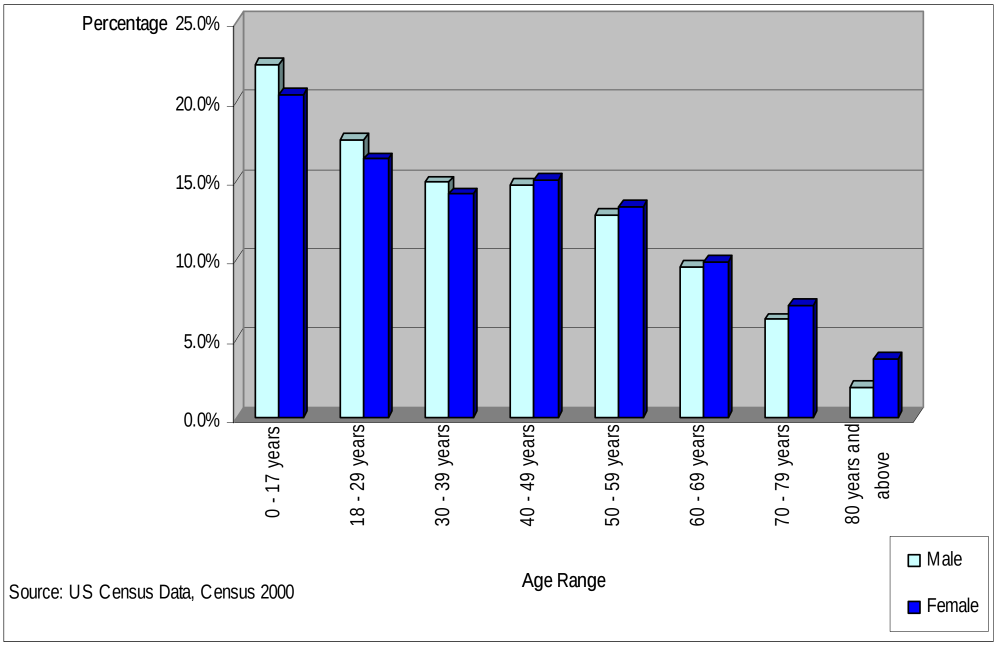
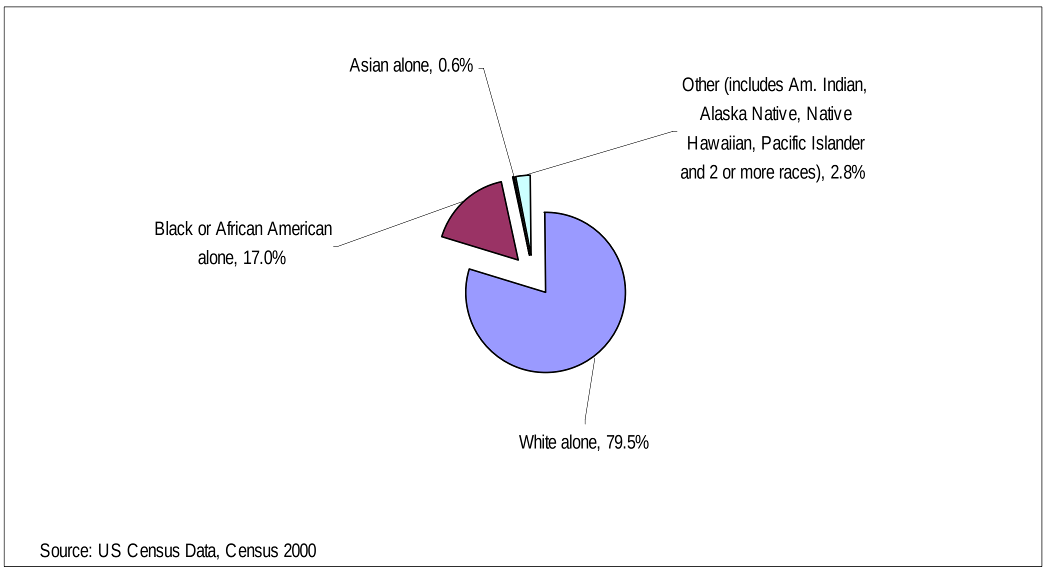
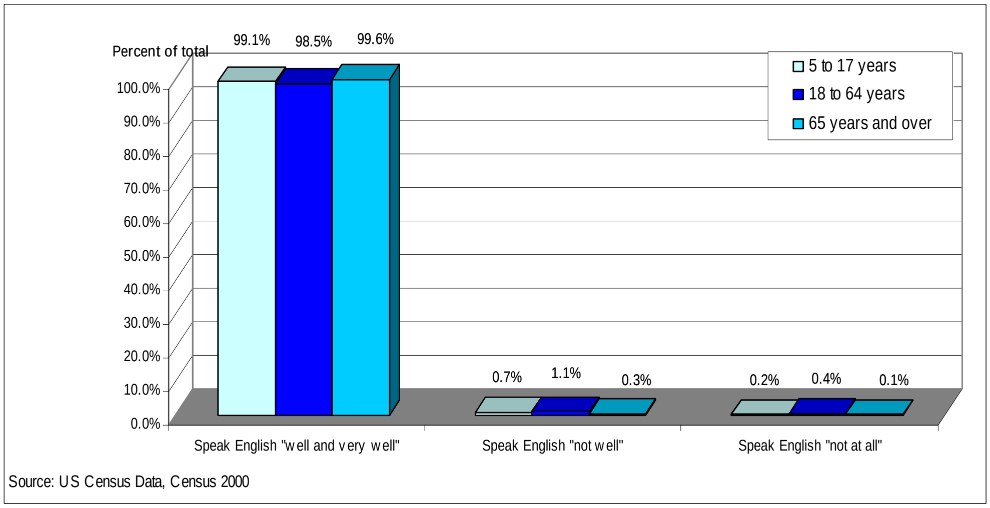


Figure 19-3. Wilmington, NC: Population by Race, 2000



It is evident from the data specified in Figure 19-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 19-4. Wilmington, NC: Ability to Speak English by Age Group, 2000

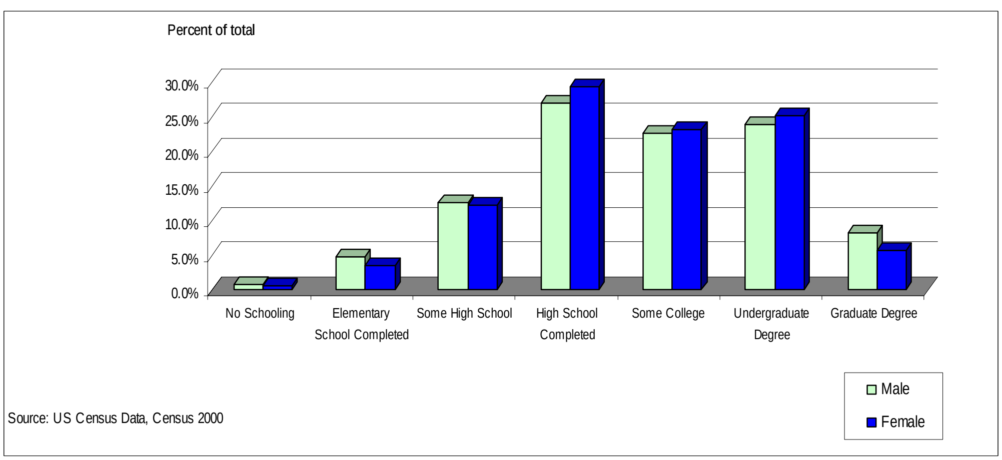


EDUCATION

It is evident from Figure 19-5, that 25 percent of males and around 28 percent of females, ages 25 or over, have completed high school. About 22 percent of males and 24 percent of females have obtained an undergraduate degree, and about 21 – 22 percent of males and females have at least completed some college.

Some of the colleges and universities around the area are: University of North Carolina, Cape Fear Community College, Miller-Motte Business College and Mount Olive College-Wilmington.

Figure 19-5. Wilmington, NC: Educational Attainment of Population by Sex Ages 25 and Over, 2000



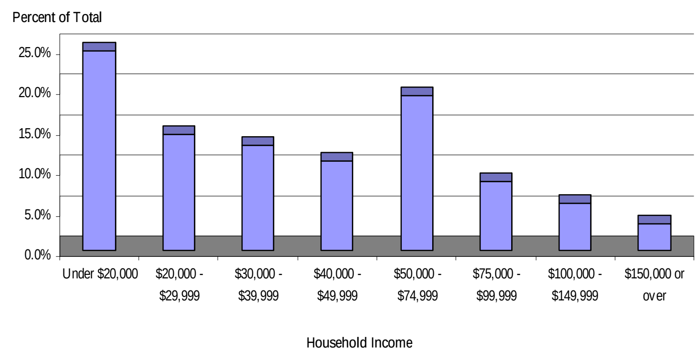
Socio-Economic Characteristics

INCOME

Around 25 percent of households in the Wilmington, NC MSA had incomes of $20,000 or under in 1999. About 20 percent of households in the region had incomes between $50,000 and $74,999. Less than 5 percent of households had incomes of $150,000 or over (Figure 19-6).

Household median income in the region in 1999 was $38,437.56 and per capita income for the same year was $21,468.56. The percentage of people under the poverty line in the region was 13 in the year 2000. The average household size in 2000 was 2.34.[2]

Figure 19-6. Wilmington, NC: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

As shown in Figure 19-7, of the employed civilian population aged 16 years or over, nearly 31 percent of females are employed in the educational, health and social services industry. About 23 percent of females are employed in 'other industries', which include the arts, entertainment, recreation, food services, public administration and information. Over 20 percent of males are employed in 'other' industries, followed by the construction (nearly 20 percent) and wholesale and retail trade (about 16 percent).

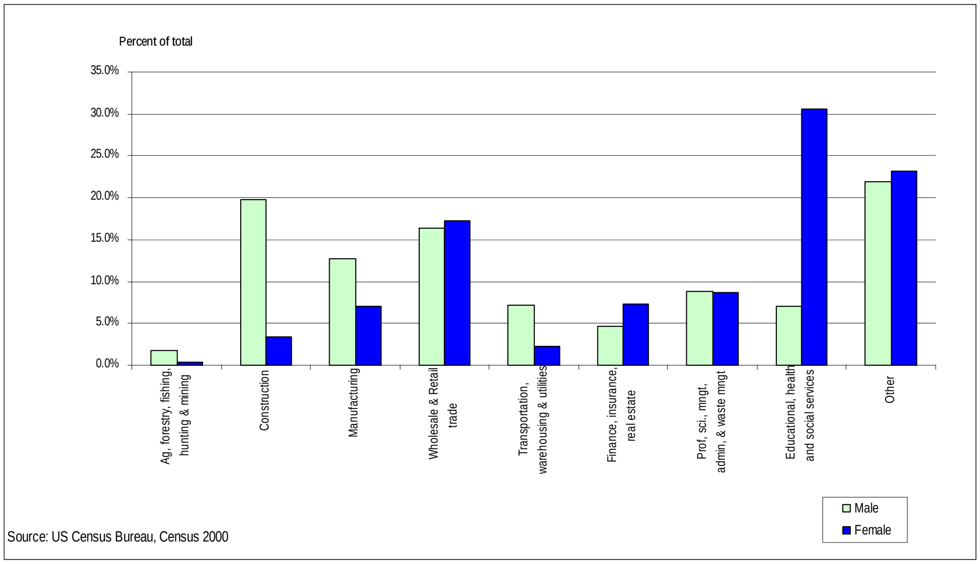
An estimated 5.2 percent of males and 5.7 percent of females were unemployed in the region in the year 2000.[3]

According to the 2000 US Census, an estimated 1.0 percent of males and 0.2 percent of females are employed in farming, fishing and forestry occupations. About 17.7 percent of males and 6.9 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.2 percent of female's occupations.

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 19-7. Wilmington, NC: Employed Civilian population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

Located on the east bank of the Cape Fear River, the Port of Wilmington offers facilities to handle containerized, bulk and breakbulk cargoes. The Port's new 42-foot channel allows current container vessel customers an additional 15% vessel capacity. The port has direct interstate access to Interstates 95 and 40 and daily train service from CSX Railways. Wilmington is one of the few South Atlantic ports with readily available berths and container storage areas and equipment.

With the volume of international trade expected to double by 2020, forward-looking businesses and industries can get ahead of the curve by taking advantage of the services offered by the North Carolina State Ports Authority. North Carolina's Ports of Wilmington and Morehead City, plus inland terminals in Charlotte and in the Piedmont Triad at Greensboro, are "ready, willing and able" to serve as competitive alternatives to ports in neighboring states for competitive access to the global markets. Owned and operated by the Ports Authority, North Carolina's port system combines modern facilities and abundant capacity with the commitment to excel in service to our customers.

The Ports' central Eastern seaboard location is closest to the center of the southeast US market -- the fastest growing region in the country. The Ports Authority, along with the N.C. Department of Commerce, is actively recruiting retail distribution centers to the state. Excellent sites are available for distribution center placement, as well as a labor pool well suited to fill materials handling positions. The North Carolina community college system has developed a course of study specifically for retail distribution center training. Current and planned improvements in the regional transportation network provide a new platform for distribution when combined with upgraded capabilities at the Port of Wilmington to handle large quantities of imported goods. A unique NC Ports tax credit is also available to port users.

The Port of Wilmington is located on the east bank of Cape Fear River and it is 26 miles from open sea. Its channel is 42 ft., mean low water and its wharf frontage is 6,768 ft. long, divided between container and general cargo operations. It has a concrete pile wharf construction with solid or concrete deck fronted with rubber fender system and a deck height that averages 12 ft. above mean low water. The Port has an open storage dry bulk facility which can outload over 800 tons per hour with a 70,000 ton storage capacity and a covered dry bulk facility with 2.5-million-cubic-foot storage capacity and import conveyor system for grain and fertilizers which can handle 1,000 tons per hour. The facility has nearly 100 acres available for development north of the present terminal, other berths with contiguous open apron areas of up to 300 ft. wide and a well-lit terminal and 24-hour security provided by North Carolina State Certified Port Police officers.

The entire Wilmington Terminal was designated Foreign Trade Zone 66 and it provides for storage, manipulation, exhibition and limited manufacturing operations. It can lower, defer or avoid import duties and can accommodate special purpose subzones.

Wilmington Port has over 1 million square feet of covered, sprinklered storage and has both road and rail access to all storage buildings. The terminal has about 100 acres of paved, open area and nearly 25 acres semi-improved open storage area. Furthermore, it has 31,200 square feet dedicated steel coils warehouse with a 30-ton remote control bridge crane and nearly one-half million square feet warehouse space dedicated to forest products, including a new 108,000 square feet forest products center. The terminal has two chambers providing vacuum methyl bromide and detia and a special covered, in-container fumigation area.

The terminal has CSX rail service twice daily and easy vehicular access with US Highways 17, 74, 76 and 421 and Interstates 95 and 40; inland service by CSX Intermodal and Norfolk Southern and connecting rail line, owned and operated by Wilmington Terminal Railroad, with interchanging cars between port and CSX system. It furthermore has equipment for handling all rail traffic, including double-stack trains, has roll-on/roll-off capacity at ramps and has transit sheds and warehouses with depressed tracks.

North Carolina Ports History

Since Europeans first viewed the area, the river known ominously as the Cape Fear has been vital to the fortunes of both buccaneers and businessmen. History shows it was the pirate Stede Bonnet - by most accounts a poor sailor who already had been convicted as a pirate and pardoned - who may have realized the river's name. After returning to piracy, he tried to escape capture in the early 1700's by hiding up the Cape Fear. But he forgot the first rule of pirates - always have more than one escape route. Bonnet was caught as soon as the British reached the mouth of the river.

Union vessels didn't have as much luck with the blockade runners of the Confederacy, who continued to escape capture and bring needed supplies back to the port at Wilmington during the Civil War. In fact, Wilmington was the last port open to blockade runners. When it finally fell in early 1865, it signaled the end of Confederate hopes. Since then, though, most seagoing traffic hasn't needed an escape route - merely a North Carolina berth. That meant the Cape Fear River and Wilmington, and the deepwater harbor at Morehead City.

Morehead City's first major port development came during the 1850's with a pier, warehouse and rail facility known as Pier No.1. Following the North Carolina tradition, it handled mostly naval stores and salt. Takeover by Federal troops during the Civil War and a damaging storm in 1876 further hampered the development of the Morehead City port for many years.

The argument for state-owned ports began in the 1920's, when North Carolina's economic development was handicapped because of higher freight rates than those charged by Virginia competitors - a situation partly due to the state's notable lack of adequate ports and water transportation. A referendum on spending $8.5 million to improve the situation was defeated in 1924, with most of the Piedmont counties voting against it.

The value of deepwater ports was recognized by the state legislature in 1945 with the creation of the NC State Ports Authority. Its job: to create two competitive ports through the sale of revenue bonds. Its ultimate mission: to create a better atmosphere for the development of North Carolina industry.

The General Assembly in 1949 approved the issue of $7.5 million in bonds for construction and improvement of seaports to promote trade throughout the state. Terminals equipped to handle oceangoing vessels were completed at Wilmington and Morehead City in 1952.

Their positions nearly midway between major competing ports in Virginia and South Carolina have made them more accessible to North Carolina traders. In fact, it was the Wilmington harbor's location near some of the state's earliest businesses - pine tar, rice and tobacco - that helped make the city the largest in the state until the early 1900's.

With ships came rail, and up until the 1960's, Wilmington was the headquarters of the Atlantic Coast Line Railroad - now part of CSX. During World War II, Wilmington was the site of major shipbuilding efforts - including an operation that built vessels out of concrete.

Now, times have changed, and so have the methods of shipping. And that has meant some major changes to keep the ports competitive. In the mid 1970's the Ports Authority bought two container cranes, eventually locating both at Wilmington. This multi-million dollar purchase of cranes the size of skyscrapers was deemed necessary because more and more cargo was being shipped in "boxes" - containers the size and shape of small mobile homes.

Morehead City has become a major port for phosphate products. And it can handle containers using its larger cranes in tandem. Wilmington, meanwhile, has acquired a total of five container cranes even as it ships wood products and other bulk and breakbulk commodities. To facilitate the growth in container traffic, two inland terminals were opened in the mid 1980's in Greensboro and Charlotte. The Ports Authority continues to remain competitive, with major projects planned at both facilities. At Morehead City, planning continues for expansion onto Ports Authority property on Radio Island. The Wilmington Harbor Deepening Project brought 42-foot deep water the entire length of the Cape Fear River navigational channel, from the ocean near Southport to the Port - readying the port for the larger ships of the future.[4]

[4] North Carolina Ports website: http://www.ncports.com

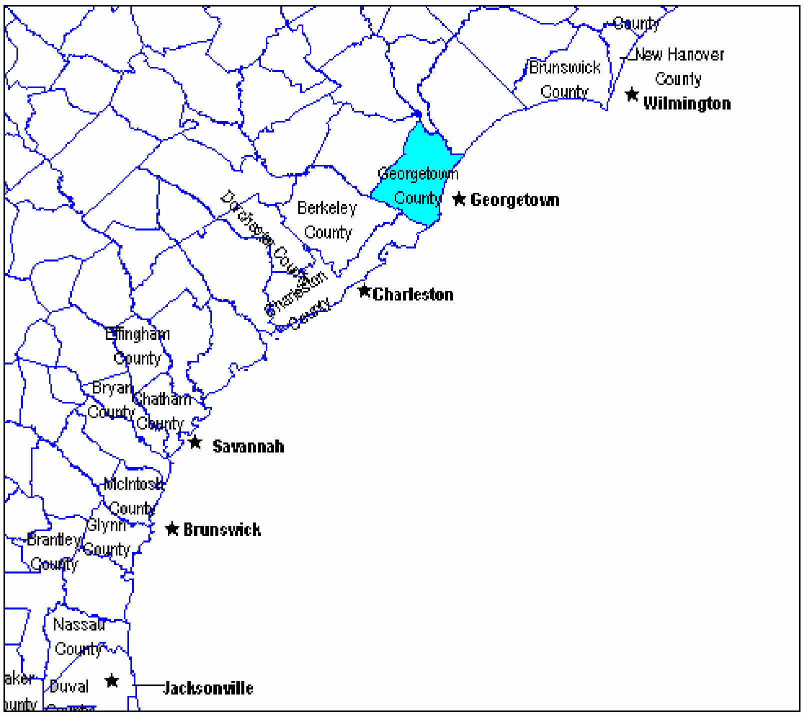
This page intentionally left blank.

20. Georgetown, SC

Location and Background Information

The Port of Georgetown is located within the Georgetown, South Carolina Micropolitan Statistical Area.

Figure 20-1. Georgetown, SC: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of this Micropolitan Area is 55,797, according to the 2000 US Census. Of this total, 26,700 or 47.9 percent are males and 29,097 or 52.1 percent are females. The median age for the region in 2000 was 39.1 years; 37.8 for males and 40.3 for females. Nearly 15 percent of the population falls in the 40 – 49 years age range. Nearly 14 percent of females and about 14 percent of males fall within the 50 – 59 years age range (Figure 20-2).

As portrayed by Figure 20-3, 59.6 percent of the population in the region is white, followed by the Black or African American population, which represents 38.7 percent of the total population. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 1.4 percent of the population. The Asian population represents roughly 0.3 percent of the total population. Only 1.5 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] US Census Data, Census 2000.

Figure 20-2. Georgetown, SC: Structure of the Population by Age, 2000

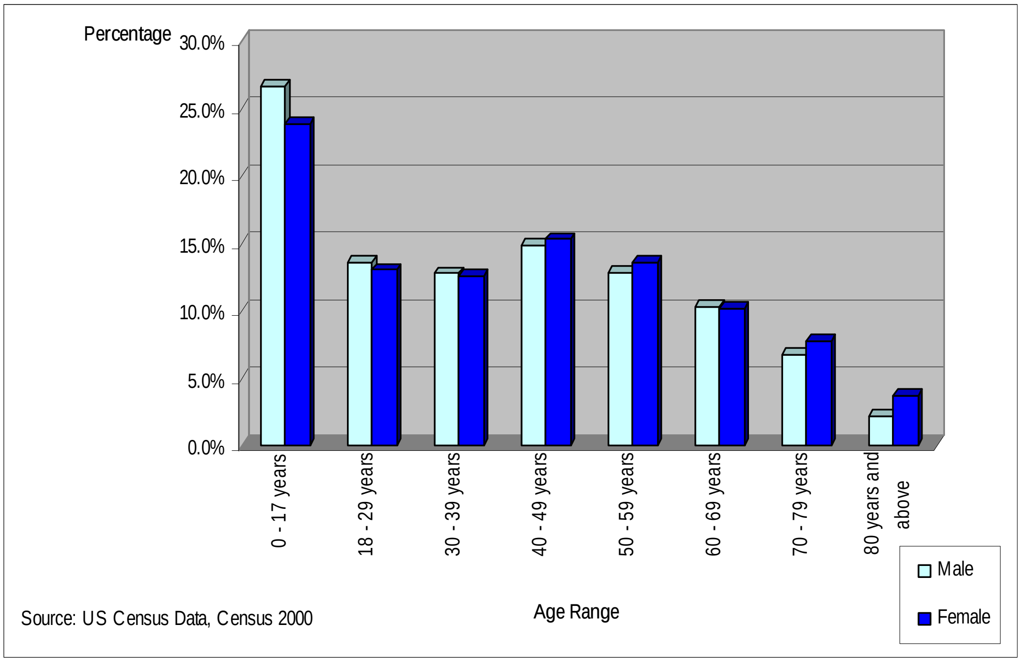
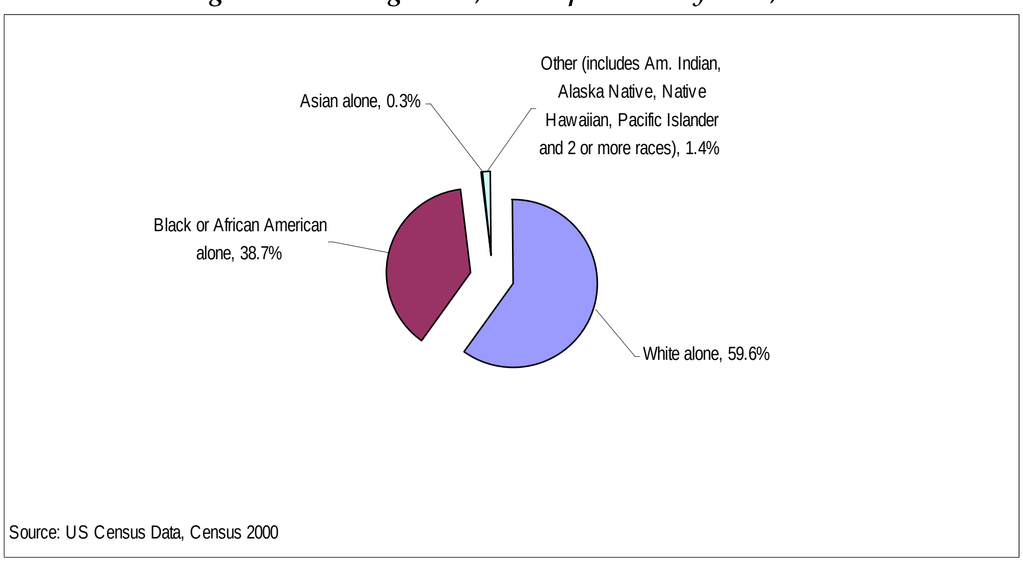
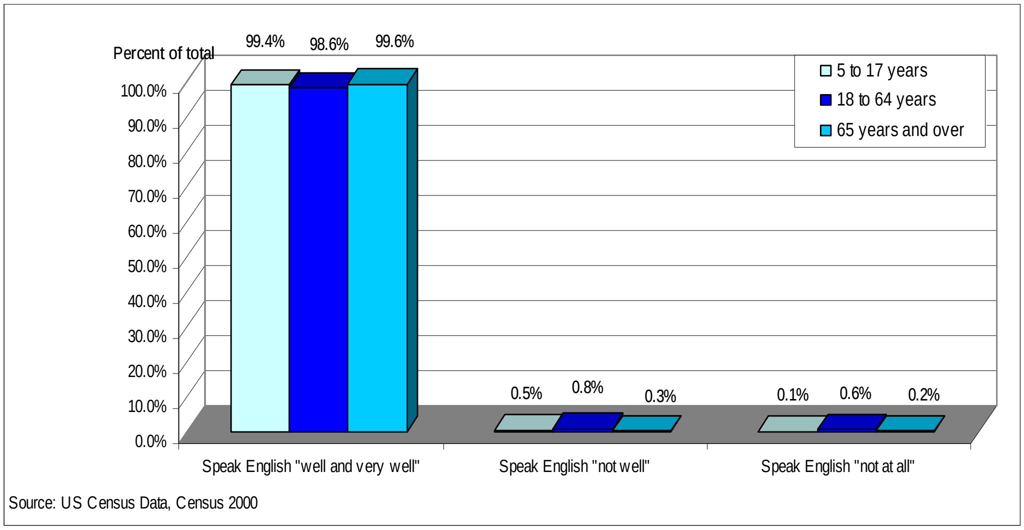


Figure 20-3. Georgetown, SC: Population by Race, 2000



It is evident from the data specified in Figure 20-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

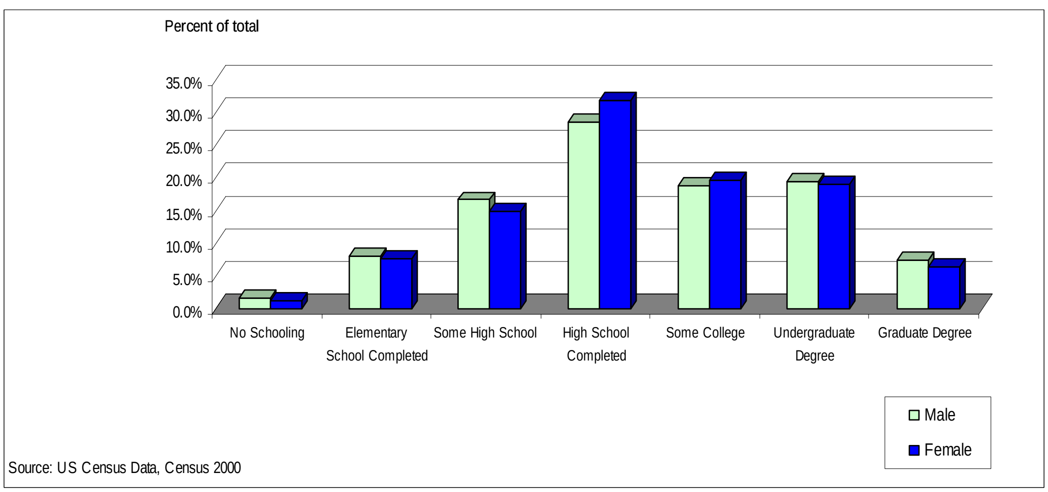
Figure 20-4. Georgetown, SC: Ability to Speak English by Age Groups, 2000



EDUCATION

As portrayed by Figure 20-5, over 30 percent of females and 25 percent of males, ages 25 or over, have completed high school. More than 17 percent of males and females have completed some college and nearly 20 percent of males and females have obtained an undergraduate degree in the region.

