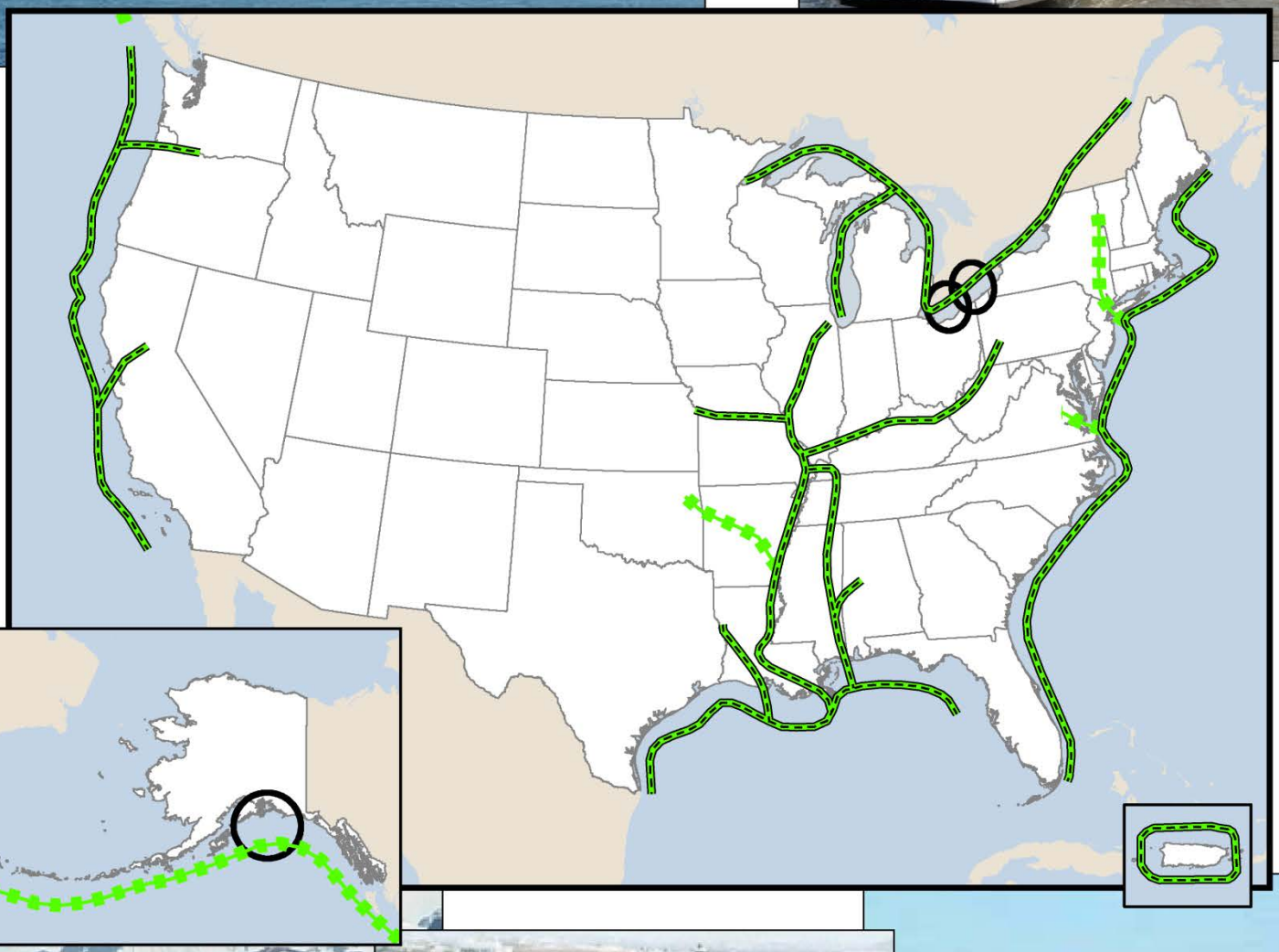
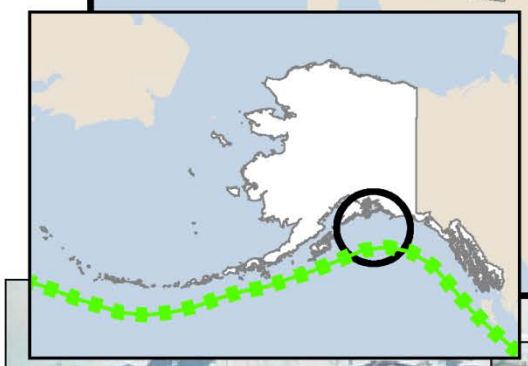
America's Marine Highway Program