Figure 20-5. Georgetown, SC: Educational Attainment of Population by Sex Ages 25 and Over, 2000



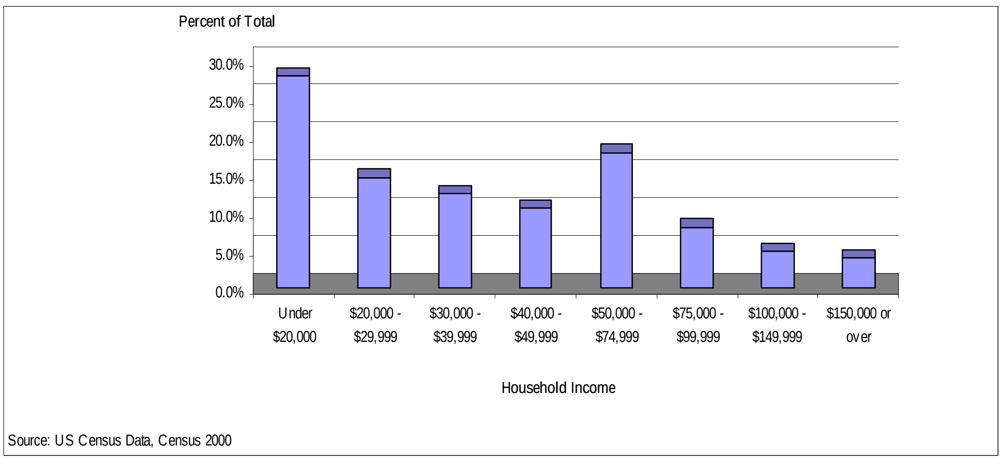
Socio-Economic Characteristics

INCOME

According to the 2000 US Census, nearly 30 percent of households in the region in 1999 had incomes of under $20,000. About 19 percent of households in the same period had incomes that feel within the $50,000 - $74,999 income bracket. Around 5 percent of households in the region had incomes of $150,000 or over (Figure 20-6).

Household median income in 1999 in the region was $35,312 and per capita income for the same year was $19,805. The percentage of people under the poverty line in the region was 17.1 in the year 2000. The average household size in 2000 was 2.55.[2]

Figure 20-6. Georgetown, SC: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

As shown on Figure 20-7, of the employed civilian population ages 16 years and over, almost 30 percent of females are employed the educational, health and social services industry and 25 percent of females are employed in 'other' industries; which include the arts, entertainment, recreation, food services, public administration and information. About 23 percent of males are employed in the manufacturing industry and almost 20 percent of them are employed in 'other' industries.

An estimated 6.2 percent of males and females were unemployed in 2000 in the region.[3]

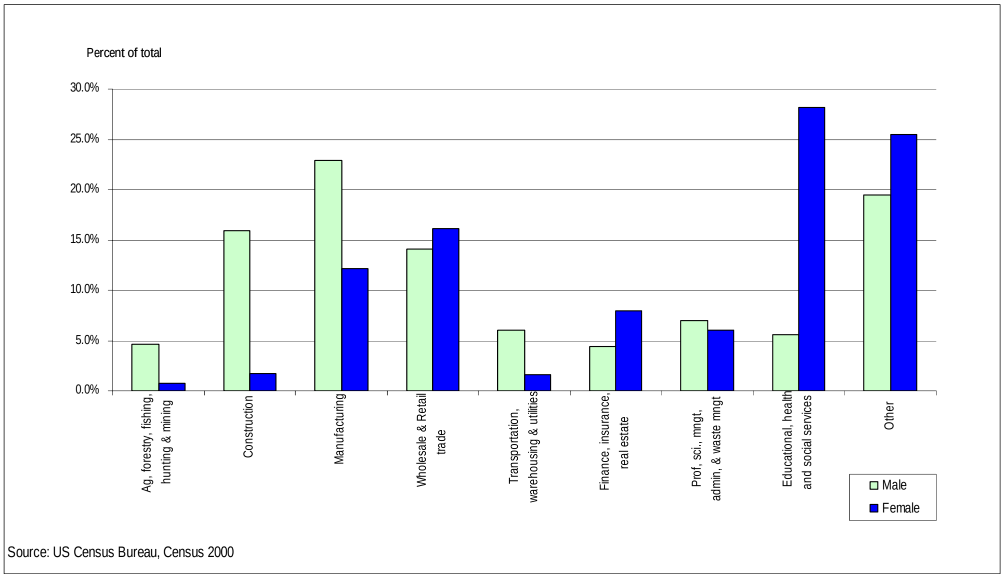
According to the 2000 US Census, an estimated 3.0 percent of males and 0.5 percent of females are employed in farming, fishing and forestry occupations. About 22.7 percent of males and 13.1 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.5 percent of male's occupations and 0.1 percent of female's occupations.

---

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 20-7. Georgetown, SC: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of Georgetown is the South Carolina State Ports Authority's dedicated breakbulk and bulk cargo facility. With an expanded berth, ample open and covered storage, specialty cargo handling facilities, and a team of workers experienced in the field, Georgetown can handle cargo efficiently and safely. Top commodities for the Port of Georgetown are steel, salt, cement, aggregates, and forest products.

Breakbulk cargo handling including Georgetown's own Intermodal Breakbulk Service (IBS) is one of the port's key services. The port's innovative IBS lets shippers and consignees combine a multitude of transportation costs and functions -- stevedoring, storage, port handling, truck and/or rail, etc. -- as a single operation under one invoice. This ability saves time, money, and administrative hassles.

Georgetown was built for breakbulk cargo. It has 3 berths totaling 1,700 ft.; 139,800 square-feet of covered storage; 2 transit warehouses totaling 103,000 square-feet; 3 enclosed sheds totaling 36,800 square-feet and 27.9 acres of open storage (covered and open storage rail access provided). It has a 100-ton mobile crane available and its specialty is in handling facilities on terminal for metals, cement, salt, and forest products and has a fleet of cargo handling equipment.[4]

[4] South Carolina State Port Authority: http://www.port-of-charleston.com/term_and_infra/ georgetown/ PortGeorgetown.asp

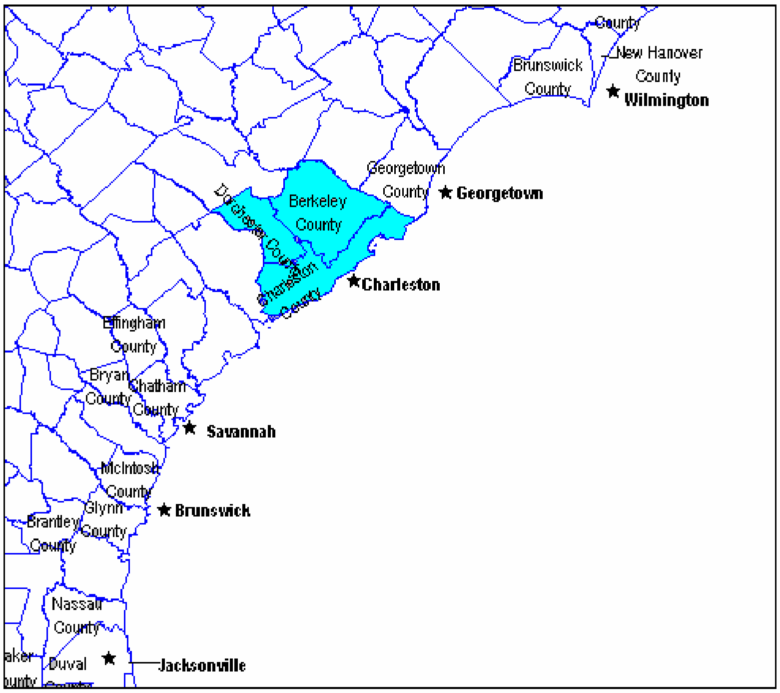
This page intentionally left blank.

21. Charleston, SC

Location and Background Information

The Port of Charleston is part of the Charleston-North Charleston, SC Metropolitan Statistical Area (MSA).

Figure 21-1. Charleston, SC: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Charleston-North Charleston, SC MSA is 549,033, according to the 2000 US Census. Of this total 269,433 or 49.1 percent are males and 279,600 or 50.9 percent are females. The median age for the region for the year 2000 was 33.9 years; 32.3 for males and 35.4 for females. Nearly 20 percent of males and about 17 percent of females in the region fall within the 18 – 29 years age bracket and about 15 percent of males and females fall within the 30 – 39 age range (Figure 21-2).

The majority of the population in the region is white (65.2 percent). The Black or African American population represents 30.5 percent of the total population. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 2.9 percent of the total population of this area, followed by the Asian population, which only represents 1.4 percent of the total population (Figure 21-3). Only 2.4 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] Source: US Census Data, Census 2000.

Figure 21-2. Charleston, SC: Structure of the Population by Age, 2000

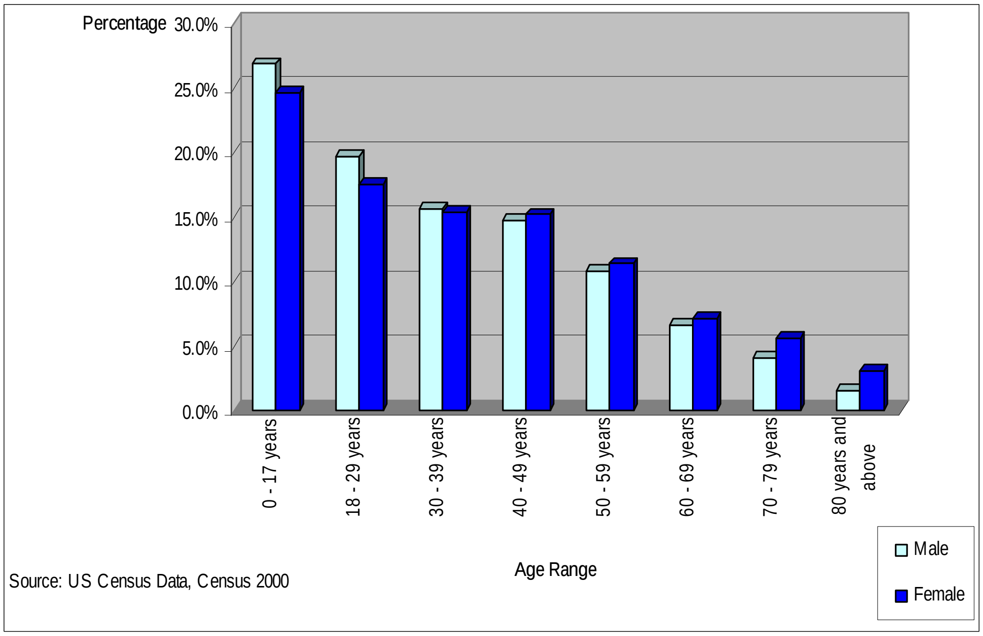
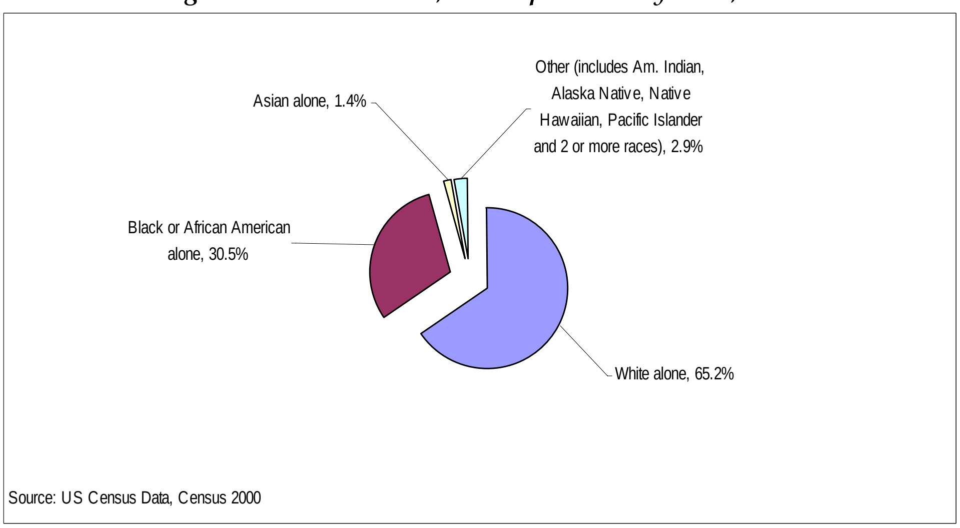
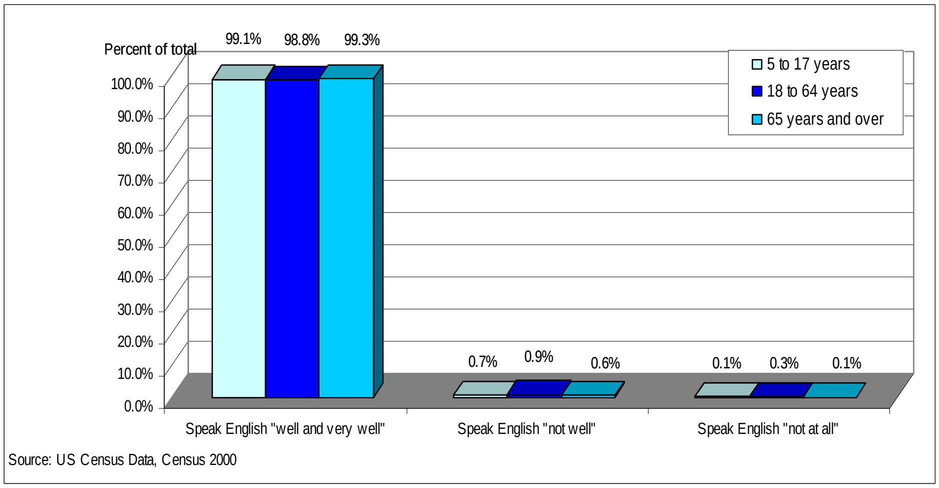


Figure 21-3. Charleston, SC: Population by Race, 2000



It is evident from the data specified in Figure 21-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 21-4. Charleston, SC: Ability to Speak English by Age Group, 2000

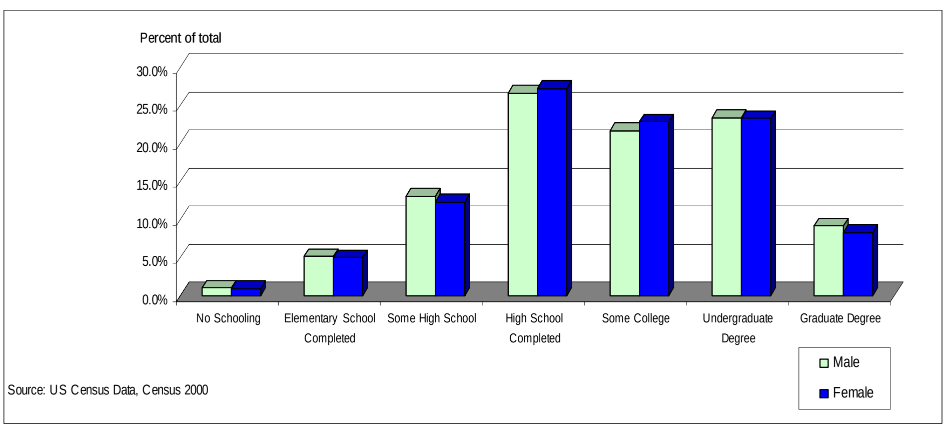


EDUCATION

As shown on Figure 21-5, of the population ages 25 and over in the region, over 25 percent of males and females have completed high school. Around 22 percent of males and females have obtained an undergraduate degree and over 20 percent of males and females have completed some college. Nearly 10 percent of the population has obtained a graduate degree.

Some of the colleges and universities around the area are: Charleston Southern University, College of Charleston, The Citadel, Johnson & Wales University-Charleston, and Medical University of South Carolina.

Figure 21-5. Charleston, SC: Educational Attainment of Population by Sex Ages 25 and Over, 2000



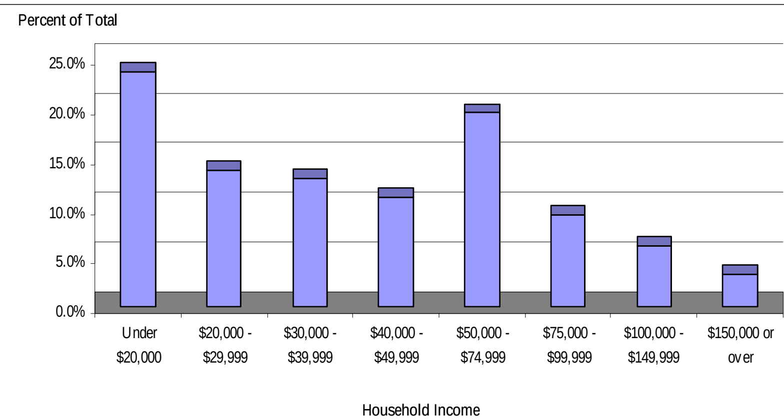
Socio-Economic Characteristics

INCOME

In 1999, nearly a quarter of households in the Charleston – North Charleston, NC MSA had an income of under $20,000. Over 20 percent of households had incomes between $50,000 and $74,999. About 5 percent of households had incomes of $150,000 or over (Figure 21-6).

Household median income in 1999 in the region was $39,232.49 and per capita income for the same year was $19,771.84. The percentage of people under the poverty line in the region was 14 in the year 2000. The average household size in 2000 was 2.56.[2]

Figure 21-6. Charleston, SC: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

From the employed civilian population ages 16 or over in the region, nearly 35 percent of females are employed in the educational, health and social services industry and almost 25 percent of females are employed in 'other' industries, which include the arts, entertainment, recreation, food services, public administration and information. Nearly 25 percent of males are employed in 'other' industries, about 15 percent are employed in the construction industry, and the same percentage of males are also employed in the wholesale and retail trade industry (Figure 21-7).

An estimated 4.9 percent of males and 5.8 percent of females were unemployed in the region in the year 2000.[3]

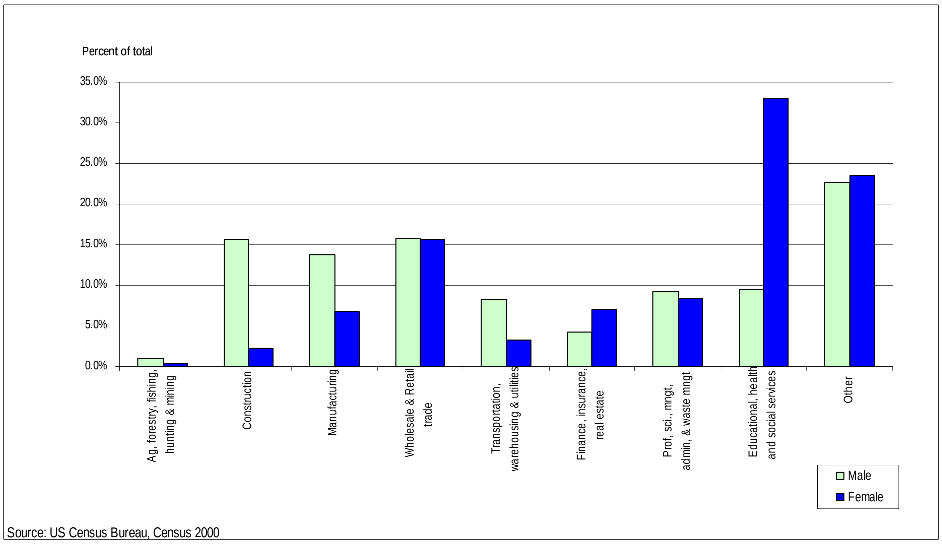
According to the 2000 US Census, an estimated 0.7 percent of males and 0.3 percent of females are employed in farming, fishing and forestry occupations. About 18.8 percent of males and 7.0 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.2 percent of female's occupations.

---

[2] Source: US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 21-7. Charleston, SC: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Port of Charleston has 6 main terminals: The PortCharleston Terminals, the Columbus Street Terminal, the North Charleston Terminal, the Wando Welch Terminal, the Union Pier Terminal and the Veterans Terminal.

Colombus Street Terminal
The Columbus Street Terminal (CST) is Charleston's premier combination breakbulk and container terminal. With dockside warehouses, dockside rail access, dockside breakbulk gantry cranes, dedicated container berths and post-Panamax container cranes, Columbus Street is a multi-purpose facility. The terminal is well-suited to container, common breakbulk, bulk, rolling stock, heavy-lift, and project cargo. The terminal has 6 berths: 2 for containers and 4 for breakbulk. It has 3,875 continuous feet of berth space, 4 container cranes (2 post-Panamax), 78 acres of open storage for containers and other cargo, EDI compatible container gates, on-terminal roadability facility and a large on-dock staging apron.

CST also has 457,500 square-feet of sprinkler-protected warehouses with covered rail access, ship side rail service, an on-terminal rail yard, 24-hour security with manned guard gate and chain-link and barbed-wire fencing, easy access to I-26 and one hour to open ocean.

North Charleston Terminal
The North Charleston Terminal (NCT) is a modern container handling facility with complete with post-Panamax container cranes, an on-terminal container freight station, an on-terminal rail yard, and direct easy access to I-26 and I-526. The terminal has 3 container berths totaling 2,500 feet of berth space and one dedicated grain elevator berth, 6 container cranes (3 post-Panamax), 123 Acres of open storage, on-terminal intermodal rail access and dockside rail service.

NCT has a 118,500 square-foot container freight station, 91,000 square-feet of leased warehouse space just outside terminal gates, breakbulk and RO-RO capability and a 1.5 million bushel export grain elevator. It also counts with chain-link and barbed-wire fencing with 24-hour manned security gates, easy interstate highway access and 2 hours to open ocean.

Wando Welch Terminal

Wando Welch Terminal (WWT) has received worldwide recognition for its innovative design and overall terminal productivity. Opened in 1982, the final stage of terminal construction was recently completed in the form of a 4th container berth, 3 new post-Panamax container cranes, and nearly 90 acres of additional container storage space. At present, it is the port's largest terminal in terms of volume and physical size. The terminal is 16.4 nautical miles from sea buoy, has 3,800 continuous ft. (1,128 m.) of berth space, 10 container cranes (4 are Super post-Panamax, 4 are post-Panamax, and 2 are Panamax), 194 acres of container storage space.

The terminal furthermore counts with an on-terminal 200,000 square foot container freight station, an on-terminal U.S. Customs and U.S. Department of Agriculture inspection facilities, an on-terminal fumigation area, an on-terminal maintenance facility and an on-terminal administration buildings and executive meeting center. It is less than one mile from I-526 interchange and has chain-link and barbed wire boundary fencing, 24-hour security, seven-days-a-week.

Union Pier Terminal

Union Pier Terminal (UPT) is one of PortCharleston's dedicated breakbulk and RO-RO cargo terminals. A recent terminal redesign has significantly increased the open storage area and improved traffic flow into and out of the facility. It has 4 berths totaling 2,470 continuous feet of berth space, and 698,049 square feet of sprinkler-protected transit sheds. There are multiple rail lines serving warehouses and dockside open storage areas and covered rail access to all warehouses, as well as asphalt and concrete open storage areas. There are smooth transitions between dockside aprons and ground-level open storage and excellent security with visibility-restricted screening on chain-link and barbed-wire fencing with a manned 24-hour guard gate.

Veterans Terminal

Veterans Terminal (VT) is a 110 acre fully secured dedicated bulk, break-bulk, RO-RO, and project cargo facility located on the Cooper River. VT can provide long term outside storage in dedicated yard space or covered sprinkler protected warehouse. Union and Non-Union stevedoring complements our determination to provide the customer with the most modern and flexible port facility in the Southeast. The terminal is 1.5 hours steaming time from the sea buoy and is 1.5 miles from Interstate I-26. There is rail service by both NS & CSX.

PortCharleston is regarded by many in the maritime industry to be among the most productive ports in the world. PortCharleston consistently tops 40 gross moves per hour per crane and has set a new U.S. record of 64.8 moves ph/pc. Charleston has industry-leading crane operators and a unique team of maritime professionals working on the docks. Even though port employees run the dockside cranes and container yard handling equipment, it takes a team effort to consistently deliver high productivity. This can be found on Charleston's waterfront. Ocean carriers, ILA workers, stevedores, agents, and port employees work in concert to keep productivity high.

Additionally, PortCharleston has an advantage in geography. Charleston's terminals are closer to the open sea than any competing port by a significant margin. With deep channels, channels wide enough for ships to easily pass, and such a short distance to travel, Charleston's facilities allow your ships to spend a minimum amount of time in-port.

Being half-way between New York and Miami, Charleston provides easy highway and rail access to the industry-rich Southeast hinterland. This region is growing in population and manufacturing and ocean carriers need top-notch access. Charleston offers that access like no competitor. Also, PortCharleston has been making heavy investments in equipment and processes to lower trucker turn time on the terminals. In the common-user yards and gates, trucker turn time has been cut by more than half in the last year. This makes the yard operation more efficient for the carrier and delivers the customer's cargo faster.[4]

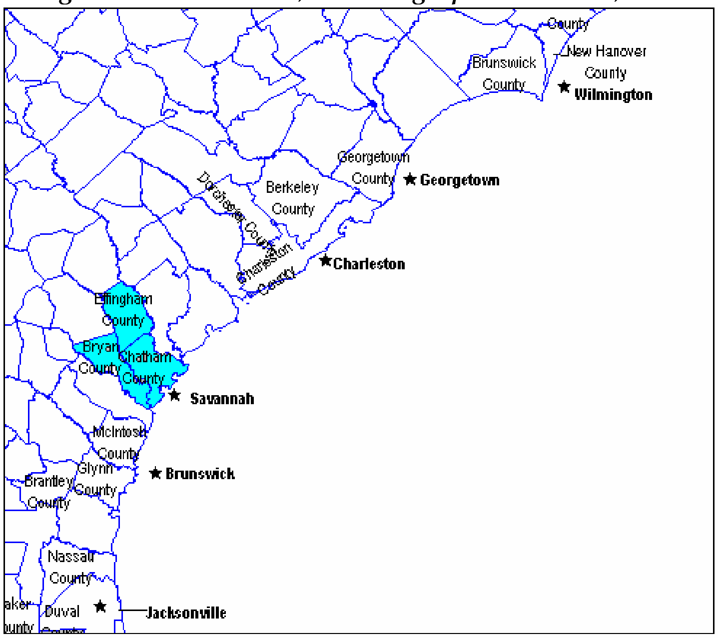
[4] South Carolina State Port Authority website: http://www.port-of-charleston.com/Term_and_Infra/Charleston/whycharleston.asp

22. Savannah, GA

Location and Background Information

The Port of Savannah is part of the Savannah, Georgia Metropolitan Statistical Area (MSA).

Figure 22-1. Savannah, GA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Savannah, GA MSA is 293,000, according to the 2000 US Census. Of this total, 142,039 or 48.5 percent are males and 150,961 or 51.5 percent are females. The median age for the population in the region is 34.2 years; 32.6 for males and 35.7 for females. Over 25 percent of males and females in the region fall within the 18 – 29 years age bracket and about 30 percent of males and females (about 15 percent per age bracket) fall within the 30-39 and 40-49 years age range (Figure 22-2).

The majority of the population in the region is white (61.1 percent), followed by the Black or African American population, which represents 34.9 percent of the total population. 'Others' (include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) represent 2.4 percent of the population. The Asian population represents only 1.6 percent of the total population (Figure 22-3). Moreover, in terms of ethnic makeup, only 2.0 percent of the total population is considered to be of Hispanic or Latino origin[1].

[1] US Census Data, Census 2000.

Figure 22-2. Savannah, GA: Structure of the Population by Age Group, 2000

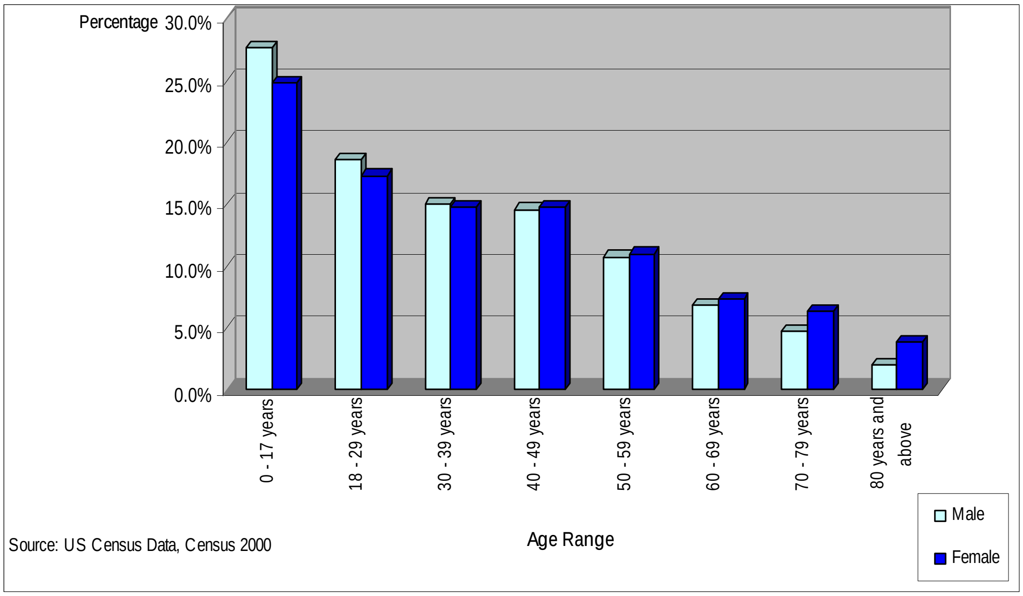
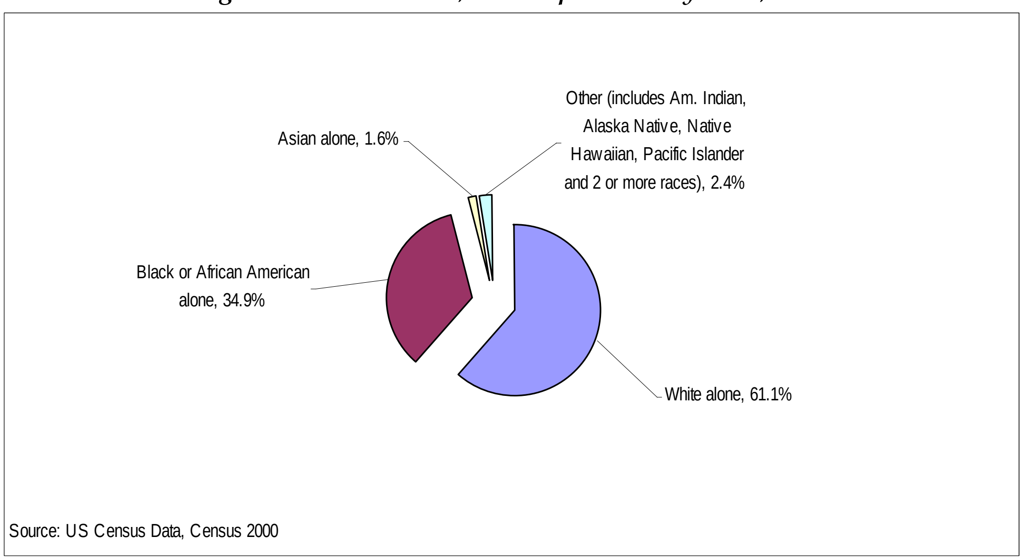
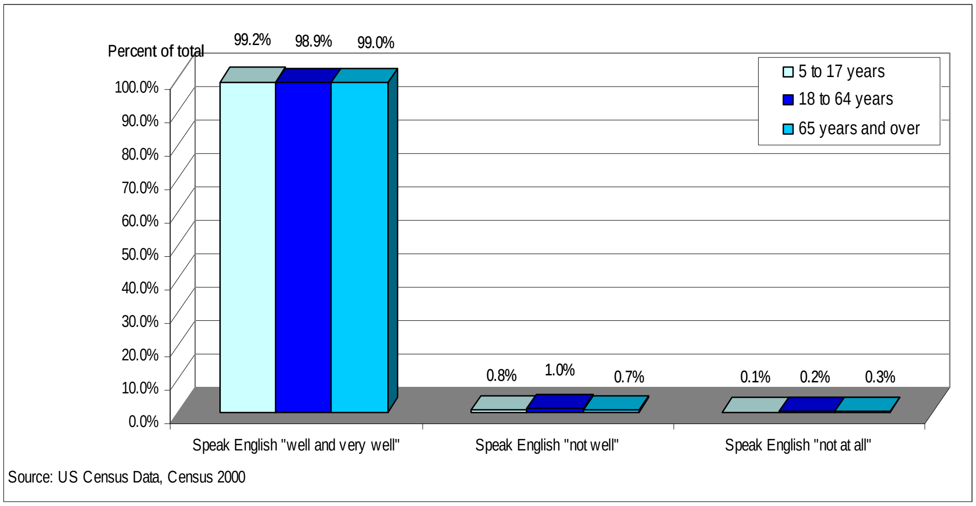


Figure 22-3. Savannah, GA: Population by Race, 2000



It is evident from the data specified in Figure 22-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 22-4.Savannah, GA: Ability to Speak English by Age Group, 2000

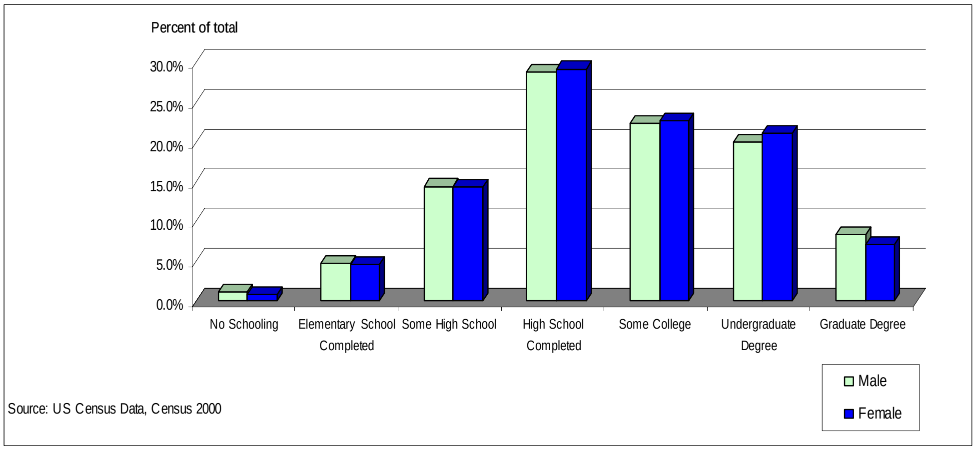


EDUCATION

Of the population in the region that is 25 years old or over, about 27 percent of males and 28 percent of females have completed high school. Over 20 percent of males and females have completed some college and around 20 percent of males and females have obtained an undergraduate degree. About 6 percent of the population has obtained a graduate degree (Figure 22-5).

Some of the colleges and universities in the area are: Savannah State University, Armstrong Atlantic State University, Savannah College of Art And Design, and Savannah Technical College.

Figure 22-5. Savannah, GA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



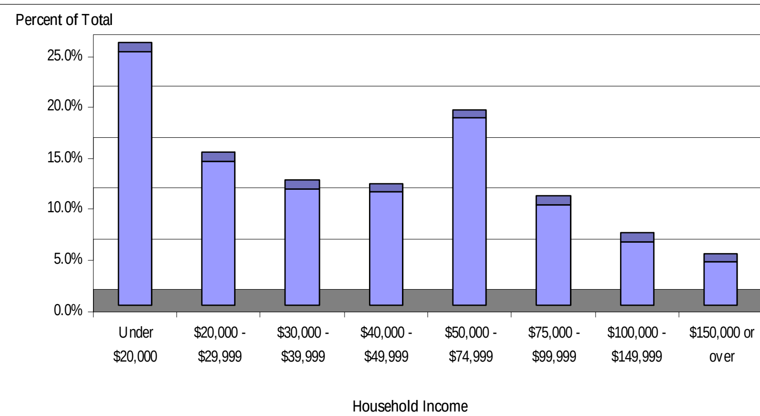
Socio-Economic Characteristics

INCOME

In 1999, about a quarter of the households in the Metropolitan Division of Savannah, GA had incomes of under $20,000. Nearly 20 percent of households had incomes that fell within the $50,000 - $74,999 income bracket. About 5 percent of households had incomes of $150,000 or over (Figure 22-6).

Household median income in the region in 1999 was $39,557.87 and per capita income in the same year was $20,751.51. The percentage of people under the poverty line in the region was 14.5 in the year 2000. The average household size in 2000 was 2.57.[2]

Figure 22-6. Savannah, GA: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

As portrayed by Figure 22-7, of the employed civilian population ages 16 years or over, nearly 35 percent of females are employed in the educational, health and social services industry and 25 percent of them are employed in 'other' industries, which include the arts, entertainment, recreation, food services, public administration and information. Over twenty percent of males are employed in 'other industries, 17 percent are employed in the manufacturing industry and 15 percent are employed in wholesale and retail trade industries.

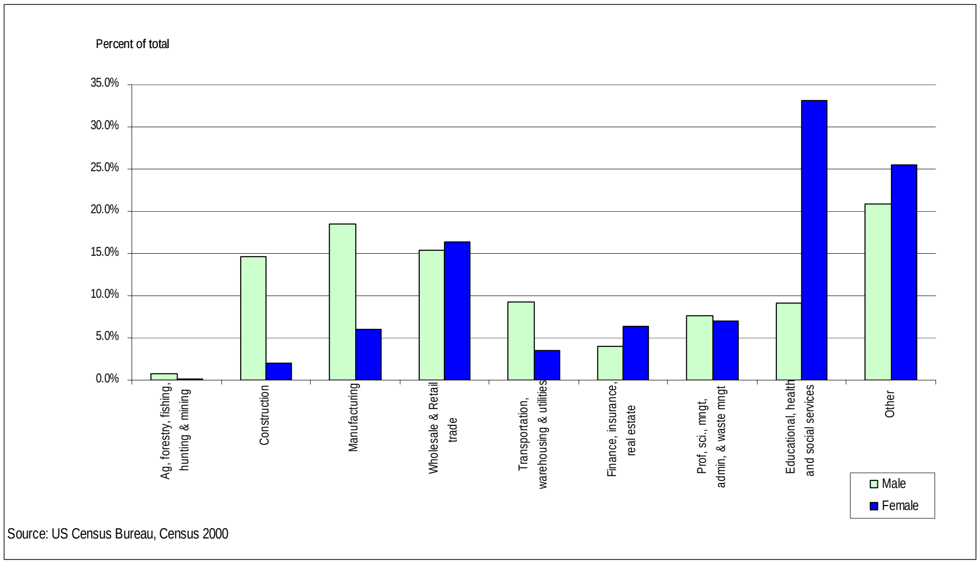
An estimated 4.9 percent of males and 5.9 percent of females were unemployed in the year 2000.[3]

According to the 2000 US Census, an estimated 0.5 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 21.5 percent of males and 5.9 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 1.0 percent of male's occupations and 0.2 percent of female's occupations.

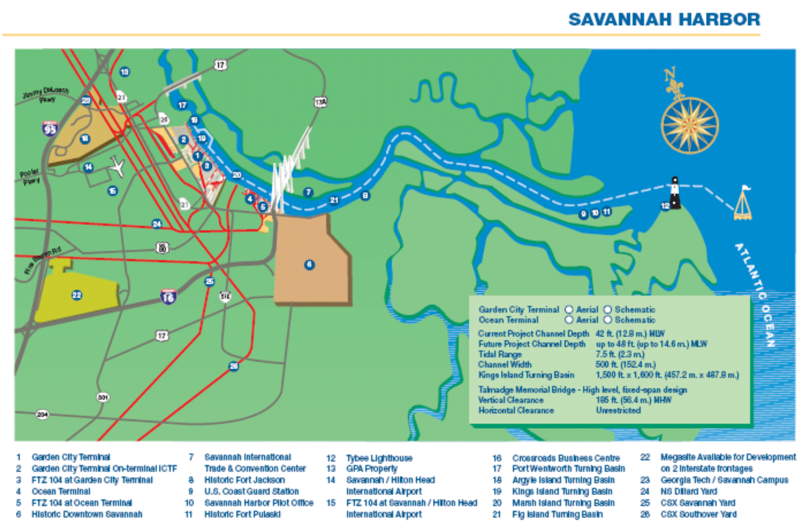
[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 22-7. Savannah, GA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION



Garden City Terminal

Owned and operated by the Georgia Ports Authority, Garden City Terminal is a secured, dedicated container facility, the largest of its kind on the U.S. East and Gulf coasts. The 1,200-acre single-terminal facility features 7,726 linear feet of continuous berthing and more than 1.3 million square feet of covered storage. The terminal is equipped with thirteen high-speed container cranes (2 super post-panamax & 11 post-panamax), as well as an extensive inventory of yard handling equipment.

Garden City Terminal is within 6.3 miles of Interstate 16 (East / West) and 5.6 miles of Interstate 95 (North / South) with access to more than 100 trucking companies. CSX Transportation and Norfolk Southern Railroad provide Class I rail service. As a key intermodal advantage, the "James D. Mason" on-terminal intermodal container transfer facility, or "Mason" ICTF, provides overnight rail service to

Atlanta. Two to four day delivery via the ICTF is also available to inland destinations such as Charlotte, Chicago, Dallas and Memphis.

With the continuing diversification of Savannah's ocean carrier portfolio, more and more retailers are making Savannah the port of choice for their import distribution centers. Together, Savannah area distribution centers cover more than 9 million square feet of warehousing and annually generate more than 300,000 TEU's. Sailings as fast as 22 days from Asian-based ports and 9 days from Europe mean your shore-to-door transits define the term expedited.

Savannah boasts all the additional ingredients for the ideal retail distribution center equation: numerous, affordable construction-ready sites; two major interstates in close proximity to the Garden City Terminal; local and state government with a keen interest in development and job creation; a workforce versed in critical logistics skills; two Class I railroads providing convenient connections to key consumer concentrations nationwide.

Ocean Terminal

Owned and operated by the Georgia Ports Authority, Ocean Terminal is a secured, dedicated breakbulk facility specializing in the rapid and efficient handling of a vast array of forest and solid wood products, steel, RoRo (Roll-on / Roll-off), project shipments and heavy-lift cargoes.

The 208-acre facility features 6,688 linear feet of deepwater berthing, approximately 1.5 million square feet of covered storage and 96 acres of open, versatile storage. Served by over 100 trucking companies, Ocean Terminal is ideally situated within 1.2 miles of Interstate 16 (East / West) and 10 miles of Interstate 95 (North / South). Norfolk Southern Railroad provides switching services on-terminal. Line-haul services are provided by two Class I rail providers, CSX Transportation and Norfolk Southern Railroad.[4]

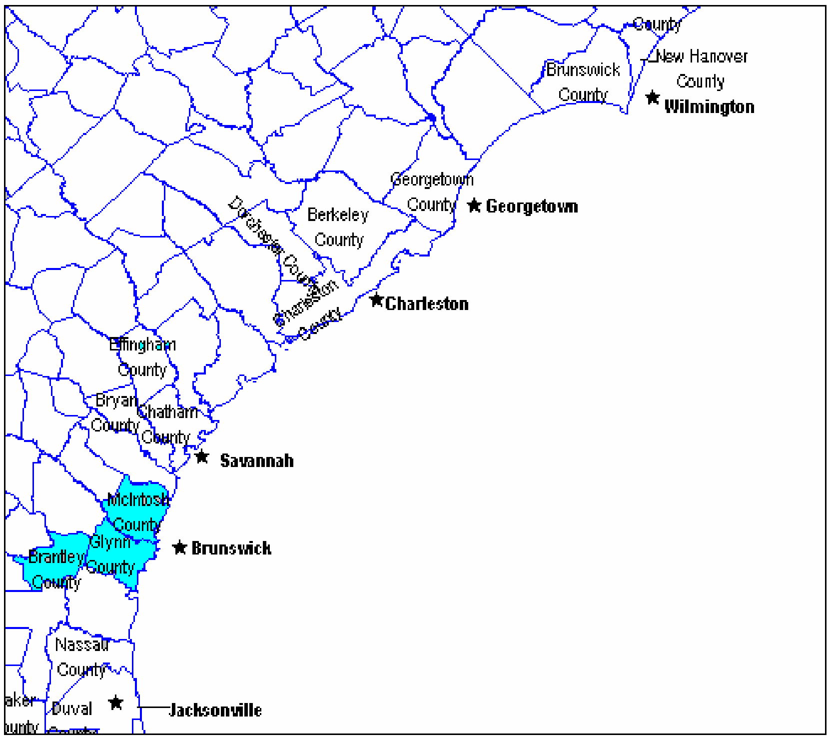
[4] Georgia Ports Authority website: http://www.gaports.com

23. Brunswick, GA

Location and Background Information

The Port of Brunswick is located in the Brunswick, GA Metropolitan Statistical Area (MSA).

Figure 23-1. Brunswick, GA: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the MSA in the year of 2000 was 93,044, according to the 2000 US Census. Of this total, 15,034 or 48.4 percent were males and 48,010 or 51.6 percent were females. The median age for the region in 2000 was 37.3 years, 35.8 for males and 38.5 for females. Nearly 30 percent of males and nearly 25 percent of females are between the ages of 0 and 17 years. About 15 percent of males and females fall within the 40-49 years age range (Figure 23-2).

The majority of the population in the region is white (73.4 percent), followed by the Black or African American population, which represents 23.7 percent of the total population. 'Others' (which includes American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) constitute 2.2 percent of the population; and the Asian population represents only 0.7 percent of the total population (Figure 23-3). Moreover, in terms of ethnic makeup, only 2.4 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] Source: US Census Data, Census 2000.

Figure 23-2. Brunswick, GA: Structure of the Population by Age Group, 2000

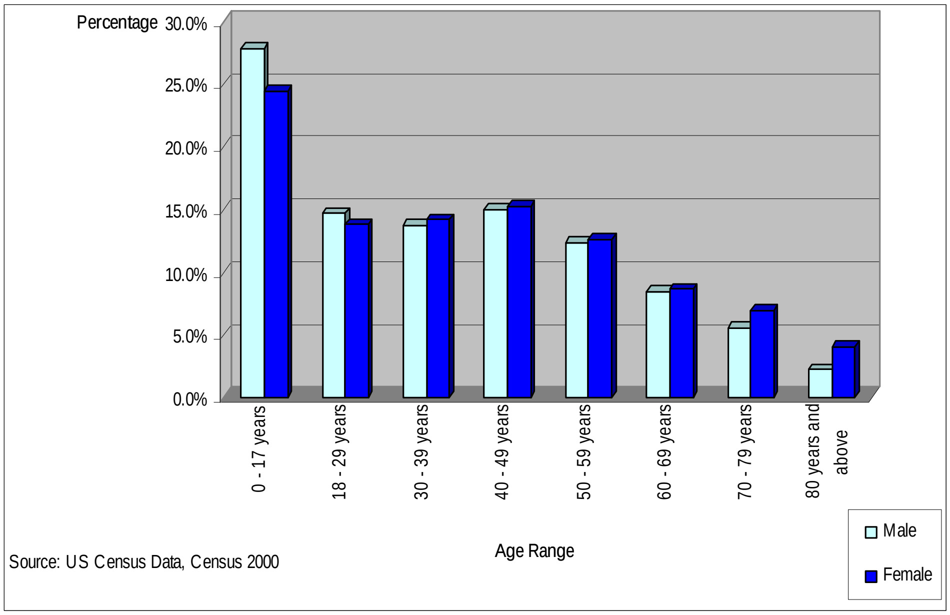
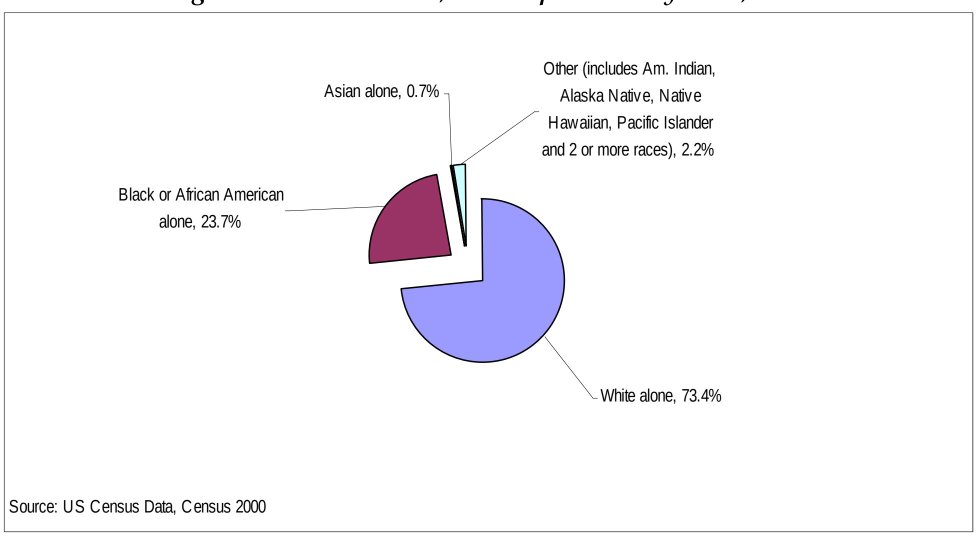
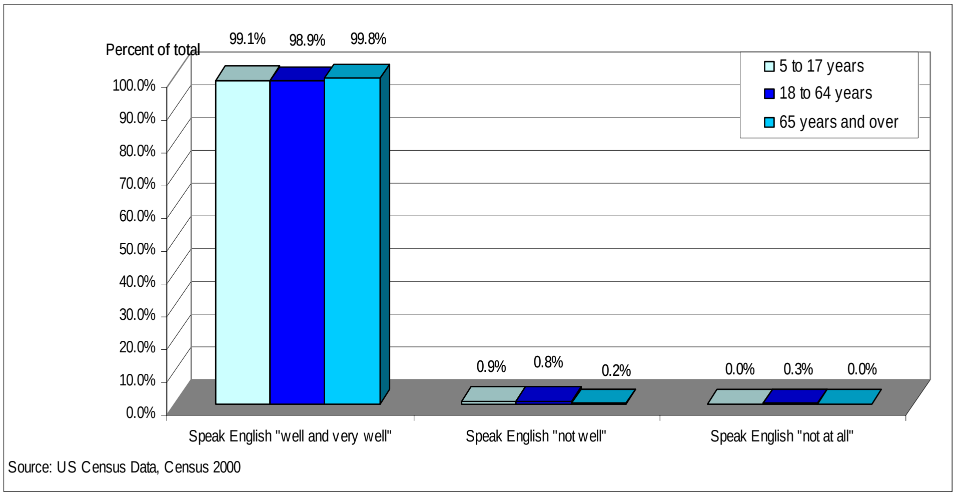


Figure 23-3. Brunswick, GA: Population by Race, 2000



It is evident from the data specified in Figure 23-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 23-4. Brunswick, GA: Ability to Speak English by Age Group, 2000

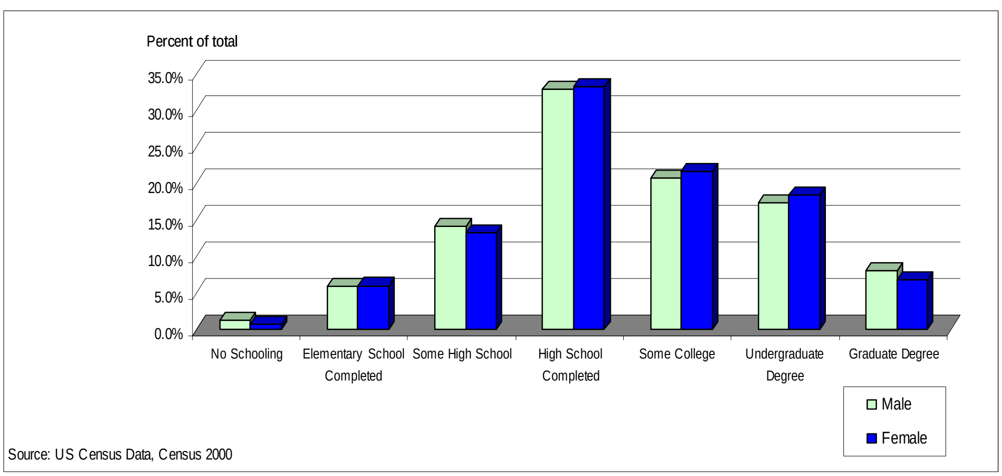


EDUCATION

As portrayed by Figure 23-5, of the population that is 25 years old or over, about 30 percent of males and females have completed high school. About 20 percent of males and females have completed some college and 15 percent of males and females have obtained an undergraduate degree.

Coastal Georgia Community College is the only college in the area.[2]

Figure 23-5. Brunswick, GA: Educational Attainment of Population by Sex Ages 25 and Over, 2000



2 Brunswick, GA Community Profile: http://www.epodunk.com

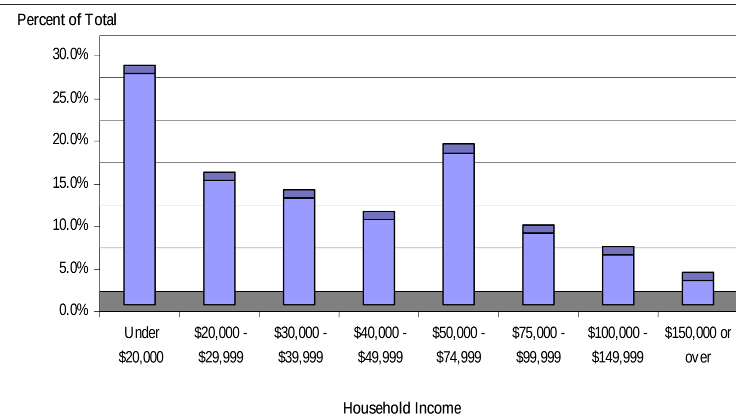
Socio-Economic Characteristics

INCOME

About 28 percent of households in this region in 1999 had an income under $20,000. Nearly 20 percent of households had incomes that fell within the $50,000 – $74,999 income bracket (Figure 23-6).

Household median income in the Brunswick GA MSA in 1999 was $36,539.46 and per capita income for the same year was $19,581.15. The percentage of people under the poverty line in the region was 15.6 in the year 2000. The average household size in 2000 was 2.48.[3]

Figure 23-6. Brunswick, GA: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

As shown on Figure 23-7, of the employed civilian population ages 16 or over, 30 percent of females are employed in the educational, health and social services industry, and about 28 percent are employed in 'other' industries, which include the arts, entertainment, recreation, food services, public administration and information. Over 25 percent of males are employed in 'other' industries, and 45 percent of males (distributed fairly evenly among each industry- around 15 percent each) are employed in the construction, wholesale and retail trade and manufacturing industries.

An estimated 4.1 percent of males are unemployed; whereas 6.9 percent of females are unemployed in the region.[4]

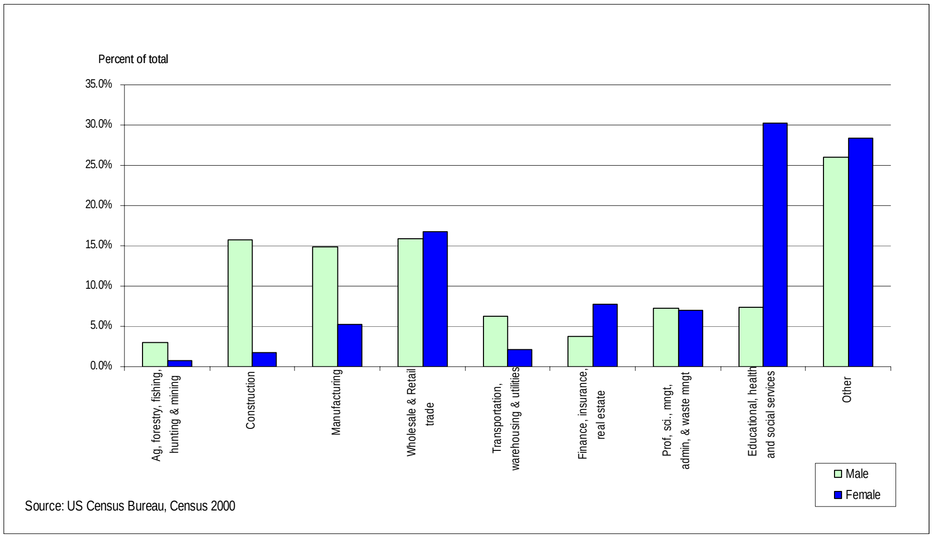
According to the 2000 US Census, an estimated 1.8 percent of males and 0.3 percent of females are employed in farming, fishing and forestry occupations. About 21.0 percent of males and 6.9 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.04 percent of female's occupations.

---

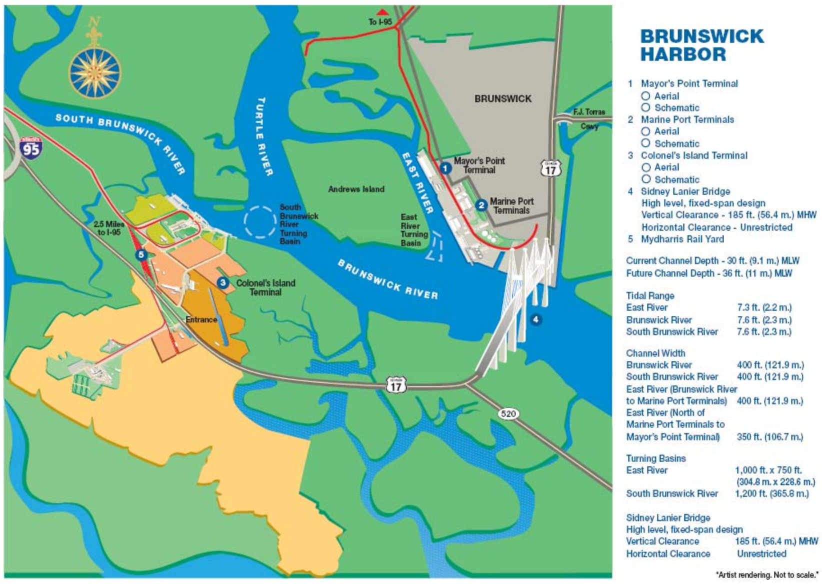
[3] US Census Data, Census 2000.

[4] Source: US Census Data, Census 2000.

Figure 23-7. Brunswick, GA: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION



Marine Port Terminals

Owned by the Georgia Ports Authority and leased to Logistec U.S.A., Marine Port Terminals is a secured, deepwater facility specializing in the productive handling of a diverse mix of breakbulk and bulk commodities. The 145-acre (58.7-ha) facility features 2,415 linear feet (736 linear meters) of berthing and 491,000 square feet (45,617 square meters) of covered storage. Marine Port Terminals is ideally situated within 7 miles (11.3 km) of Interstate 95 (North / South). On-terminal interchange and line-haul services are provided by two Class I rail providers, CSX Transportation and Norfolk Southern Railroad.

Mayor's Point Terminal

Owned and operated by the Georgia Ports Authority, Mayor's Point Terminal is a secured, dedicated breakbulk facility specializing in the rapid and efficient handling of a vast array of forest products and solid wood products. The 22-acre (8.9-ha) facility features 1,750 linear feet (533 linear meters) of berthing, 355,000 square feet (32,980 square meters) of intransit space, 2,000 feet (610 m) of covered rail siding and 7.9 acres (3.21 ha) of open, versatile storage. As a key U.S. South Atlantic gateway, the Port of Brunswick provides a competitive portfolio of ocean carrier services, as well as excellent interstate and rail connections to all major Southeast, Midwest and Gulf Coast commerce centers. Mayor's Point Terminal is ideally situated within six miles (9.7 km) of Interstate 95 (North / South). Two Class I rail providers, CSX Transportation and Norfolk Southern Railroad, offer exceptional service.[5]

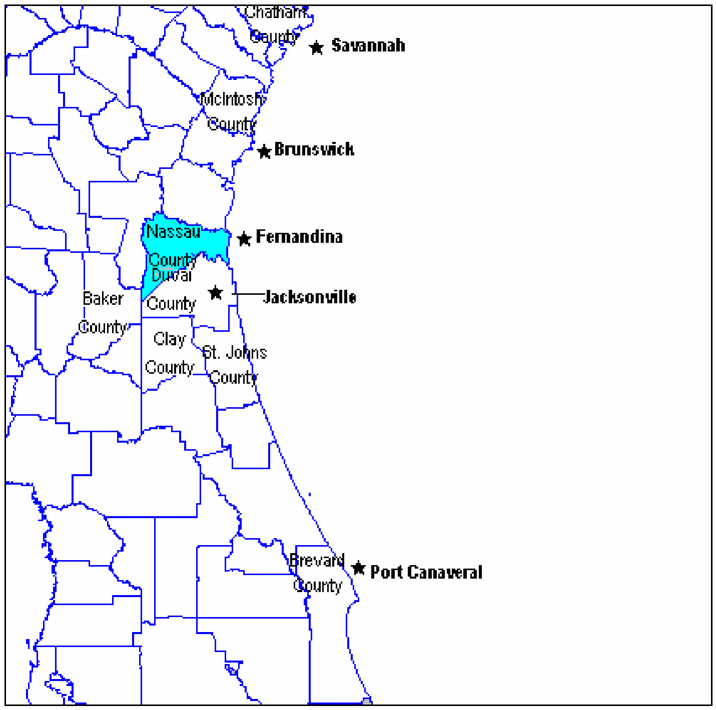
[5] Georgia Ports Authority website: http://www.gaports.com

24. Fernandina, FL

Location and Background Information

The Port of Fernandina is located in Nassau County, FL.

Figure 24-1. Fernandina, FL: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population in this county for the year 2000 was 57,663, according to the 2000 US Census. Of this total, 28,443 or 49.3 percent were males and 29,220 or 50.7 percent were females. The median age for the population for the same year was 38.3 years; 37.6 for males and 38.9 for females. About 25 percent of males and nearly 25 percent of females are between the ages of 0 and 17 years. About 15 percent of males and females fall within the 40-49 years age range (Figure 24-2).

As shown on Figure 24-3, 90.1 percent of the total population is white, 7.4 percent is Black or African American, 1.8 percent are part of the 'other' category (American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) and 0.7 percent of the population is Asian. Only 1.8 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] Source: US Census Data, Census 2000.

Figure 24-2. Fernandina, FL: Structure of the Population by Age Group, 2000

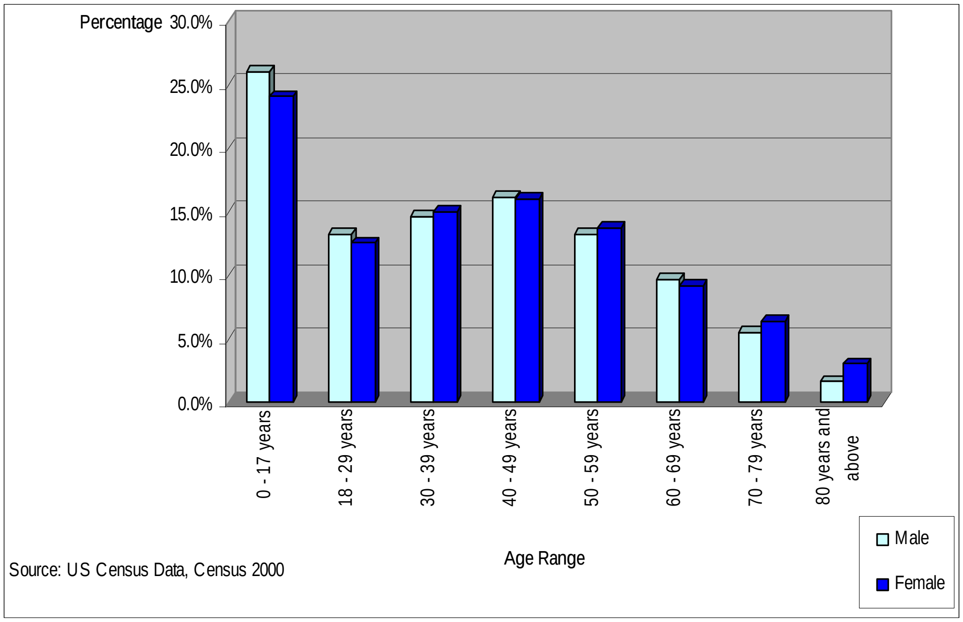
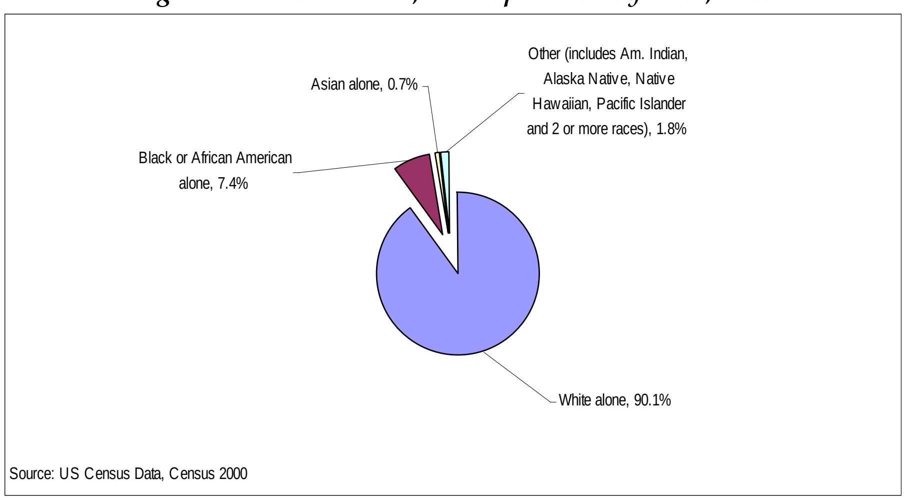
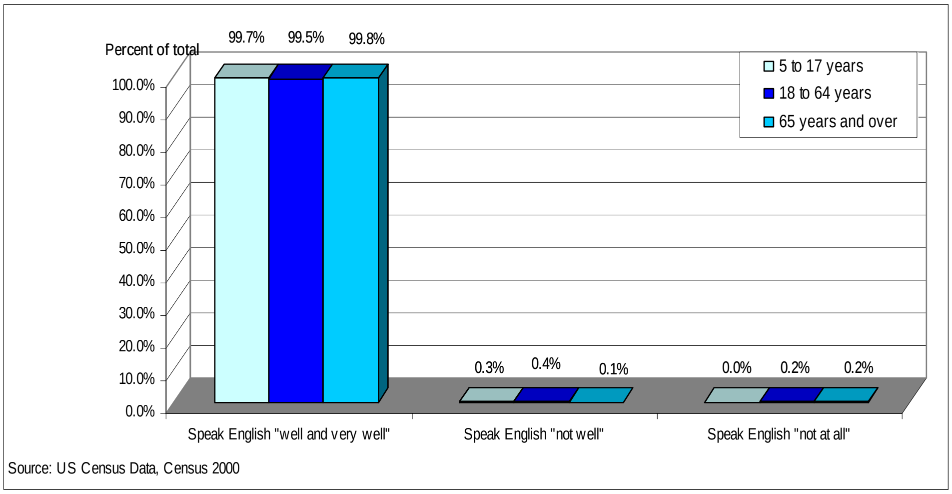


Figure 24-3. Fernandina, FL: Population by Race, 2000



It is evident from the data specified in Figure 24-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

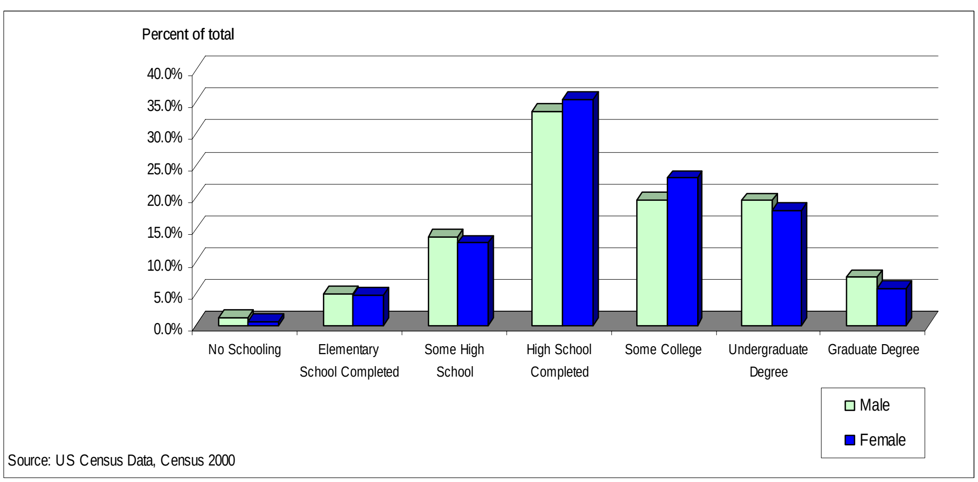
Figure 24-4. Fernandina, FL: Ability to Speak English by Age Group, 2000



EDUCATION

As portrayed by Figure 24-5, of the population of Nassau County, FL, ages 25 and over, over 35 percent of males and females (nearly 40 percent of females) have completed high school. Over 18 percent of males and females have completed some college and between 15 – 20 percent of males and females have obtained an undergraduate degree.

Figure 24-5. Fernandina, FL: Educational Attainment of Population by Sex Ages 25 and Over, 2000



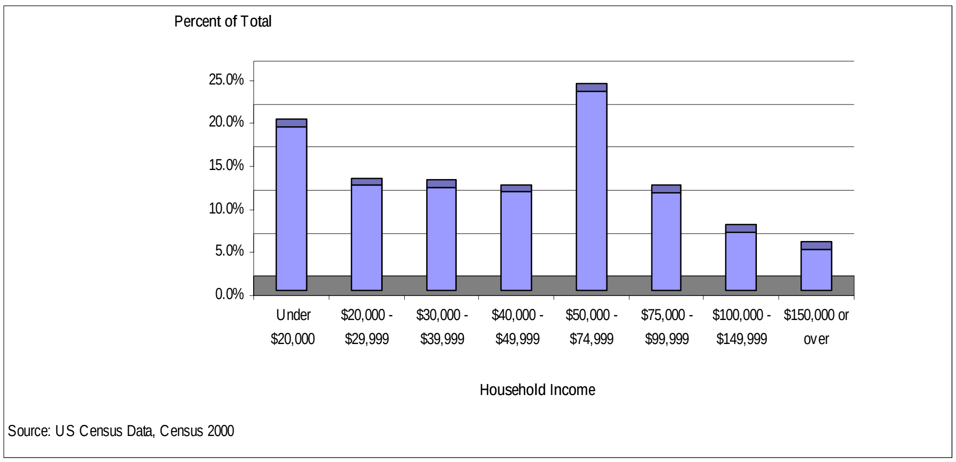
Socio-Economic Characteristics

INCOME

Nearly a quarter of all households in Nassau County, FL in 1999 had an income that fell in the $50,000 - $74,999 income bracket. About 20 percent of households in the county had an income under $20,000 (Figure 24-6).

Household median income in the county in 1999 was $46,022 and per capita income for the same year was $22,836. The percentage of people under the poverty line in the region was 9.1 in the year 2000. The average household size in 2000 was 2.59.[2]

Figure 24-6. Fernandina, FL: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

As portrayed in Figure 24-7, of the employed civilian population, ages 16 or over, over 50 percent of females were employed in the educational, health and social services industries, and other industries (25 percent per industry). The 'other' category includes industries such as the arts, recreation, entertainment, food services and information. About 22 percent of males are employed in 'other' industries; around 16 percent of them are employed in the construction industry and 18 percent in the manufacturing industry.

An estimated 4.4 percent of males and 5.2 percent of females are unemployed in the county.[3]

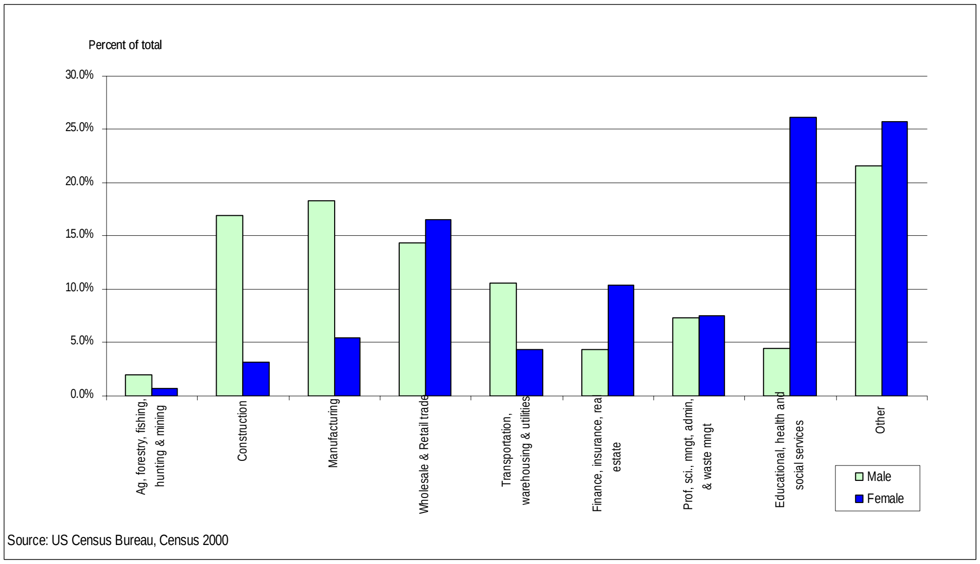
According to the 2000 US Census, an estimated 1.0 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 24.1 percent of males and 7.0 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.4 percent of male's occupations and 0.1 percent of female's occupations.

---

2 US Census Data, Census 2000.

3 US Census Data, Census 2000.

Figure 24-7. Fernandina, FL: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

Fernandina Beach in the Center of Activity and the "Crown Jewel" of Amelia Island. The town of Fernandina by the early 1800's had become a thriving seaport town. Both the "locals," as residents call themselves, and visitors to the Island appreciate the area's rich and colorful history. Fernandina Beach is the only city in the United States to have served under eight (8) flags.

The Port of Fernandina was the heart of the development of the city from its earliest days, but that changed dramatically in 1862, when Confederate forces were forced to abandon the Island. With the advancement of Federal troops, Fernandina's economy was wrecked. Its port, shops, warehouses were destroyed and the railroad, heavily damaged. By 1870, Fernandina had begun rebuilding the port and the town and once again became a bustling and thriving seaport town, relying primarily on the shipping industry, shrimping, and the tourist trade. The town was then rocked by another disaster, a devastating fire which burned and destroyed the original wooden structures from the docks to 3rd Street. This required another extensive rebuilding process.

Major William B. C. Duryee, who had served with the Occupational Forces of the Union Army, returned to Fernandina, purchased property at the west end of what is now Centre Street, and built a two-story masonry structure, unique for its time, due to its being built on pilings sunk into the earth for support. The building was completed in the mid 1880's. The first occupant was Major Duryee's business, which dealt in hay, grain, and oats. Also occupying the building was the First Customs House in the United States. Major Duryee also served as Collector of Customs. The lease was made by the U.S Treasury for $180.00 per annum. The Customs House occupied this space until the early 1900's. The Duryee Building, home now to the Marina Restaurant, was also the home of the oldest newspaper in the State of Florida. A very colorful and flamboyant Major George Fairbanks, who was the Editor, recorded Fernandina's life and history during that period of time. The 'Florida Mirror' later became the Fernandina Beach News-Leader, which continues in operation today. The First Bank of Fernandina was also located in the Duryee Building. This Bank was later sold and became the First National Bank of Florida.[4]

---

[4] URL: http://www.ameliaisland.com/fbhist.htm

Nassau Terminals - Port of Fernandina (AAPA Member)
Nassau Terminals provides terminal and stevedoring services as the operator of the Port of Fernandina under contract with the local port authority. The Port specializes in breakbulk forest products and container liner services to the Caribbean and South America.[5]

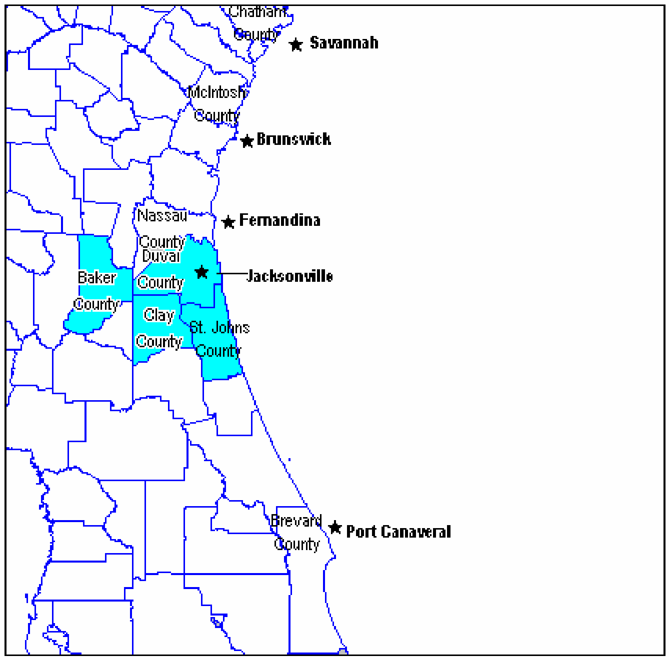
[5] American Association of Port Authorities website: http://www.aapadirectory.com/cgi-bin/showpage.cgi?id=3914

25. Jacksonville, FL

Location and Background Information

The Port of Jacksonville, Florida is part of the Jacksonville, FL Metropolitan Statistical Area (MSA).

Figure 25-1. Jacksonville, FL: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

The total population of the Jacksonville, FL MSA in 2000 was 1,065,087, according to the 2000 US Census. Of the total, 518,618 or 48.7 percent were males and 546,469 or 51.3 percent were females. The median age for the MSA in the same year was 35.1 years; 33.9 for males and 36.1 for females. About 27 percent of males and nearly 25 percent of females are between the ages of 0 and 17 years. About 45 percent of males and females (15 percent per age group approximately) are between the ages of 18 and 49 years (Figure 25-2).

As shown in Figure 25-3, 71.9 percent of the total population is white, 22.2 percent is Black or African American, 3.6 percent is categorized as 'others' (includes American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone) and 2.3 percent is Asian. Furthermore, in terms of ethnic makeup, around 3.9 percent of the total population is considered to be of Hispanic or Latino origin.[1]

[1] Source: US Census Data, Census 2000.

Figure 25-2. Jacksonville, FL: Structure of the Population by Age Group, 2000

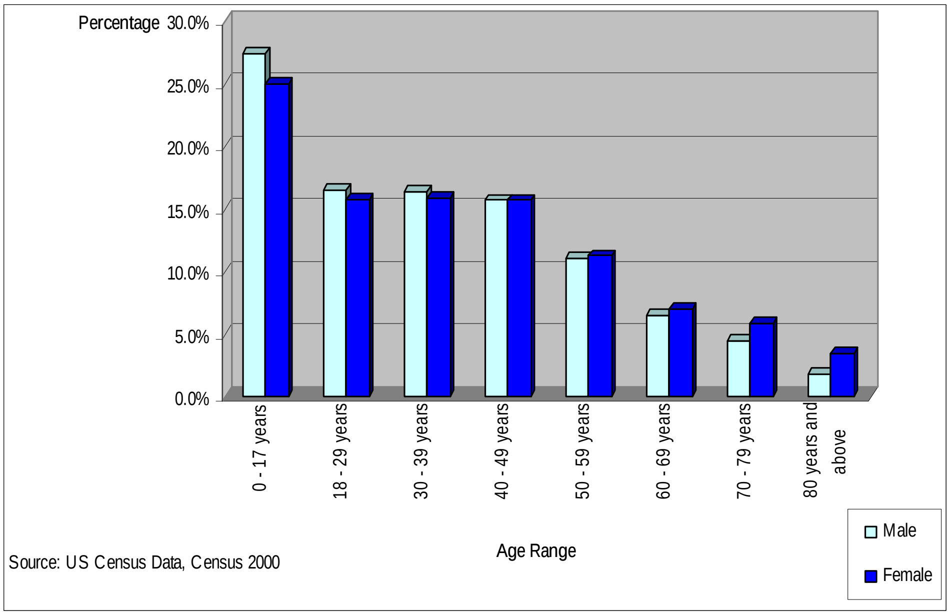
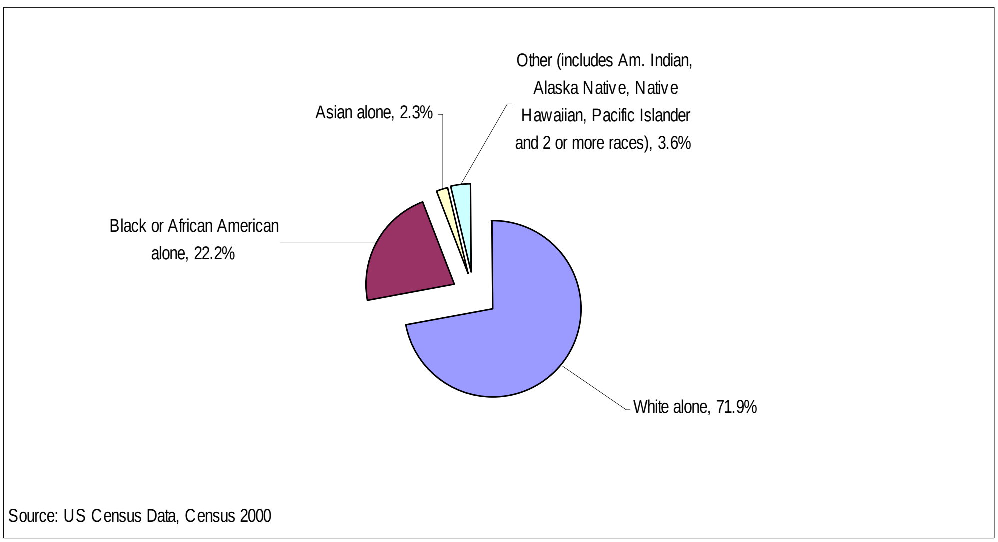
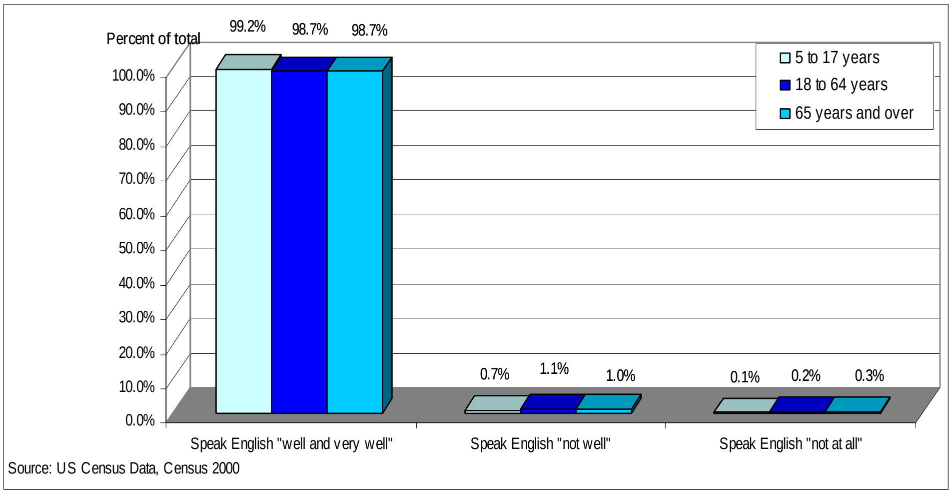


Figure 25-3. Jacksonville, FL: Population by Race, 2000



It is evident from the data specified in Figure 25-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 25-4. Jacksonville, FL: Ability to Speak English by Age Group, 2000

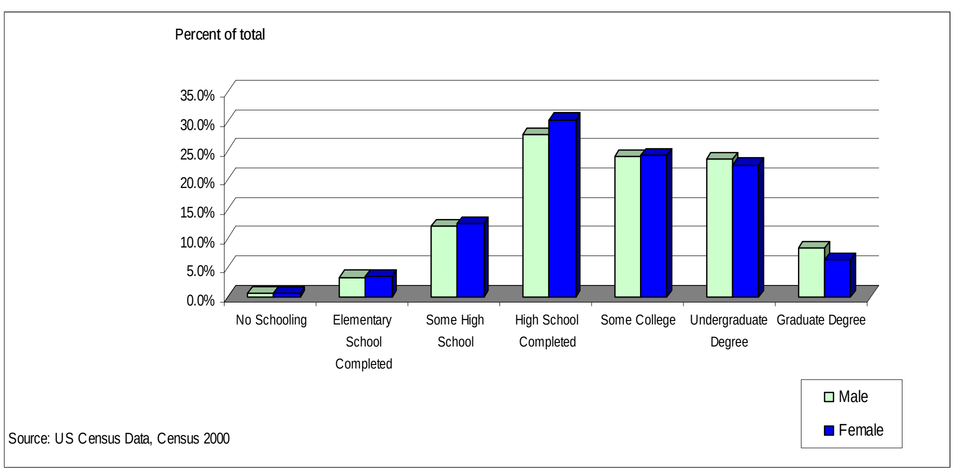


EDUCATION

As portrayed in Figure 25-5, of the population in the Jacksonville, FL MSA aged 25 or over, nearly 30 percent of females and 25 percent of males have completed high school. About 23 percent of males and females have completed some college and over 20 percent of males and females have obtained an undergraduate degree.

Some of the colleges and universities in the area are: Edward Waters College, Florida Community College at Jacksonville, Jacksonville University, Jones College - Jacksonville, Trinity Baptist College and the University of North Florida.

Figure 25-5. Jacksonville, FL: Educational Attainment of Population by Sex Ages 25 and Over, 2000



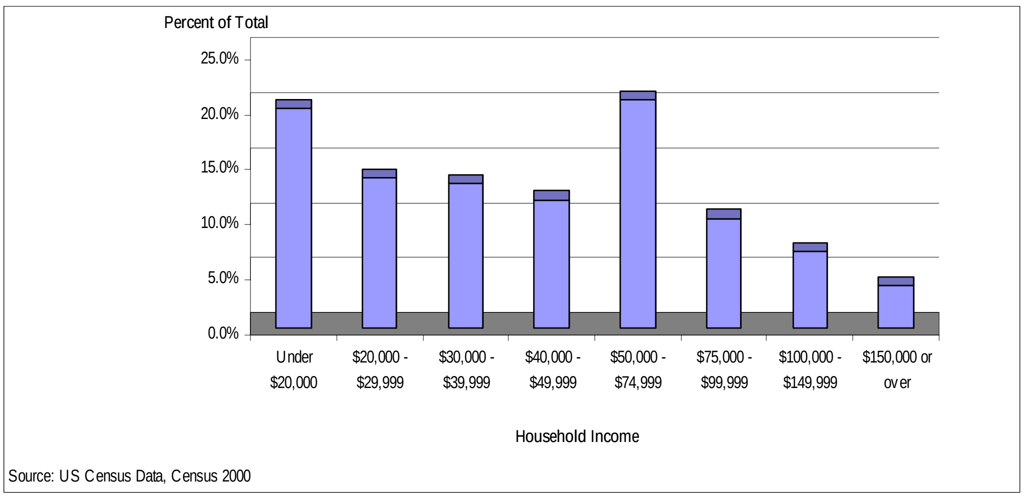
Socio-Economic Characteristics

INCOME

About 22 percent of households in the Jacksonville, FL MSA in 1999 had an income that fell within the $50,000 - $74,999 income bracket and around 20 percent of households had incomes below $20,000. Only 5 percent of households had incomes of $150,000 or over (Figure 25-6).

Household median income in 1999 in the region according to the 2000 US Census was $42,825.10 and per capita income was $21,567.15. The percentage of people under the poverty line in the region was 10.8 in the year 2000. The average household size for 2000 was 2.54.[2]

Figure 25-6. Jacksonville, FL: Distribution of Households by Household Income Level, 1999



EMPLOYMENT

Of the employed civilian population, aged 16 or over, in the Jacksonville, FL MSA in 2000, over 25 percent of females were employed in the educational, health and social services industries and over 20 percent were employed in 'other' industries. 'Other' industries include the arts, recreation, entertainment, food services and information. About 20 percent of males were employed in 'other' industries and around 17% were employed in the wholesale and retail trade industries. Less than 1 percent of males and females were involved in agriculture, mining, fishing, farming or forestry industries (Figure 25-7).

An estimated 4.2 percent of males and 4.9 percent of females were unemployed in the MSA in the year 2000.[3]

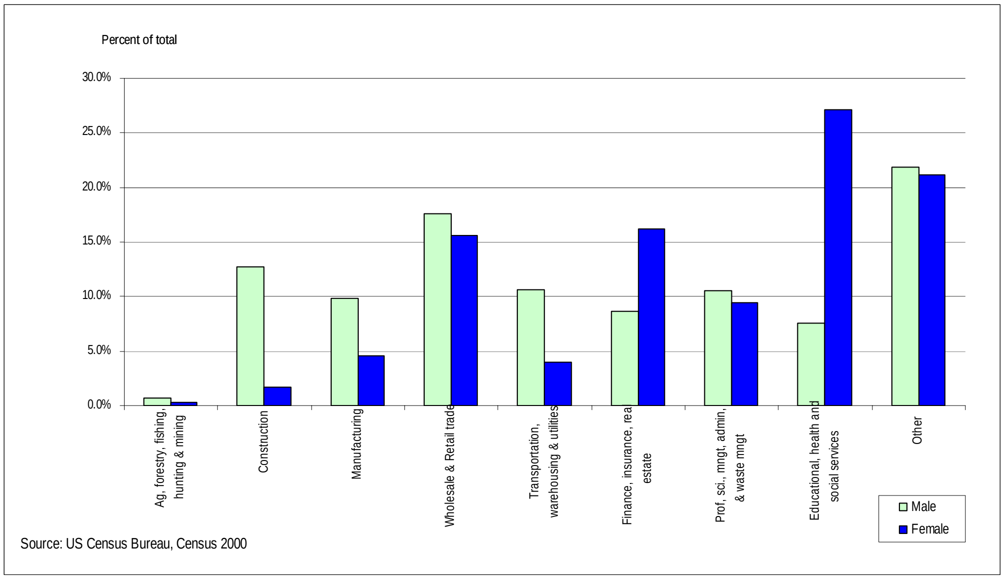
According to the 2000 US Census, an estimated 0.5 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 17.4 percent of males and 5.2 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.7 percent of male's occupations and 0.1 percent of female's occupations.

---

[2] US Census Data, Census 2000.

[3] US Census Data, Census 2000.

Figure 25-7. Jacksonville, FL: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Jacksonville Port Authority (JAXPORT) is a full-service international trade seaport in Northeast Florida. JAXPORT offers multiple cargo terminals and unmatched opportunities for intermodal transportation of container, automobile, bulk, breakbulk and refrigerated cargoes, as well as cruise passenger service.

JAXPORT owns and operates three public marine terminals and one passenger cruise terminal in Jacksonville Florida: the Blount Island Marine Terminal, the Talleyrand Marine Terminal, the Dames Point Marine Terminal, and the temporary JAXPORT Cruise Terminal. JAXPORT develops, manages and markets those publicly-owned facilities to promote the growth of maritime and related industries in Jacksonville Florida and beyond. JAXPORT also offers year-round cruise ship service aboard Carnival Cruise Lines' ship Celebration. The Celebration sails from the JAXPORT Cruise Terminal.

The port of Jacksonville, Florida, has a rich maritime history. Travel back to 1562 and you would see Jean Ribault and his French Huguenots crossing a shallow sand bar into what is now called the St. Johns River. In 1565, English traders sailed into the mouth of the St. Johns and traded guns and ammunition for food and a vessel with the French Huguenots who had settled at Fort Caroline. This transaction was the first recorded act of international waterborne commerce in the New World; hence Jacksonville is known as America's First Port.

In 1963, Florida Legislature created the Jacksonville Port Authority. The City transferred to the JPA the Talleyrand Municipal Docks near downtown and a tract of land known as Goat Island, later renamed Blount Island. The original Charter granted the Port Authority 1.5 mils of ad valorem taxing authority. The Florida State Legislature amended JPA's Charter, repealing the port's 1.5 mils of ad valorem

authority and capping the annual City's allocation to the port at its present millage value, $800,000. To this day, JAXPORT has no taxing authority.
In 1964, voters approved port improvements and the issuance of a $25 million General Obligation Bond for port improvements. In 1968, as part of the consolidation of the City of Jacksonville and Duval County, the City transferred ownership and management of its airports to the JPA. In addition to its maritime responsibilities, the Port Authority managed operations at Jacksonville International Airport, Craig Airport and Herlong Airport until October 1, 2001, when a separate Jacksonville Airport Authority was created to manage those facilities.

In 1972 JPA sold the eastern half of Blount Island to Offshore Power Systems, Inc. when this company announced plans to build floating nuclear power stations. For a variety of economic reasons, the project never moved forward and the property was sold to Gate Maritime, Inc. In 1978 the U.S. Army Corps of Engineers deepened the St. Johns River from 34 to 38 feet, a depth maintained for more than 20 years. In 1992 JPA facilities handled 5,001,074 tons in fiscal year 1992, the first time the port reached the five million ton mark. In 1998 JPA acquired the final property for its third marine terminal: Dames Point. While JPA owns nearly 600 acres at the site in Northeast Jacksonville, plans call for potentially leaving more than one third of the property in its natural state to protect environmentally sensitive wetlands. In 1999 JPA facilities set a port record by moving 7,524,271 tons of cargo in fiscal year 1999. This marked the ninth consecutive year of tonnage growth at the port. In 2001 Port security becomes paramount, and in the same year, the Florida Legislature repealed the JPA's existing charter and abolished the JPA by enacting Chapter 2001-319, Laws of Florida. Two new authorities were created: the Jacksonville Airport Authority took over control and operations of all aviation facilities formerly controlled by the JPA, and the Jacksonville Seaport Authority (doing business as the Jacksonville Port Authority, or JAXPORT) was created to handle all matters related to the marine operations and facilities formerly controlled by the JPA. The seaport continued to call itself the "Jacksonville Port Authority" or "JAXPORT."

In 2002 JAXPORT completed the first strategic business plan for the new JAXPORT, placing an emphasis on growing the port's business and economic impact for the community. In 2003 U.S. the U.S. Army Corps of Engineers deepened the St. Johns River from 38 to 41 feet. In 2003 Celebrity Cruises and Carnival Cruise Lines both announced plans to begin regular service from Jacksonville - the city's first regular cruise service. JAXPORT built a temporary cruise terminal in only six months. Celebrity kicked off their Jacksonville service with an 11-night cruise to the Caribbean on October 27, 2003 aboard the 1,375-passenger Zenith.

JAXPORT's three marine terminals handled a record-setting 7.6 million tons of cargo in Fiscal Year 2004, including more than 530,000 vehicles - making JAXPORT one of the largest vehicle handling ports in the country.

Blount Island Marine Terminal
Located just nine nautical miles from the Atlantic Ocean, the Blount Island Marine Terminal has 5,280 feet of berthing space on 41 feet of deepwater. Blount Island has an additional 1,350 feet of berthing space on 38 feet of water. This 754-acre terminal is JAXPORT's largest container facility - handling 80 percent of the nearly 700,000 TEUs moved annually through JAXPORT facilities. The terminal dedicates more than 150 acres to container storage, and 240,000 square feet of dockside transit shed to house commodities such as stainless steel, liner board, wood pulp and other cargoes in need of warehousing.

Blount Island also is one of the largest vehicle import-export centers on the East Coast, and the terminal handles recreational boats, tractors, paper, wood pulp, forest products and a variety of general cargoes. The entire terminal is covered under JAXPORT's Foreign Trade Zone No. 64 license and can be activated for qualified users.

To help speed both ships and cargo on their way, JAXPORT deploys nine cranes on the island, including eight container cranes. The efficient movement of cargo is facilitated by the terminal's on-dock rail served directly by CSX Corporation.

Talleyrand Marine Terminal
The Talleyrand Marine Terminal is located 21 miles from the Atlantic Ocean on the St. Johns River. This 173-acre terminal has 38 feet of water along its docks. Talleyrand handles South American and Caribbean containerized cargoes, breakbulk commodities such as steel and paper, imported automobiles, frozen and chilled goods and liquid bulk commodities.

Ocean carriers calling the Talleyrand Marine Terminal offer direct access to world trade lanes for all U.S. bound or originated containerized cargo through Freeport, Bahamas. This efficient transportation link bridges Freeport and major U.S. markets through Jacksonville.

The terminal also offers on-Dock warehousing; JAXPORT Refrigerated Services, an ICS Logistics Company, offers 160,000-square feet of warehouse space which can handle cargo in ambient, cooler or freezer conditions. This facility is located within 75 feet of Talleyrand's vessel berthing area. It offers on-Dock Rail Facilities; it provides direct switching for Norfolk Southern, CSX and Florida East Coast Railroad. Furthermore, the entire terminal is within FTZ #64.

The Talleyrand terminal is serviced by three Class 1 railroads, and is easily reached by I-95 and I-10 leading to U.S. 1 and Jacksonville's 20th Street Expressway. Currently, long-time JAXPORT tenant ICS Logistics is constructing a 553,000-square foot warehouse at the Talleyrand Marine Terminal to store an assortment of cargoes. ICS projects warehouse operations to create 45-60 new full and part-time jobs in Jacksonville, with the potential to create as many as 500 direct and indirect jobs over the course of 30 years. Construction is expected to be complete by the close of 2005. Once built, the new warehouse will give ICS more than 700,000-square feet of warehouse space at Talleyrand.

Dames Point Marine Terminal
The Dames Point Marine Terminal is JAXPORT's newest marine facility. The terminal fronts on the harbor's 41-foot deep channel. Located on more than 585 acres of land owned by JAXPORT, this terminal is only 12 miles from the open sea. Dames Point is one of the few major greenfield sites on the U.S. East coast available for port development.

JAXPORT is currently expanding Dames Point's bulk terminal to 22 acres, and plans call for adding facilities to support new breakbulk cargoes and potentially new container or Ro/Ro operations. JAXPORT is now soliciting new business partnerships with investor/operators for further development of this site.

The JAXPORT Cruise Terminal, located one mile northwest of the Dames Point Marine Terminal, offers service to cruise ships calling Jacksonville. JAXPORT has committed more than $200 million in capital projects over the past decade to improve its three marine terminals and Jacksonville's harbor.

At the Dames Point Marine Terminal, JAXPORT has recently expanded its bulk terminal to 22 acres, and plans call for adding facilities to support new breakbulk cargoes and potentially new container or Ro/Ro operations.[4]

[4] Jacksonville Port Authority website: http://www.jaxport.com/

This page intentionally left blank.

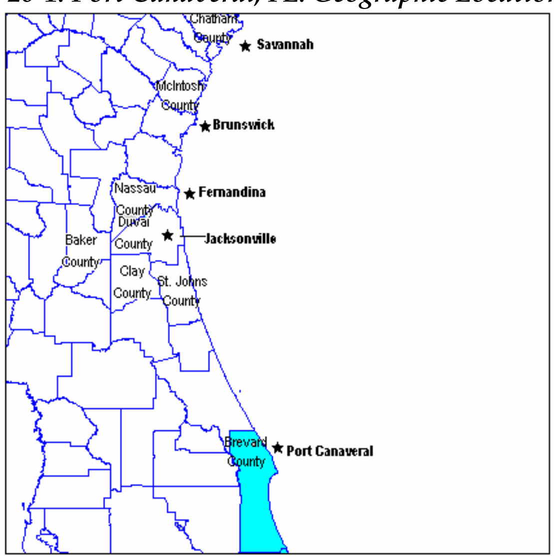
26. Port Canaveral, FL

Location and Background Information

Port Canaveral is located in the Palm Bay-Melbourne-Titusville, Florida Metropolitan Statistical Area (MSA). This MSA is comprised of Brevard County, FL. The port is strategically located on Florida's Central Atlantic Coast and has the necessary intermodal connections to reach all of Florida and the Southeast U.S. In addition, it is an ideal hub between the Southeast U.S., the Caribbean and Central America.

In operation for more than half a century, Port Canaveral has built its reputation as a business-friendly port and a reliable facilitator of breakbulk cargo, with an excellent background in: fresh produce, frozen food, single-strength juice and juice concentrate, milled lumber, bagged cement, steel and newsprint. Efficient handling systems carry cargo from vessels to warehouses. More than three million tons of bulk cargo moves through Port Canaveral per year. The port has cement, petroleum and aggregate facilities, as well as conveyors and hoppers for efficient loading of products directly into trucks. [1]

Figure 26-1. Port Canaveral, FL: Geographic Location, 2000



Source: Table 3-1

Demographics

POPULATION

Brevard County had a total population of 476,230 in the year 2000, according to the 2000 US Census. Of this total, 233, 186 or 49 percent were males and 243,044 or 51 percent were females. The median age in the county in 2000 was 41.4 years, 40.3 for males and 42.6 for females. Over 20 percent of males and females are between the ages of 0 and 17 years. About 15 percent of males and females fall within the 40-49 years age range (Figure 26-2).

[1] Port Canaveral website: http://www.portcanaveral.org

As shown in Figure 26-3, 86.7 percent of the population in Brevard County, FL is white, 8.1 percent of the population is Black or African American. 'Others' (which include American Indians, Alaska natives, Hawaiian natives, Pacific Islanders, and 2 or more races alone), represent 3.7 percent of the population and the Asian population represents only 1.5 percent of the total population. About 4.6 percent of the total population is considered to be of Hispanic or Latino origin.[2]

Figure 26-2. Port Canaveral, FL: Structure of the Population by Age Group, 2000

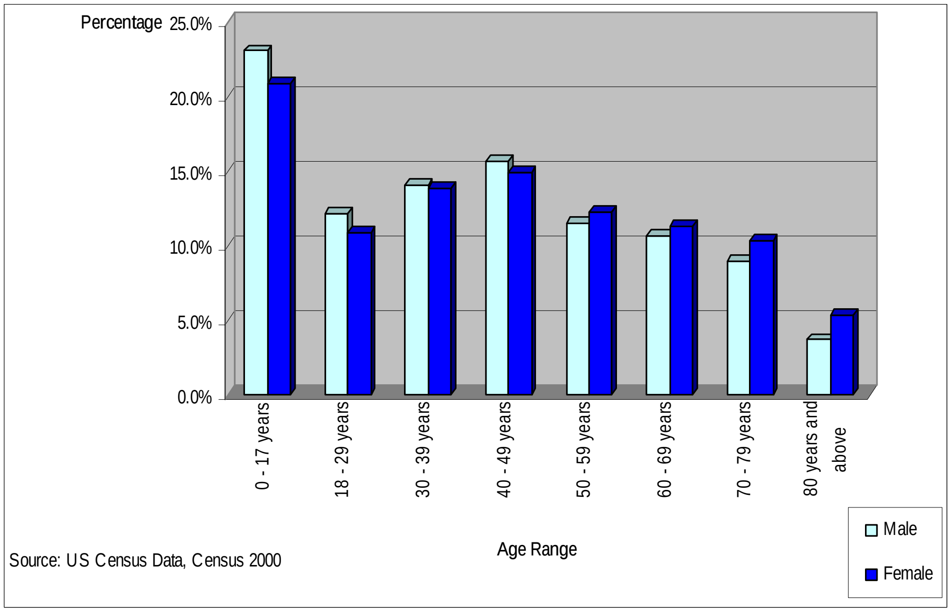
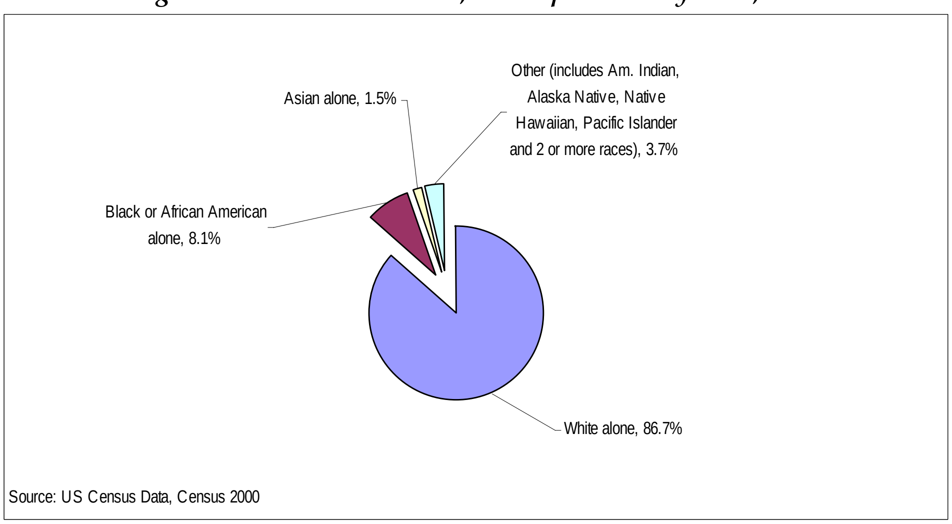


Figure 26-3. Port Canaveral, FL: Population by Race, 2000

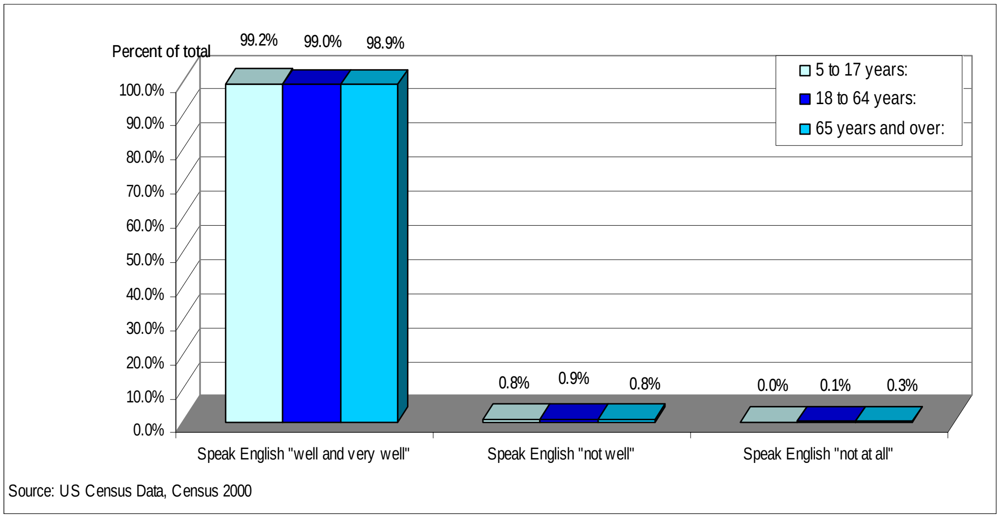


---

[2] US Census Data, Census 2000.

It is evident from the data specified in Figure 26-4 that most of the population in all age ranges in the area dominates the English language 'well' and 'very well'.

Figure 26-4. Port Canaveral, FL: Ability to Speak English by Age Group, 2000

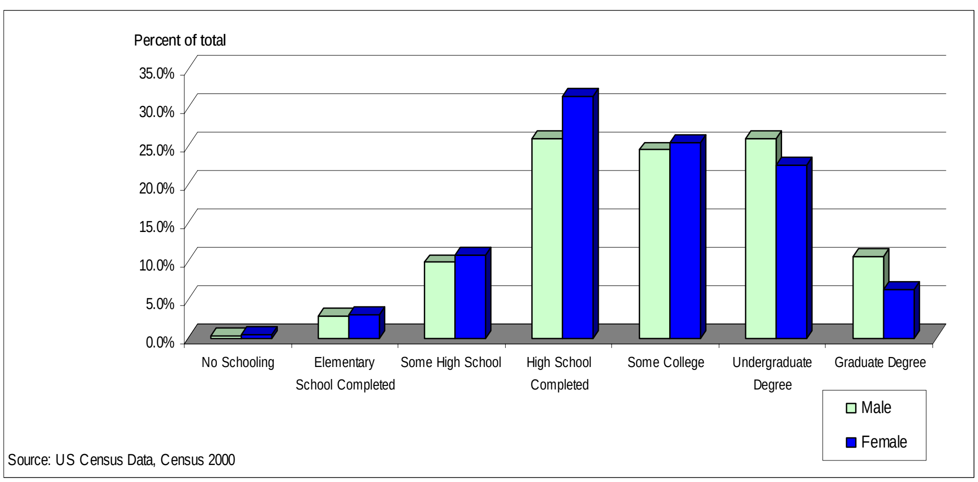


EDUCATION

Of the population in Brevard County, FL, ages 25 or over, 30 percent of females and 25 percent of males have completed high school. About 25 percent of the population has finished some college, and about 21 percent of females and 25 percent of males have obtained an undergraduate degree (Figure 26-5).

There are only two higher education institutions in the area: Brevard Community College and the Florida Institute of Technology.

Figure 26-5. Port Canaveral, FL Educational Attainment of Population by Sex Ages 25 and Over, 2000



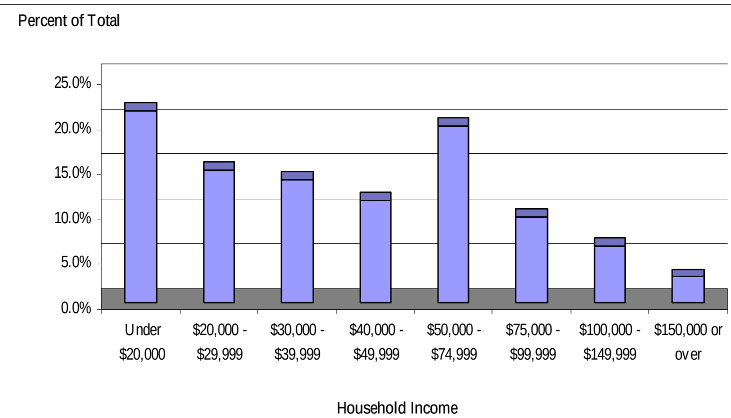
Socio-Economic Characteristics

INCOME

About 23 percent of all households in the county had an income of under $20,000 in 1999, and over 20 percent of households fell within the $50,000 - $74,999 income bracket. Less than 3 percent of households had incomes of $150,000 or above (Figure 26-6).

Household median income in the region in 1999 was $40,099 and per capita income for the same year was $21,484. The percentage of people under the poverty line in the region was 9.5 in the year 2000. The average household size in 2000 was 2.35.[3]

Figure 26-6. Port Canaveral, FL: Distribution of Households by Household Income Level, 1999



Source: US Census Data, Census 2000

EMPLOYMENT

As shown in Figure 26-7, of the employed civilian population in Brevard County, FL, ages 16 or over, around 29 percent of females are employed in the educational, health and social services industry. This percentage is closely followed by females employed in 'other' industries (25 percent), which include the arts, recreation, entertainment, food services and information. About 25 percent of males are employed in 'other' industries, 17 percent of them are employed in the manufacturing industry and 15 percent are employed in the wholesale and retail trade industry.

An estimated 4.8 percent of males and 5.0 percent of females were unemployed in the region in the year 2000.[4]

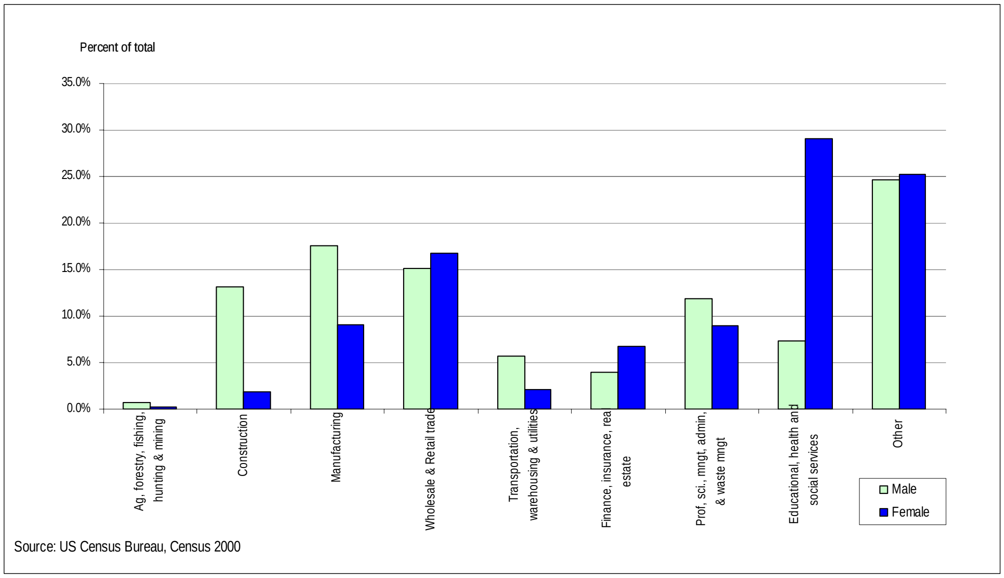
According to the 2000 US Census, an estimated 0.5 percent of males and 0.1 percent of females are employed in farming, fishing and forestry occupations. About 14.8 percent of males and 6.2 percent of females are employed in production, transportation and material moving occupations. The aforementioned occupations include rail, water and other transportation occupations. Rail, water and other transportation occupations represent only 0.6 percent of male's occupations and 0.1 percent of female's occupations.

---

[3] US Census Data, Census 2000.

[4] US Census Data, Census 2000.

Figure 26-7. Port Canaveral: Employed Civilian Population by Sex and Industry 16 Years and Over, 2000



MARITIME INFORMATION

The Canaveral Port Authority is an independent governmental agency created by the Florida Legislature. The Canaveral Harbor Port District was created by House Bill 1136, Chapter 28922, from the Laws of Florida Special Acts of 1953. It established a port district in the central and north areas of Brevard County, Florida, and designated the area as the Canaveral Port District. As an independent governing body, the Canaveral Port Authority can levy ad valorem taxes, incur indebtedness through the sale of bonds, establish Federal Maritime Commission -regulated tariff rates and negotiate for government grants. Five elected commissioners representing the five port regions are the governing body of Port Canaveral and have jurisdiction over all fiscal and regulatory policies and operations of the Port.

For the past 50 years, Port Canaveral has been offering cargo services in Florida. It handles a variety of cargoes on an ongoing basis: cement, petroleum, aggregate, fresh produce and other perishables, frozen food, single-strength juice and juice concentrate, milled lumber, steel, newsprint, and special project cargo. In addition, the port has the facilities for handling containerized cargoes. The port has 24-hour cargo terminals, a south Intermodal Gate to provide faster truck throughput at the south cargo piers, with a fiber optic weighing and tracking system for breakbulk cargo.

Each cargo berth pier is 400 feet with a 50-foot apron. The **North Cargo Piers 1 and 2 (continuous)** have 1,260 feet of docking space extending north/south with–38‘9” MLW draft, with a 66-foot apron. Vessel length is unlimited. North Cargo Pier 3 has 800 feet of docking space extending east/west with–32′ MLW draft. Vessel length is unlimited. North Cargo Pier 4 has 800 feet of docking space extending east/west withÐ36′ MLW draft. The pier is equipped with a cement unloader and with pipes for self unloading of cement ships. Vessel length is unlimited but not to extend more than 140 feet to west of pier face.

South Cargo Piers 1, 2 and 3 (continuous) have 1,616 feet of docking space with Ð34′ 10” MLW draft. South Cargo Pier 3 is equipped with petroleum manifolds for five products. Vessel length is unlimited. Tanker Berth 1 has 900 feet of docking space with Ð39′ 6” MLW draft. It is equipped for five petroleum products and bulk cement self unloaders. Vessel length is unlimited but not to extend more than 140 feet to west of pier face. South Cargo Pier 4 has 800 feet of docking space with Ð39′ 6″ MLW draft with a 50-foot apron. It is equipped with four load arms for loading and discharging number 6 oil to and from shore-side facilities. South Cargo Pier 5 has 800 feet of docking space with Ð39′ 6″ MLW draft, it also has 400 feet of pier space with a 50-foot apron.

The port features nearly 14 acres of covered warehouse storage facilities, as well as dry warehouse and temperature/humidity-controlled areas. It also provides special storage facilities for: cement and petroleum; and 120,000 square feet of general purpose foreign trade zone warehousing.

Private terminal and warehouse operators at the port include:

Mid-Florida Freezer Warehouses, Ltd: boasts the largest, privately held, vessel-side freezer/chill facility in the South, with 8.6 million cubic feet. Mid Florida Freezer also operates more than 400,000 square feet of dry vessel-side cargo warehouses.

Ambassador Services, Inc: offers ship agency, cruise ship stevedoring, logistics, equipment fabrication, rail terminal operations, receiving and processing building products for distribution and warehouse operations, are but a sampling of their many areas of expertise.

The Foreign Trade Zone Group, Inc: operating an expanding FTZ climate-controlled warehouse, The Foreign Trade Zone Group offers computerized inventory systems management services, record storage and value added distribution services. CBP house broker and freight forwarders are available on site.

Integrated Distributions Services, Inc: climate-controlled FTZ warehouse. Offers general warehousing and record storage with computerized inventory systems management and pick up and delivery services. IDS opened the first Container Freight Station in the port in 1999.

Cruise Terminals:

North Side Terminals
Terminal No. 5 has a 2,000 x 1,200' turning area Cruise, 970 feet of docking space, 565 feet of pier space, 40 feet wide with -35 MLW draft, 63,000 square feet embarkation/baggage handling facility and 1,536 paved parking spaces. Cruise Terminal No. 8 has 1,000 feet of docking space, 50-foot wide -35 feet MLW draft, 70,000 square feet embarkation/baggage handling facility and 1,100 parking spaces. Cruise Terminal No. 9/10 has 1,100 feet of docking space, 700 feet of pier space, 50 feet wide with -35 MLW draft, 80,000 square foot embarkation/baggage handling facility and 2,150 paved parking spaces, including 1,200-vehicle parking garage.

South Side Terminals
These terminals have 2,153 feet of continuous dock with -28 feet MLW draft. Cruise Terminal No. 2 has 8,500 square feet of embarkation space and 17,000 square feet of baggage handling area and 246 paved parking spaces. Cruise Terminal No. 3 has 8,500 square feet of embarkation space and 16,000 square feet of baggage handling area and 662 paved parking spaces. Cruise Terminal No. 4 has 9,200 square feet of embarkation area and 20,000 square feet of baggage handling area and 699 paved parking spaces. Two large- or three medium-length cruise ships can be accommodated at Cruise Terminals 2, 3 and 4 to a total of 2,153 feet.

Port Canaveral is Foreign Trade Zone number 136.[5]

---

[5] Port Canaveral website: http://www.portcanaveral.org

APPENDIX E

U.S. East Coast Ferry Vessels and Routes

Table E-1. Ferry Vessels Operating on U.S. East Coast, 2000

State and Vessel Name	City	State	Type	Typical Speed (Knots)	Length (ft)	Gross Tons
<u>Maine</u>						
Scotia Prince	Portland	ME	RoRo	18	469	11,968
Margaret Chase Smith	Rockland	ME	RoRo	14	152.8	99
Captain Charles Philbrook	Rockland	ME	RoRo	12	127	288
Captain Neal Burgess	Rockland	ME	RoRo	12	127	288
Captain Henry Lee	Rockland	ME	RoRo	12	127	288
Governor Curtis	Rockland	ME	RoRo	12	123.2	303
Machigonne II	Portland	ME	RoRo	9	116.4	88
Everett Libby	Rockland	ME	RoRo	10	104.8	198
North Haven	Rockland	ME	RoRo	10	84.8	143
Bay Mist	Portland	ME	Passenger	9	83.9	95
Maquoit II	Portland	ME	RoRo	9	77.9	97
Balmy Days II	Boothbay Harbor	ME	Passenger	12	64.9	97
Island Romance	Portland	ME	Passenger	9	64.7	78
Elizabeth Ann	Port Clyde	ME	Passenger	10.5	64	48
Island Holiday	Portland	ME	Passenger	9	59.9	84
Laura B.	Port Clyde	ME	Passenger	9	58.1	46
Hardy III	New Harbor	ME	Passenger	11	56	66
Islander	Chebeague Island	ME	Passenger	7.5	52	46
Miss Lizzie	Stonington	ME	Passenger	n.a.	49	20
Novelty	Boothbay Harbor	ME	Passenger	9	46.7	38
Big Squaw	Chebeague Island	ME	Passenger	7.5	46	33
Sea Queen	Cranberry Isles	ME	Passenger	9	44	26
Mink	Stonington	ME	Passenger	n.a.	41.7	34
<u>New Hampshire</u>						
M.V. Thomas Laighton	Portsmouth	NH	Passenger	n.a.	83.4	59
M.V. Oceanic	Portsmouth	NH	Passenger	n.a.	70.59	95
<u>Massachusetts</u>						
Governor	Woods Hole	MA	RoRo	12	242	678
Martha's Vineyard	Woods Hole	MA	RoRo	13	224.1	1,297
Eagle	Woods Hole	MA	RoRo	12	219.5	276
Nantucket	Woods Hole	MA	RoRo	12	219.5	1,152
Gay Head	Woods Hole	MA	RoRo	13	218.3	99
Katama	Woods Hole	MA	RoRo	13	215.8	99
Islander	Woods Hole	MA	RoRo	10.5	191.7	855
Sankaty	Woods Hole	MA	RoRo	13	180.3	351
Provincetown II	Boston	MA	Passenger	16	176.8	96
Great Point	Hyannis	MA	Passenger	16	169.5	71
Flying Cloud	Woods Hole	MA	Passenger	36	134.5	99
Schamonchi	New Bedford	MA	Passenger	14	129.8	91
Brant Point	Hyannis	MA	Passenger	12	112.4	97
Grey Lady II	Hyannis	MA	Passenger	30	106	74
Eugina Louise	Boston	MA	Passenger	18	105.8	97
Cross Rip	Hyannis	MA	Passenger	11	103.8	97
Point Gammon	Hyannis	MA	Passenger	11	103	99
Island Queen	Falmouth	MA	Passenger	14	101.3	99
James J. Doherty	Boston	MA	Passenger	18	100.7	98
Laura	Boston	MA	Passenger	18	100.7	98
Lulu E	Boston	MA	Passenger	18	100.7	98
Matthew J. Hughes	Boston	MA	Passenger	18	100.7	98
Chimera	Plymouth	MA	Passenger	19	100	97
Bay State	Boston	MA	Passenger	11	97.8	98
Fort Independence	Boston	MA	Passenger	10	89.9	98
Capt. Red	Newburyport	MA	Passenger	25	88.8	94
Massachusetts	Boston	MA	Passenger	20	87.6	99
Capt. John & Son IV	Plymouth	MA	Passenger	19	85.9	96
Frederick L. Nolan, Jr.	Boston	MA	Passenger	10	82.9	98

State and Vessel Name	City	State	Type	Typical Speed (Knots)	Length (ft)	Gross Tons
East Chop	Hyannis	MA	Passenger	10	79.9	99
Capt. John & Son	Plymouth	MA	Passenger	17	76.9	79
Capt. John & Son II	Plymouth	MA	Passenger	17	76.59	76
Capt. John & Son III	Plymouth	MA	Passenger	17	76.59	78
Flying Cloud	Quincy	MA	Passenger	30	75.8	45
Lightning	Quincy	MA	Passenger	30	75.8	45
Yankee Freedom	Gloucester	MA	Passenger	18	72.2	94
Native Son	Boston	MA	Passenger	10	65	93
Freedom	Harwich Port	MA	Passenger	20	62.4	67
Alert II	New Bedford	MA	Passenger	n.a.	61.6	66
Anna	Boston	MA	Passenger	20	61.3	56
On Time III	Edgartown	MA	RoRo	4	60.2	26
Edward Rowe Snow	Boston	MA	Passenger	10	58.6	59
Bostonian II	Boston	MA	Passenger	10	56.6	49
On Time II	Edgartown	MA	RoRo	4	52.5	28
Patriot Too	Falmouth	MA	Passenger	9	47	35
Betty Joe Tyler	Boston	MA	Passenger	10	46.1	33
Quickwater	Falmouth	MA	Passenger	15	45	28
Breeds Hill	Boston	MA	Passenger	10	40.9	22
Bunker Hill	Boston	MA	Passenger	10	40.9	22
Minuteman	Falmouth	MA	Passenger	14	40	19
Alison	Boston	MA	Passenger	10	39.29	32
Rhode Island						
Prudence Ferry	Bristol	RI	Passenger	n.a.	91.9	78
Prudence Ferry	Bristol	RI	RoRo	n.a.	61.5	94
Connecticut						
Cape Henlopen	New London	CT	RoRo	11	307.6	1,492
Susan Anne	New London	CT	RoRo	15	237.6	1,348
John H.	New London	CT	RoRo	13	229.7	96
New London	New London	CT	RoRo	13	198.9	94
Block Island	New London	CT	RoRo	12.5	187.3	98
Carol Jean	New London	CT	RoRo	12.5	167.4	88
North Star	New London	CT	RoRo	10	157.9	238
Sassacus	New London	CT	Passenger	45	137.8	95
Tatobam	New London	CT	Passenger	45	137.8	318
Nelseco	New London	CT	RoRo	12.5	124.5	89
Caribbean	New London	CT	RoRo	10	116	94
Sea Jet I	New London	CT	Passenger	28	109.6	99
Shuttle VI	New London	CT	Passenger	15	99.3	98
Zelinsky	Danbury	CT	Passenger	28	84.6	96
Selden III	Newington	CT	RoRo	6	64.8	87
Hollister III	Newington	CT	RoRo	4	64	29
Cumberland	Newington	CT	RoRo	4	28.4	10
New York						
Railcar Float #29	Brooklyn	NY	Rail	4	360	n.a.
Railcar Float #30	Brooklyn	NY	Rail	4	360	n.a.
Samuel I. Newhouse	Staten Island	NY	Passenger	16	310	3,335
Andrew J. Barberi	Staten Island	NY	Passenger	16	310	3,335
P.T. Barnum	Port Jefferson	NY	RoRo	18	290.3	1,595
Railcar Float #16	Brooklyn	NY	Rail	4	290	n.a.
Railcar Float #17	Brooklyn	NY	Rail	4	290	n.a.
The Gov. Herbert H. Lehman	Staten Island	NY	RoRo	16	277	2,109
American Legion	Staten Island	NY	RoRo	16	277	2,109
John F. Kennedy	Staten Island	NY	RoRo	16	277	2,109
Park City	Port Jefferson	NY	RoRo	15	261.2	1,129
Grand Republic	Port Jefferson	NY	RoRo	14.5	260.7	1,237
John A. Noble	Staten Island	NY	Passenger	16	207	499
Alice Austen	Staten Island	NY	Passenger	16	207	499
Anna C.	Orient Point	NY	RoRo	15	179.7	98

State and Vessel Name	City	State	Type	Typical Speed (Knots)	Length (ft)	Gross Tons
Race Point	Fishers Island	NY	RoRo	11	162	87
Miss Circle Line	New York	NY	Passenger	n.a.	139.69	369
Circle Line XIV	New York	NY	Passenger	n.a.	123.2	580
Miss Ellis Island	New York	NY	Passenger	n.a.	122.9	93
Miss New Jersey	New York	NY	Passenger	n.a.	122.9	93
Miss New York	New York	NY	Passenger	n.a.	122.9	94
Miss Freedom	New York	NY	Passenger	n.a.	121.6	98
Miss Liberty	New York	NY	Passenger	n.a.	121.5	98
Miss Gateway	New York	NY	Passenger	n.a.	120.9	95
Viking Starship	Montauk	NY	Passenger	12	117.4	98
Munnatawket	Fishers Island	NY	RoRo	10.5	115.5	95
Viking Starliner	Montauk	NY	Passenger	11	97.8	99
Southern Cross	Shelter Island	NY	RoRo	8	90.4	72
Viking Star	Montauk	NY	Passenger	11	88.2	87
Greenport	Shelter Island Heights	NY	RoRo	7	84.7	95
New Prospect	Shelter Island Heights	NY	RoRo	7	84.7	95
Firebird	Bay Shore	NY	Passenger	19	81.8	72
Shelter Island	Shelter Island Heights	NY	RoRo	7	81.3	90
Islander	Shelter Island Heights	NY	RoRo	7	81.2	90
Voyager	Bay Shore	NY	Passenger	19	79.09	62
Explorer	Bay Shore	NY	Passenger	19	79.09	62
South Bay Clipper	Sayville	NY	Passenger	20	76.8	63
Kiki	Patchogue	NY	Passenger	18	75	68
Fire Island Clipper	Sayville	NY	Passenger	20	73.4	71
Vagabond	Bay Shore	NY	Passenger	9	71.59	73
Capt. Patterson	Bay Shore	NY	Passenger	18	70.7	58
Fire Island Miss	Bay Shore	NY	Passenger	18	70.7	58
Traveler	Bay Shore	NY	Passenger	18	70.7	58
Fireball	Bay Shore	NY	Passenger	18	70.59	56
Pathfinder II	Patchogue	NY	Passenger	18	65.3	99
Quaiapen	Patchogue	NY	Passenger	16	63.7	87
Fire Island Belle	Bay Shore	NY	Passenger	17	62.4	59
Fire Island Duchess	Sayville	NY	Passenger	15	62.3	77
Zee Whiz	Bay Shore	NY	Passenger	18	62.3	73
Zee Lion	Bay Shore	NY	Passenger	17	62	79
Beach Comber IV	Sayville	NY	Passenger	1	61.3	9
Fire Island Empress	Sayville	NY	Passenger	15	61.2	63
Fire Island Trader	Bay Shore	NY	Passenger	9	60.8	33
Michael Cosgrove	Staten Island	NY	Passenger	8	60.75	139
Point O'Woods VI	Long Island	NY	Passenger	n.a.	60.4	70
Stranger	Bay Shore	NY	Passenger	17	60.1	65
Highlander	Patchogue	NY	Passenger	18	58.3	13
North Haven	Shelter Island	NY	RoRo	6	58.2	97
South Ferry II	Shelter Island	NY	RoRo	8	57.5	95
Capt. Ed Cartwright	Shelter Island	NY	RoRo	7	54.2	99
Roamer II	Sayville	NY	Passenger	15	51.5	14
Merrimac II	Sayville	NY	Passenger	15	51.2	38
Monitor II	Sayville	NY	Passenger	15	49	38
Mehsomac	Patchogue	NY	Passenger	18	40.79	35
Bemus Point - Stow Ferry	Mayville	NY	RoRo	n.a.	n.a.	n.a.
New Jersey						
currently unnamed	Highlands	NJ	Passenger	42	125	90
Bravest	Highlands	NJ	Passenger	34	114.1	93
City Express	Little Falls	NJ	Passenger	20	100	98
Port Imperial New Jersey	Weehawken	NJ	Passenger	n.a.	94.6	96
Empire State	Weehawken	NJ	Passenger	n.a.	92	95
Garden State	Weehawken	NJ	Passenger	n.a.	92	95
Henry Hudson	Weehawken	NJ	Passenger	n.a.	92	95
Robert Fulton	Weehawken	NJ	Passenger	n.a.	92	95
Abraham Lincoln	Weehawken	NJ	Passenger	n.a.	87.3	95
Alexander Hamilton	Weehawken	NJ	Passenger	n.a.	87.3	95

State and Vessel Name	City	State	Type	Typical Speed (Knots)	Length (ft)	Gross Tons
George Washington	Weehawken	NJ	Passenger	n.a.	87.3	95
Thomas Jefferson	Weehawken	NJ	Passenger	n.a.	87.3	95
Port Imperial Manhattan	Weehawken	NJ	Passenger	n.a.	87.2	94
Express I	Little Falls	NJ	Passenger	30	77.7	90
Express II	Little Falls	NJ	Passenger	30	77.7	90
Port Imperial	Weehawken	NJ	Passenger	n.a.	76.8	69
Yogi Berra	Weehawken	NJ	Passenger	n.a.	n.a.	n.a.
LaGuardia	Weehawken	NJ	Passenger	n.a.	n.a.	n.a.
Christopher Columbus	Weehawken	NJ	Passenger	n.a.	n.a.	n.a.
Frank Sinatra	Weehawken	NJ	Passenger	n.a.	n.a.	n.a.
Pennsylvania						
Riverlink	Philadelphia	PA	Passenger	n.a.	90.8	98
Frederick	Uniontown	PA	RoRo	n.a.	64	35
Roaring Bull V	Millersburg	PA	RoRo	n.a.	n.a.	n.a.
Delaware						
Twin Capes	Wilmington	DE	RoRo	12.5	301.2	2,262
Cape May	Wilmington	DE	RoRo	12.5	299.2	2,165
Cape Henlopen	Wilmington	DE	RoRo	12.5	284.89	2,120
Delaware	Wilmington	DE	RoRo	12.5	284	2,108
New Jersey	Wilmington	DE	RoRo	12.5	284	2,108
Whale Watcher	Wilmington	DE	Passenger	31	106.4	99
American River	Wilmington	DE	Passenger	21	95.9	96
Virginia C	Georgetown	DE	RoRo	3	64.9	35
Delafort	Wilmington	DE	Passenger	10	55	39
Lady Christina	Wilmington	DE	Passenger	8	47	5
Maryland						
General Jubal A. Early	Dickerson	MD	RoRo	n.a.	84	68
Steven Thomas	Crisfield	MD	Passenger	9	78.3	99
Talbot	Royal Oak	MD	RoRo	7.5	64.5	43
Capt. Tyler	Ewell	MD	Passenger	12	64	84
Whitehaven Ferry	Salisbury	MD	RoRo	4	60	21
Chelsea Lane Tyler	Ewell	MD	Passenger	14	60	42
Upper Ferry	Salisbury	MD	RoRo	4	50	n.a.
Island Belle II	Ewell	MD	Passenger	n.a.	38.1	21
Capt. Jason	Tylerton	MD	Passenger	n.a.	38.1	19
Capt. Jason II	Tylerton	MD	Passenger	n.a.	38.1	23
Virginia						
Nandua	Cape Charles	VA	Rail	6	407.6	2,105
Pocahontas	Surry	VA	RoRo	8.5	263.3	1,197
Williamsburg	Surry	VA	RoRo	8.5	200	837
Surry	Surry	VA	RoRo	8.5	189.9	825
Virginia	Surry	VA	RoRo	8.5	152	327
Chesapeake Breeze	Reedville	VA	Passenger	15	95.7	97
Captain Evans	Reedville	VA	Passenger	9	64.7	60
James C. Echols (Elizabeth Ferry I)	Hampton	VA	Passenger	4	60	60
Elizabeth River Ferry II	Hampton	VA	Passenger	4	60	60
Elizabeth River Ferry III	Hampton	VA	Passenger	4	60	60
The Lancaster	Lancaster	VA	RoRo	12	44.25	30
Northumberland	Lottsburg	VA	RoRo	12	44.25	30
Hatton Ferry	Charlottesville	VA	RoRo	0.5	40	20
North Carolina						
Silver Lake	Morehead City	NC	RoRo	10	210.2	736
Pamlico	Morehead City	NC	RoRo	10	210	735
Cedar Island	Morehead City	NC	RoRo	10	207.8	648
Carteret	Morehead City	NC	RoRo	10	207.5	687
Governor Daniel Russell	Morehead City	NC	RoRo	10	172.8	469
Southport	Morehead	NC	RoRo	10	167.7	374

State and Vessel Name	City	State	Type	Typical Speed (Knots)	Length (ft)	Gross Tons
Neuse	Morehead City	NC	RoRo	10	167.7	380
Floyd J. Lupton	Morehead City	NC	RoRo	10	167.7	374
Fort Fisher	Morehead City	NC	RoRo	10	167.7	374
Governor Hyde	Morehead City	NC	RoRo	9	161	574
Baum	Morehead City	NC	RoRo	10	143.6	283
Lupton	Morehead City	NC	RoRo	10	143.6	248
Cape Point	Morehead City	NC	RoRo	10	140.3	276
Chicamacomico	Morehead City	NC	RoRo	10	140.3	276
Frisco	Morehead City	NC	RoRo	10	140.3	275
Kinnakeet	Morehead City	NC	RoRo	10	140.3	280
Ocracoke	Morehead City	NC	RoRo	10	140.1	276
Governor James B. Hunt, Jr.	Morehead City	NC	RoRo	10	125.1	323
Beaufort	Morehead City	NC	RoRo	9	124.1	287
Alpheus W. Drinkwater	Morehead City	NC	RoRo	9	122.4	199
Conrad Wirth	Morehead City	NC	RoRo	9	112.4	199
Herbert C. Bonner	Morehead City	NC	RoRo	9	112.4	199
Sans Souci	Bald Head Island	NC	Passenger	18	72	93
Adventure	Bald Head Island	NC	Passenger	18	64.8	76
Revenge	Bald Head Island	NC	Passenger	18	62.2	67
Capt. Alger	Davis	NC	RoRo	5	51	35
Capt Alex	Bald Head Island	NC	RoRo	6	50	47
Green Grass	Atlantic	NC	RoRo	n.a.	47.8	34
Elwell	Raleigh	NC	RoRo	5	46.9	22
San Souci	Raleigh	NC	RoRo	5	46.2	22
Parker	Raleigh	NC	RoRo	5	46.2	22
Catherine T.	Davis	NC	RoRo	5	40	n.a.
Miss Anne	Davis	NC	RoRo	7	32.2	9
H.I.F.C. I	Harkers Island	NC	Passenger	20	24	2
Last Cast	Harkers Island	NC	Passenger	25	20	1
South Carolina						
Daufuskie Clipper I	Hilton Head Island	SC	Passenger	n.a.	58	48
Haig Point I	Hilton Head Island	SC	Passenger	19	55.25	40
Haig Point II	Hilton Head Island	SC	Passenger	19	55.2	39
Daufuskie Clipper IV	Hilton Head Island	SC	Passenger	n.a.	54	20
Daufuskie Clipper II	Hilton Head Island	SC	Passenger	n.a.	48.9	38
Daufuskie Clipper III	Hilton Head Island	SC	Passenger	n.a.	48.9	38
South Island	Columbia	SC	RoRo	2	46	23
Haig Point Pelican	Hilton Head Island	SC	Passenger	22	46	28
Haig Point Osprey	Hilton Head Island	SC	Passenger	22	45	28
Haig Point III	Hilton Head Island	SC	Passenger	16	35.79	22
Georgia						
Cumberland Princess	St. Marys	GA	Passenger	10	65	50
Annemarie	Sapelo Island	GA	Passenger	12	64.8	61
Cumberland Queen	St. Marys	GA	Passenger	10	64.3	55
Sapelo Queen	Sapelo	GA	Passenger	12	60	82
Florida						
Blackbeard	Jacksonville	FL	RoRo	6	170.3	537
Jean Ribault	Jacksonville	FL	RoRo	6	153.6	497
Drayton Island Ferry	Palatka	FL	RoRo	n.a.	48	n.a.
Ruby B.	Carrabelle	FL	Passenger	7	38	14
Fort Gates Ferry	Crescent City	FL	RoRo	3	36	n.a.
Fort Gates Ferry	Crescent City	FL	RoRo	3	n.a.	n.a.

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, National Ferry Database

Table E-2. Ferry Routes Operating on U.S. East Coast, 2000

State and Route	Metro Area	Waterbody Crossed	Type	Data Year	Passengers	Vehicles	Season Start	Season End
<u>Maine</u>								
Yarmouth (NS) - Bar Harbor (ME)	Bar Harbor	Gulf of Maine	Passenger	1998	223,000	61,000	6/1/2000	10/22/2000
Yarmouth (NS) - Portland (ME)	Portland	Bay of Fundy	Passenger	1999	160,000	30,000	5/1/2000	10/26/2000
Bass Harbor (ME) - Frenchboro (ME)	Bangor	Blue Hill Bay	Passenger	1999	3,539	1,514	Year-round	
Bass Harbor (ME) - Swans Island (ME)	Bangor	Blue Hill Bay	Passenger	1999	68,849	32,112	Year-round	
Boothbay Harbor (ME) - Monhegan Island (ME)	Portland	Coastal Atlantic Ocean	RoRo	1999	10,810	n.a.	5/27/2000	10/9/2000
Boothbay Harbor (ME) - Squirrel Island (ME)	Portland	Boothbay Harbor	RoRo	1999	17,193	n.a.	3/1/2000	11/30/2000
Lincolnville (ME) - Islesboro (ME)	Bangor	Penobscot Bay	Passenger	1999	191,360	91,954	Year-round	
Northeast Harbor (ME) - Islesford, Little Cranberry Island (ME)	Bangor	Coastal Atlantic Ocean	RoRo	1999	29,011	n.a.	Year-round	
Cousins Island (ME) - Chebeague Island, Stone Wharf (ME)	Portland	Casco Bay	Passenger	1999	118,000	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Bailey Island (ME)	Portland	Casco Bay	RoRo	1999	8,664	n.a.	6/30/2000	9/4/2000
Portland, Casco Bay Ferry Terminal (ME) - Chebeague Island, Chandler Cove Landing (ME)	Portland	Casco Bay	RoRo	1999	11,546	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Cliff Island (ME)	Portland	Casco Bay	RoRo	1999	27,764	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Diamond Cove, Great Diamond Island (ME)	Portland	Casco Bay	RoRo	1999	64,596	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Little Diamond Island (ME)	Portland	Casco Bay	RoRo	1999	16,590	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Great Diamond Island (ME)	Portland	Casco Bay	RoRo	1999	35,941	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Long Island (ME)	Portland	Casco Bay	RoRo	1999	103,794	n.a.	Year-round	
Portland, Casco Bay Ferry Terminal (ME) - Peaks Island (ME)	Portland	Casco Bay	Passenger	1999	659,699	17,000	Year-round	
Stonington (ME) - Duck Harbor, Isle Au Haut (ME)	Stonington	Isle Au Haut Bay	RoRo	n.a.	n.a.	n.a.	6/12/2000	9/9/2000
Stonington (ME) - Isle Au Haut (ME)	Stonington	East Penobscot Bay	RoRo	n.a.	n.a.	n.a.	4/3/2000	10/14/2000
Port Clyde (ME) - Monhegan Island (ME)	Portland	Coastal Atlantic Ocean	RoRo	1999	15,000	n.a.	Year-round	
New Harbor (ME) - Monhegan Island (ME)	Portland	Muscongus Bay	RoRo	n.a.	n.a.	n.a.	5/15/2000	10/15/2000
Rockland (ME) - Matinicus Island (ME)	Portland	Penobscot Bay	Passenger	1999	653	221	Year-round	
Rockland (ME) - North Haven (ME)	Portland	Penobscot Bay	Passenger	1999	54,163	19,788	Year-round	
Rockland (ME) - Vinalhaven (ME)	Portland	Penobscot Bay	Passenger	1999	138,916	38,755	Year-round	
<u>New Hampshire</u>								
Portsmouth (NH) - Star Island, Gosport Harbor (NH)	Portsmouth	Coastal Atlantic Ocean	RoRo	n.a.	n.a.	n.a.	6/15/2000	9/30/2000
<u>Massachussetts</u>								
World Trade Center, Boston (MA) - Provincetown (MA) (high speed service)	Boston	Masschusetts Bay	RoRo	1999	16,000	n.a.	5/20/2000	10/15/2000
Rowes Wharf, Boston (MA) - Logan Airport, East Boston, Boston (MA)	Boston	Boston Harbor	RoRo	1999	122,411	n.a.	Year-round	
Long Wharf, Boston (MA) - Provincetown (MA)	Boston	Massachusetts Bay	RoRo	2000	20,000	n.a.	5/5/2000	10/9/2000
Charlestown Navy Yard, Charlestown, Boston (MA) - Lovejoy Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	18,331	n.a.	Year-round	
Long Wharf, Boston (MA) - Georges Island, Boston (MA)	Boston	Boston Harbor	RoRo	1999	87,320	n.a.	4/29/2000	10/9/2000
Hingham, Hingham Shipyard (MA) - Georges Island, Boston (MA)	Boston	Boston Harbor	RoRo	1999	15,340	n.a.	4/29/2000	10/9/2000
Hingham, Hingham Shipyard (MA) - Rowes Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	90,000	n.a.	Year-round	
Hingham, Hingham Shipyard (MA) - Rowes Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	829,866	n.a.	Year-round	
Salem, Blaney St. ferry landing (MA) - Georges Island, Boston (MA)	Boston	Boston Harbor	RoRo	1999	15,340	n.a.	5/20/2000	10/31/2000
Fore River, Quincy (MA) - Logan Airport, East Boston (MA)	Boston	Boston Harbor	RoRo	1999	110,000	n.a.	Year-round	
Logan Airport, East Boston, Boston (MA) - Long Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	7,260	n.a.	Year-round	
Pemberton Point, Hull (MA) - Long Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	22,000	n.a.	Year-round	
Falmouth, Falmouth Harbor (MA) - Oak Bluffs, Marthas Vineyard (MA)	Boston	Vineyard Sound	RoRo	1999	287,000	n.a.	5/26/2000	10/9/2000
Falmouth Harbor, Falmouth (MA) - Oak Bluffs, Marthas Vineyard (MA)	Boston	Vineyard Sound	RoRo	1999	25,000	n.a.	Year-round	
Edgartown, Memorial Wharf (MA) - Chappaquiddick (MA)	Boston	Edgartown Harbor	Passenger	1998	355,691	202,207	Year-round	
Long Wharf, Boston (MA) - Charlestown Navy Yard, Charlestown, Boston (MA)	Boston	Boston Harbor	RoRo	1999	383,736	n.a.	Year-round	
Lovejoy Wharf, Boston (MA) - US Federal Courthouse, Fan Pier, Boston (MA)	Boston	Boston Harbor	RoRo	1999	30,984	n.a.	Year-round	
US Federal Courthouse, Fan Pier, Boston (MA) - World Trade Center, Boston (MA)	Boston	Boston Harbor	RoRo	n.a.	n.a.	n.a.	Year-round	

State and Route	Metro Area	Waterbody Crossed	Type	Data Year	Passengers	Vehicles	Season Start	Season End
World Trade Center, Boston (MA) - Lovejoy Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	n.a.	n.a.	n.a.	Year-round	
Hyannis (MA) - Nantucket (MA)	Boston	Nantucket Sound	RoRo	1999	235,000	n.a.	Year-round	
Hyannis (MA) - Nantucket (MA)	Boston	Nantucket Sound	RoRo	1999	137,396	n.a.	Year-round	
Hyannis (MA) - Nantucket (MA)	Boston	Nantucket Sound	Passenger	1999	435,000	122,600	Year-round	
Hyannis (MA) - Nantucket (MA)	Boston	Nantucket Sound	RoRo	1999	206,176	n.a.	5/8/2000	10/28/2000
Hyannis (MA) - Oak Bluffs, Marthas Vineyard (MA)	Boston	Nantucket Sound	RoRo	1999	154,135	n.a.	5/8/2000	10/28/2000
Harwich Port, Saquatucket Harbor (MA) - Nantucket (MA)	Boston	Nantucket Sound	RoRo	1999	32,000	n.a.	5/15/2000	10/14/2000
World Trade Center, Boston (MA) - Provincetown (MA) (conventional service)	Boston	Massachusetts Bay	RoRo	1999	28,000	n.a.	6/21/2000	9/6/2000
Falmouth Harbor, Falmouth (MA) - Cuttyhunk (MA)	Boston	Vineyard Sound and Buzzarc	RoRo	1999	1,000	n.a.	7/1/2000	8/31/2000
Plymouth (MA) - Provincetown (MA)	Boston	Massachusetts Bay	RoRo	1999	10,000	n.a.	5/20/2000	10/13/2000
Woods Hole (MA) - Oak Bluffs, Marthas Vineyard (MA)	Boston	Vineyard Sound	Passenger	1999	300,000	55,000	5/18/2000	10/26/2000
Woods Hole (MA) - Vineyard Haven, Marthas Vineyard (MA)	Boston	Vineyard Sound	Passenger	1999	2,000,000	351,400	Year-round	
Salem, Blaney St. ferry landing (MA) - Long Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	15,000	n.a.	4/1/2000	11/1/2000
Nantucket (MA) - Oak Bluffs, Marthas Vineyard (MA)	Boston	Nantucket Sound	RoRo	1999	24,084	n.a.	6/5/2000	9/17/2000
New Bedford (MA) - Cuttyhunk (MA)	New Bedford	Buzzards Bay	RoRo	n.a.	n.a.	n.a.	Year-round	
New Bedford, Schamonchi Dock (MA) - Vineyard Haven, Marthas Vineyard (MA)	New Bedford	Buzzards Bay	RoRo	n.a.	n.a.	n.a.	5/18/2000	10/9/2000
Fore River, Quincy (MA) - Long Wharf, Boston (MA)	Boston	Boston Harbor	RoRo	1999	250,000	n.a.	Year-round	
New London, Ferry Street (CT) - Vineyard Haven, Marthas Vineyard (MA)	New London	Rhode Island Sound	RoRo	1999	45,000	n.a.	5/15/2000	9/4/2000
Rhode Island								
Bristol (RI) - Hog Island (RI)	Providence	Narragansett Bay	RoRo	n.a.	n.a.	n.a.	Year-round	
Bristol (RI) - Homestead, Prudence Island (RI)	Providence	Narragansett Bay	Passenger	n.a.	n.a.	n.a.	Year-round	
Point Judith (RI) - Block Island, Old Harbor (RI)	Providence	Block Island Sound	Passenger	n.a.	n.a.	n.a.	Year-round	
Montauk (NY) - Vineyard Haven, Marthas Vineyard (MA)	Montauk	Rhode Island Sound; Vineya	RoRo	1999	40	n.a.	8/6/2000	8/8/2000
Providence, Point Street Landing (RI) - Newport, Perrotti Park (RI)	Providence	Narragansett Bay	RoRo	2000	28,500	n.a.	Year-round	
Providence, Point Street Landing (RI) - Portsmouth, Mount Hope Maritime Terminal (RI)	Providence	Narragansett Bay	RoRo	n.a.	n.a.	n.a.	Year-round	
Portsmouth, Mount Hope Maritime Terminal (RI) - Newport, Perrotti Park (RI)	Providence	Narragansett Bay	RoRo	n.a.	n.a.	n.a.	Year-round	
Connecticut								
New London, Ferry Street (CT) - Block Island, Old Harbor (RI)	New London	Block Island Sound	Passenger	n.a.	n.a.	n.a.	6/10/2000	9/10/2000
New London, State Street (CT) - Fishers Island (NY)	Hartford	Fishers Island Sound	Passenger	1999	164,000	47,000	Year-round	
New London, Ferry Street (CT) - Glen Cove (NY)	New York	Long Island Sound	RoRo	n.a.	n.a.	n.a.	Year-round	
New London, Ferry Street (CT) - Orient Point (NY) (conventional RoRo service)	Southold	Long Island Sound	Passenger	1999	919,183	379,885	Year-round	
New London, Ferry Street (CT) - Orient Point (NY) (high speed service)	Southold	Long Island Sound	RoRo	1999	215,000	n.a.	3/31/2000	11/26/2000
New York								
Atlantic Highlands (NJ) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	New York Bay	RoRo	1999	156,000	n.a.	Year-round	
Bay Shore (NY) - Atlantique, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	49,032	n.a.	5/20/2000	9/6/2000
Bay Shore (NY) - Dunewood, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	65,376	n.a.	3/31/2000	10/25/2000
Bay Shore (NY) - Fair Harbor, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	89,892	n.a.	3/1/2000	12/25/2000
Bay Shore (NY) - Kismet, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	89,892	n.a.	4/1/2000	11/1/1931
Bay Shore (NY) - Ocean Bay Park, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	114,409	n.a.	3/1/2000	11/1/1931
Bay Shore (NY) - Ocean Beach, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	167,097	n.a.	Year-round	
Bay Shore (NY) - Point O'Woods, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	15,600	n.a.	4/15/2000	11/1/2000
Bay Shore (NY) - Saltaire, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	101,720	n.a.	Year-round	
Bay Shore (NY) - Seaview, Fire Island (NY)	Islip	Great South Bay	RoRo	1999	122,581	n.a.	3/1/2000	10/31/2000
Bemus Point (NY) - Stow (NY)	Buffalo	Lake Chautauqua	Passenger	1999	2,880	2,400	5/31/2000	9/4/1931
Patchogue, Davis Park Ferry Terminal (NY) - Davis Park, Fire Island (NY)	New York	Great South Bay	RoRo	n.a.	n.a.	n.a.	3/15/2000	12/1/2000
Patchogue, NPS Ferry Terminal (NY) - Watch Hill, Fire Island (NY)	New York	Great South Bay	RoRo	1999	25,815	n.a.	5/15/2000	10/15/2000
E 34th Street Ferry Terminal (NY) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	East River	RoRo	n.a.	n.a.	n.a.	Year-round	
La Guardia Airport, Queens (NY) - E 34th Street Ferry Terminal, Manhattan (NY)	New York	East River	RoRo	1999	56,126	n.a.	Year-round	

State and Route	Metro Area	Waterbody Crossed	Type	Data Year	Passengers	Vehicles	Season Start	Season End
Liberty State Park, Liberty Landing Marina (NJ) - Statue of Liberty (NY)	New York	New York Harbor	RoRo	1999	1,120,108	n.a.	Year-round	
Lincoln Harbor, Weehawken (NJ) - W 38th Street Ferry Terminal, Manhattan (NY)	New York	Hudson River	RoRo	1999	631,677	n.a.	Year-round	
Montauk (NY) - Block Island, New Harbor (RI)	Montauk	Block Island Sound	RoRo	1999	15,000	n.a.	4/15/2000	10/12/2000
Montauk (NY) - New London, Ferry Street (CT)	Montauk	Block Island Sound	RoRo	n.a.	n.a.	n.a.	5/26/2000	9/4/2000
North Haven (NY) - Shelter Island (NY)	New York	Shelter Island Sound	Passenger	1999	1,015,047	602,994	Year-round	
Sayville, Long Island (NY) - Barrett Beach, Fire Island (NY)	New York	Great South Bay	RoRo	1999	340	n.a.	7/1/2000	9/6/2000
Sayville, Long Island (NY) - Cherry Grove, Fire Island (NY)	New York	Great South Bay	RoRo	1999	180,000	n.a.	Year-round	
Sayville, Long Island (NY) - Fire Island Pines, Fire Island (NY)	New York	Great South Bay	RoRo	1999	210,000	n.a.	Year-round	
Sayville, Long Island (NY) - Sailors Haven, Sunken Forest (NY)	New York	Great South Bay	RoRo	1999	60,500	n.a.	5/12/2000	10/31/2000
Sayville, Long Island (NY) - Water Island, Fire Island (NY)	New York	Great South Bay	RoRo	1999	3,000	n.a.	5/12/2000	10/12/2000
Saint George, Staten Island (NY) - South Ferry, Whitehall Ferry Terminal (NY)	New York	New York Harbor	Passenger	1999	19,270,397	367,594	Year-round	
Highlands (NJ) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	New York Bay	RoRo	1999	105,000	n.a.	Year-round	
Wall Street Ferry Terminal, Pier 11 (NY) - E 34th Street Ferry Terminal (NY)	New York	New York Harbor	RoRo	1999	91,000	n.a.	Year-round	
Greenville Piers, Jersey City (NJ) - Atlantic Basin (Redhook), Brooklyn (NY)	New York	Upper New York Bay	Rail	1999	n.a.	1,000	Year-round	
Bridgeport (CT) - Port Jefferson (NY)	New York	Long Island Sound	Passenger	1999	800,000	345,000	Year-round	
Hoboken, Hoboken Rail Terminal (NJ) - World Financial Center, Battery Park City, Manhattan (NY)	New York	Hudson River	RoRo	1999	2,352,317	n.a.	Year-round	
Hunters Point, Queens (NY) - E 34th Street Ferry Terminal, Manhattan (NY)	New York	East River	RoRo	1999	70,601	n.a.	Year-round	
Brooklyn Army Terminal, Brooklyn (NY) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	New York Harbor	RoRo	1999	50,000	n.a.	Year-round	
Haverstraw (NY) - Ossining (NY)	New York	Hudson River	RoRo	n.a.	n.a.	n.a.	Year-round	
Statue of Liberty (NY) - Ellis Island (NY)	New York	New York Harbor	RoRo	1999	3,543,907	n.a.	Year-round	
Ellis Island (NY) - World Financial Center, Battery Park City (NY)	New York	New York Harbor	RoRo	1999	1,447,629	n.a.	Year-round	
Ellis Island (NY) - Liberty State Park, Liberty Landing Marina (NJ)	New York	New York Harbor	RoRo	1999	436,741	n.a.	Year-round	
Greenport, Long Island (NY) - Shelter Island Heights, Long Island (NY)	New York	Shelter Island Sound	Passenger	1999	1,153,669	615,816	Year-round	
Harborside, Exchange Place (NJ) - World Financial Center, Battery Park City (NY)	New York	Hudson River	RoRo	1999	242,360	n.a.	Year-round	
Colgate Palmolive, Exchange Place (NJ) - World Financial Center, Battery Park City (NY)	New York	Hudson River	RoRo	1999	621,895	n.a.	Year-round	
Highlands (NJ) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	New York Bay	RoRo	1999	160,000	n.a.	Year-round	
Port Imperial, Weehawken (NJ) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	Hudson River	RoRo	1999	120,730	n.a.	Year-round	
Port Imperial, Weehawken (NJ) - W 38th Street Ferry Terminal (NY)	New York	Hudson River	RoRo	1999	2,955,129	n.a.	Year-round	
Port Liberte, Jersey City (NJ) - Wall Street Ferry Terminal, Pier 11 (NY)	New York	Hudson River	RoRo	1999	160,584	n.a.	Year-round	
Greenville Piers, Jersey City (NJ) - Bush Terminal, Brooklyn (NY)	New York	Upper New York Bay	Rail	1999	n.a.	4,000	Year-round	
World Financial Center, Battery Park City (NY) - Statue of Liberty (NY)	New York	New York Harbor	RoRo	1999	4,308,169	n.a.	Year-round	
Pennsylvania								
Penns Landing, Philadelphia (PA) - Camden (NJ)	Philadelphia	Delaware River	RoRo	1999	300,000	n.a.	4/1/2000	12/31/2000
Delaware								
Woodland, County Road 79 (DE) - Bethel, State Route 78 (DE)	Salisbury	Nanticoke River	Passenger	1999	100,710	83,925	Year-round	
Delaware City (DE) - Fort Delaware, Pea Patch Island (DE)	Philadelphia	Delaware River	RoRo	1999	20,000	n.a.	4/20/2000	10/31/2000
Fort Mott (NJ) - Fort Delaware, Pea Patch Island (DE)	Philadelphia	Delaware River	RoRo	1999	7,500	n.a.	4/20/2000	10/31/2000
Lewes (DE) - Cape May (NJ)	Atlantic City	Delaware Bay	Passenger	1999	1,258,799	394,235	Year-round	
Maryland								
Crisfield (MD) - Ewell, Smith Island (MD)	Salisbury	Chesapeake Bay	RoRo	n.a.	n.a.	n.a.	Year-round	
Crisfield (MD) - Ewell, Smith Island (MD)	Salisbury	Chesapeake Bay	RoRo	1999	6,549	n.a.	5/27/2000	10/15/2000
Crisfield (MD) - Ewell, Smith Island (MD)	Salisbury	Tangier Sound	RoRo	n.a.	n.a.	n.a.	Year-round	
Oxford (MD) - Bellevue (MD)	Baltimore	Tred Avon River	Passenger	n.a.	n.a.	n.a.	3/1/2000	11/30/2000
Allen (MD) - Catchpenny (MD)	Salisbury	Wicomico River	Passenger	1998	139,245	116,038	Year-round	
Whitehaven, State Route 352 (MD) - Widgeon, State Route 362 (MD)	Salisbury	Wicomico River	Passenger	1998	94,910	79,092	Year-round	
Point Lookout State Park (MD) - Ewell, Smith Island (MD)	Washington	Chesapeake Bay	RoRo	1999	8,950	n.a.	6/15/2000	9/15/2000
Virginia								

State and Route	Metro Area	Waterbody Crossed	Type	Data Year	Passengers	Vehicles	Season Start	Season End
Portside, Portsmouth (VA) - High Street Landing, Portsmouth (VA)	Norfolk	Elizabeth River	RoRo	1999	98,210	n.a.	Year-round	
Waterside, Norfolk (VA) - High Street Landing, Portsmouth (VA)	Norfolk	Elizabeth River	RoRo	1999	194,626	n.a.	Year-round	
Waterside, Norfolk (VA) - Portside, Portsmouth (VA)	Norfolk	Elizabeth River	RoRo	1999	123,660	n.a.	Year-round	
Hatton, Route 625 (south bank) (VA) - Hatton, Route 625 (north bank) (VA)	Charlottesville	James River	Passenger	1999	2,730	1,092	4/15/2000	10/15/2000
Scotland, Scotland Wharf (VA) - Jamestown, Jamestown Wharf (VA)	Norfolk	James River	Passenger	1999	2,100,000	880,485	Year-round	
Portside, Portsmouth (VA) - Harbor Park, Norfolk (VA)	Norfolk	Elizabeth River	RoRo	1999	5,957	n.a.	Year-round	
Reedville (VA) - Ewell, Smith Island (MD)	Richmond	Chesapeake Bay	RoRo	n.a.	n.a.	n.a.	5/1/2000	10/15/2000
Reedville (VA) - Tangier (VA)	Richmond	Chesapeake Bay	RoRo	1999	15,000	n.a.	5/1/2000	10/15/2000
Cape Charles (VA) - Little Creek (VA)	Hampton	Chesapeake Bay	Rail	1999	n.a.	4,400	Year-round	
Crisfield (MD) - Tangier (VA)	Salisbury	Chesapeake Bay	RoRo	n.a.	n.a.	n.a.	5/15/2000	10/31/2000
Sunnybank, State Route 644 (VA) - Kayan, State Route 644 (VA)	Richmond	Little Wicomico River	Passenger	1999	18,189	8,855	Year-round	
Hampton, Public Pier (VA) - Norfolk, on Waterside Dr. (VA)	Norfolk	Hampton Roads	RoRo	1999	60,000	n.a.	Year-round	
North Carolina								
Elwell (NC) - Carvers Creek (NC)	Wilmington	Cape Fear River	Passenger	1999	25,544	14,099	Year-round	
Cedar Island (NC) - Ocracoke (NC)	Greenville	Pamlico Sound	Passenger	1999	242,397	95,470	Year-round	
Cherry Branch (NC) - Minnesott Beach (NC)	Greenville	Neuse River	Passenger	1999	478,395	290,058	Year-round	
Como, State Route 1306 (NC) - Winton, State Route 1175 (NC)	Norfolk	Meherrin River	Passenger	1999	3,903	6,997	Year-round	
Hatteras (NC) - Ocracoke (NC)	Washington DC	Hatteras Inlet	Passenger	1999	925,806	358,962	Year-round	
Ocracoke (NC) - Swan Quarter (NC)	Greenville	Pamlico Sound	Passenger	1999	49,712	23,721	Year-round	
Sans Souci (NC) - Woodard (NC)	Greenville	Cashie River	Passenger	1999	5,110	3,667	Year-round	
Southport (NC) - Fort Fisher (NC)	Wilmington	Cape Fear River	Passenger	1999	426,642	149,533	Year-round	
Atlantic (NC) - Core Banks, Cape Lookout Natl. Seashore (NC)	Morehead City	Core Sound	Passenger	n.a.	n.a.	n.a.	3/13/2000	12/17/2000
Davis (NC) - Core Banks, Cape Lookout Natl. Seashore (NC)	Morehead City	Core Sound	Passenger	n.a.	n.a.	n.a.	3/1/2000	12/31/2000
Harkers Island (NC) - Cape Lookout (NC)	Morehead City	Back Sound	RoRo	1999	3,461	n.a.	4/1/2000	12/1/2000
Atlantic (NC) - Portsmouth Village, Portsmouth Island (NC)	Morehead City	Core Sound	RoRo	n.a.	n.a.	n.a.	Year-round	
Southport (NC) - Bald Head Island (NC)	Wilmington	Cape Fear River	Passenger	n.a.	n.a.	n.a.	Year-round	
Aurora (NC) - Bayview (NC)	Greenville	Pamlico River	Passenger	1999	135,397	73,243	Year-round	
Southport, Indigo Plantation (NC) - Bald Head Island (NC)	Wilmington	Cape Fear River	RoRo	1999	233,158	n.a.	Year-round	
Currituck (NC) - Knotts Island (NC)	Norfolk	Currituck Sound	Passenger	1999	82,931	24,043	Year-round	
South Carolina								
Hilton Head Island, Opossum Point Landing (SC) - Daufuskie Island, Haig Point (SC)	Savannah	Atlantic Intracoastal Waterwa	RoRo	1999	150,500	n.a.	Year-round	
Hilton Head Island, Broad Creek Marina (SC) - Daufuskie Island, Cooper River Landing (SC)	Savannah	Atlantic Intracoastal Waterwa	RoRo	1999	10,664	n.a.	Year-round	
Jenkins Island, Hilton Head (SC) - Daufuskie Island, Cooper River Landing (SC)	Savannah	Atlantic Intracoastal Waterwa	RoRo	1999	4,578	n.a.	Year-round	
Hilton Head Island, Harbortown (SC) - Daufuskie Island, Cooper River Landing (SC)	Savannah	Calibogue Sound	RoRo	1999	31,040	n.a.	Year-round	
South Island (SC) - Georgetown, State Highway S-22-18 (SC)	Charleston	Atlantic Intracoastal Waterwa	Passenger	1999	9,160	7,300	Year-round	
Hilton Head Island, Salty Fare Village (SC) - Daufuskie Island, Cooper River Landing (SC)	Savannah	Atlantic Intracoastal Waterwa	RoRo	n.a.	n.a.	n.a.	Year-round	
Georgia								
St. Marys (GA) - Plum Orchard, Cumberland Island (GA)	Jacksonville	Atlantic Intracoastal Waterwa	RoRo	1999	300	n.a.	Year-round	
St. Marys (GA) - Cumberland Island (GA)	Jacksonville	Cumberland Sound	RoRo	1999	44,644	n.a.	Year-round	
Meridian (GA) - Sapelo Island, Natl. Estuarine Research Reserve (GA)	Savannah	Doboy Sound	RoRo	1999	70,000	n.a.	Year-round	
Hutchinson Island, Savannah Cove (GA) - Daufuskie Island, Cooper River Landing (SC)	Savannah	Savannah River and Atlantic	RoRo	1999	15,616	n.a.	Year-round	
Florida								
De Land (FL) - Hontoon Island State Park (FL)	Orlando	Saint Johns River	RoRo	n.a.	n.a.	n.a.	Year-round	
Georgetown (FL) - Drayton Island (FL)	Jacksonville	Lake George	Passenger	n.a.	n.a.	n.a.	Year-round	
Mayport (FL) - Fort George Island (FL)	Jacksonville	St. Johns River	Passenger	1999	374,785	374,785	Year-round	
Welaka Landing, Fort Gates Ferry Rd. (FL) - Fort Gates, Salt Springs Road (FL)	Daytona Beach	St. Johns River	Passenger	n.a.	n.a.	n.a.	Year-round	

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, National Ferry Database.

This Page Intentionally Left Blank

APPENDIX F

Initial Regulatory Flexibility Analysis (IRFA)

This Page Intentionally Left Blank

This proposed rule has been determined to be significant for purposes of Executive Order 12866.

NMFS prepared the following Initial Regulatory Flexibility Analysis (IRFA).

IRFA

A description of the action, why it is being considered, and the legal basis for this action are contained in the preamble to this proposed rule. This proposed rule does not duplicate, overlap, or conflict with other Federal rules. This IRFA analyzes the proposed alternatives and other alternatives described in the preamble to the rule and does not address alternatives previously considered and subsequently dismissed in the DEIS. There are no recordkeeping or reporting requirements associated with this proposed rule. There most likely will be a compliance cost or benefit associated with changes in fuel consumption from speed restrictions measures. These changes are likely to be small given that they would occur only in a 20-30 nautical mile area. However, given the heterogeneous characteristics of the many types, lengths, gross tonnages, and horsepower equivalents of vessels impacted by this rule, it is not possible to make this estimate on a vessel, firm, or aggregate basis.

As discussed below, NMFS believes that there may be disproportionate economic impacts among types of small entities within the same industry as well as between large and small entities of different vessel types occurring within different industries. While the economic impacts discussed in this IRFA would reflect the impact on the typical vessel within each classification, NMFS recognizes that there may be variation of impacts among different vessels within each classification from the implementation of this proposed rule. NMFS recognizes that there may be disproportionate impacts between or among vessels servicing different areas or ports. However, there is no hard data or evidence to indicate that this is the case. In addition, changes in annual revenues are used as a proxy for changes in profitability since cost data is not readily available. For the most part, NMFS does not expect any small entity to cease operation as a result of this rulemaking, regardless of the alternative implemented by the Agency. There are two cases where small entities might cease operation if no adjustments are made to the composition of their operations. They include small entities composed entirely of fast-speed ferry services and fast-speed whale watching vessels. Without the ability to pick up the increased demand for regular-speed ferry or regular-speed whale watching trips as a result of temporary cessation of high-speed vessel operations whenever a DMA is in place, these entities may cease operations under any Alternatives containing DMAs. The economic impacts of the proposed rule as relates to small entities are as follows.

Description of Affected Small Entities

There are 7 industries directly affected by this proposed rulemaking as follows: commercial shipping, high-speed passenger ferries, regular-speed passenger ferries, high-speed whale watching vessels, regular-speed whale watching vessels, commercial fishing vessels, and charter fishing vessels. This analysis uses size standards prescribed by the Small Business Administration (SBA). Specifically, for international and domestic shipping operators, the SBA size standard for a small business is 500 employees or less. The same threshold applies for international cruise operators and domestic ferry service operators. For whale watching operators and charter fishing commercial fish harvesters, the SBA threshold is $6.0 million of average annual receipts. For commercial fishing operators, the SBA threshold is $3.5 million of average annual receipts. The number of small entities affected by the proposed rule-making by industry are as follows: 372 commercial shipping vessels of various classifications, 33 passenger ships, 345 commercial fishing vessels, 40 charter fishing vessels, 9 high-speed passenger ferries, 8 regular-speed passenger ferries, 3 high-speed whale watching vessels and 5 regular-speed whale watching vessels.

Economic Impacts

Preferred Alternative (Right Whale Ship Strike Reduction Strategy)

The preferred alternative is comprised of management measures that would define specific areas on a seasonal basis and requires vessels to reduce speed to avoid right whale strikes. In addition, the preferred alternative would implement dynamic management areas (DMAs) on a case-by-case basis outside of designated areas specified in this rule. In addressing the speed reduction option, NMFS analyzed impacts of a speed restriction of 10, 12, and 14 knots.

The proposed option of a speed restriction of 10 knots would reduce annual revenues to vessels as follows. Commercial shipping 0.18% of annual receipts, passenger cruise vessels 0.20%, high-speed passenger ferries 9.8%, regular-speed passenger ferries 7.9%, high-speed whale watching vessels 8.3%, regular-speed whale watching vessels 3.8%, commercial vessels 0.4%, charter fishing vessels 8.9%.

At a speed of 12 knots, all vessels defined as small entities, with the exception of high-speed passenger ferries and high-speed whale-watching vessels, show less adverse economic impact than the proposed option ranging from less than 0.1% of annual receipts for commercial fishing vessels to 5.2% for regular-speed passenger ferries. The economic impact to high-speed passenger ferries and whale-watching vessels are estimated to be the same as the proposed option, 9.8 % and 8.3 %, respectively.

For the 14-knot option, with the exception of the high-speed passenger ferries and high-speed whale-watching vessels which incur the same economic impact as compared with the proposed option, 9.8 % and 8.3 %, all vessels show less adverse economic impacts than the proposed option from less than 0.1% reduction in annual receipts for commercial fishing vessels to 2.6% for regular-speed passenger ferries.

Based on this analysis, NMFS concludes that operators of regular-speed passenger ferries, regular-speed whale-watching vessels, and charter fishing vessels would prefer either the 12 or 14 knot options. However, NMFS' scientists and other independent scientists have determined that a higher speed restriction increases likelihood of a ship striking a right whale. Furthermore, scientists have shown that only a small percentage of ship strikes occur at 10 knots, and those that do usually result in injury rather than death. Therefore, among the three speed restriction options, the 10 knots option would afford the preferred option for right whale recovery and from a biological standpoint, a speed restriction of either 12 or 14 knots are not preferred options for protecting the critically endangered right whale.

NMFS concludes that there would be disproportionate impacts from implementation of this proposed option between the group consisting of passenger ferries, high-speed whale watching vessels, and charter fishing vessels and all other types of vessels included in this IRFA. In addition, NMFS has determined that there may be disproportionate impacts between large commercial shipping and large passenger vessels, such as Carnival Cruise Lines, Chevron, Maersk, etc. and the group consisting of passenger ferries, high-speed whale watching vessels, and charter fishing vessels. This conclusion is based on the assumption these large vessels would be less adversely affected than their companion small commercial and shipping vessels which were found to be adversely affected, on average, by the 0.18% for the 10 knot speed restriction, whereas, reductions to revenues for small passenger ferries, high-speed whale watching vessels, and charter fishing vessels would range from 7.9 % to 9.8%.

No-Action Alternative

The no-action option would be preferable to all small entities, particularly to all passenger ferries, high-speed whale watching vessels, and charter fishing vessels. This determination is based on the fact that the reduction in annual revenues as a percentage of total revenue for these three classes of vessels under the proposed alternative and proposed speed restriction would exceed approximately 8% annually.

Dynamic Management Areas (DMA) Only Alternative

One alternative considered in the DEIS is the use of DMAs as described in the preamble, excluding all other options that are part of the proposed rule. NMFS has determined that this alternative would be preferable to small businesses as compared to the proposed alternative because vessels would not be required to reduce speeds in seasonally managed areas as described in the preamble. Vessels would simply be required to follow speed restrictions for shorter time frames in a smaller DMA in response to right whale sightings. However, relying solely on this alternative would not afford the needed protection to right whales. This measure calls for being able to identify right whale aggregations in order to trigger DMAs, but as identification of right whale aggregations is not always possible in practice, relying on this measure would have only a minor, positive effect on right whale population size and may not reduce ship strikes sufficiently to promote population recovery. In addition, relying on this alternative would impose substantial costs on government resources in terms of the monitoring and assessment activities needed to implement the DMAs.

Speed Restrictions in Designated Areas Only Alternative

An alternative considered in this proposed rule is the use of speed restrictions in designated areas that are more extensive than those prescribed in the proposed rule. The designated areas considered under this alternative are both larger in size and would extend for a greater length of time, with the exception of those located in the southeastern part of the United States where speed restriction would be in place for a shorter length of time. This would require vessels to travel at slower speed for a greater period of time and throughout a greater range, which may cause greater adverse economic impacts to small entities when compared to the proposed alternative. However, this alternative does not attempt to route ships away from high-density areas of right whales through identified shipping lanes. Furthermore, right whales that are sighted outside of these areas are not protected under this alternative because DMAs are not included. Therefore, as a stand-alone measure, this alternative is less likely to aid the recovery of the right whale population when compared to the proposed alternative.

Use of Recommended Shipping Routes Alternative

This alternative would simply designate recommended shipping lanes away from areas where right whales are known to congregate without any other measures. NMFS has not yet designated port access routes; therefore the economic impact of this alternative on small entities is indeterminate at this time. If, in the future, NMFS decides to implement this alternative, an IRFA will be conducted when all port access routes are known and analyzed. This alternative may not provide sufficient protection to effectively reduce the occurrence of ship strikes and therefore it is also less likely to aid in the recovery of right whale populations when compared with the proposed alternative.

"Combination of Alternatives" Alternative

This alternative combines the more restrictive designated areas, DMAs, and recommended shipping routes (the previous three alternatives considered in this IRFA). Impacts to small entities are expected to be greater under this alternative when compared to the proposed alternative, due to the use of designated areas that are generally greater in size and greater in length of time as compared to those prescribed in the proposed alternative. Therefore, NMFS has determined that this alternative will be less preferable to small businesses since it has more adverse economic impacts. This alternative would provide a higher level of protection to the right whale population since it would reduce the amount and/or severity of ship strikes when compared with the proposed alternative.

This Page Intentionally Left Blank