Draft Programmatic Environmental Assessment





May 2013

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America's Marine Highway Program
Draft Programmatic Environmental Assessment

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Washington, DC 20590

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EXECUTIVE SUMMARY

The United States (U.S.) Department of Transportation (DOT), Maritime Administration (MARAD) has established the America's Marine Highway Program (the Program) in order to supplement the surface transportation system with added capacity offered by the national waterway system and maximize the efficiency of the U.S. transportation system by incorporating a maritime component into the planning for the transport of passengers and cargo. The Program is a short sea transportation program designed to bring about a seamless and efficient transportation system through the expansion of America's inland, intracoastal, and coastal waterways and the Great Lakes-Saint Lawrence Seaway System.

ES.1 INTRODUCTION

In recognition of the growing need to address concerns about land-based transportation efficiencies and sustainability, Congress enacted the Energy Independence and Security Act of 2007 (Energy Act) (Public Law 110-140, Sections 1121-1123), and DOT established America's Marine Highway Program to meet the requirements of the Energy Act. The Program was established on October 9, 2008 in an Interim Final Rule published in the *Federal Register* by DOT (75 F.R. 59530-59537). The Interim Final Rule presented the Secretary of Transportation's intention to designate Marine Highway Corridors and short sea transportation projects to accomplish the following: expand domestic water transportation services as an alternative means of moving freight cargo; mitigate economic, environmental and energy costs due to landside congestion; and integrate the Marine Highway into the transportation planning process. On April 9, 2010 the Program was finalized and implemented as the Final Rule (75 F.R. 18095-18107). The Final Rule addresses Marine Highway Corridors and establishes criteria, eligibility requirements and information to apply for designation as a Marine Highway Project.

On August 11, 2010 the Secretary of Transportation designated 18 Marine Highway Corridors (including 11 Corridors, four Connectors, and three Crossings), eight Marine Highway Projects, and six Initiatives within five regions of the U.S.: West Coast, Great Lakes, Mississippi, Gulf Coast, and East Coast. It is anticipated that the number and locations of Marine Highway Corridors and Marine Highway Projects will expand over time as the Program progresses.

These Marine Highway Corridors identify existing routes where water transportation presents an opportunity to offer relief to corresponding landside routes that suffer from traffic congestion, excessive air emissions or other environmental concerns and challenges. Corridors are generally longer, multistate routes whereas Connectors represent shorter routes that serve as feeders to the larger Corridors. Connectors also provide relief to congested border crossings, bridges, or tunnels. Crossings are short routes that transit harbors or waterways and offer alternatives to much longer or less convenient land routes between points.

Marine Highway Projects represent new or expanded Marine Highway services, within existing shipping routes on designated Marine Highways that offer the promise of public benefit and long-term sustainability without continuous governmental operational support. As designated Marine Highway Projects, these projects would qualify for potential future Marine Highway Grant funding under the Program. If Marine Highway Grant funds are available, only designated Marine Highway Projects would be eligible to apply for those funds. To date, Congress has only provided funding in fiscal year 2010.

Grants funded in 2010 were used for equipment or barge purchases for two of the designated projects including the James River Container Expansion Project and the Tennessee-Tombigbee Freight Project.

The Secretary has designated six Initiatives that, while not developed to the point of proposing specific services and routes required for Project designation, offer promise of potential in the future. Marine Highway Initiatives are not eligible to compete for future Marine Highway Grants, but would receive support from DOT in further developing the concepts through research, market analysis, and other efforts to identify the opportunities they may present.

ES.2 SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

The National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §4321 *et seq*.) requires all Federal agencies to analyze the possible environmental impacts of actions that a Federal agency implements, funds, permits, or licenses. The purpose of NEPA review is to inform Federal decision makers about the environmental impacts associated with their projects (e.g., impacts on air quality, water resources, endangered species, etc.). MARAD determined that a Programmatic Environmental Assessment (PEA) would be prepared to examine the potential environmental impacts of further development of the Program.

The Program does not develop or operate Marine Highway services. The private sector or state/local governments develop and operate Marine Highway services. Successful services must acquire economically competitive vessels, make their own routing decisions, and choose to begin or halt their service without any involvement from the Program. Further, successful services must be competitive with other modes of transportation.

The Program provides a set of tools to assist in the development or expansion of Marine Highway services. The primary tools used by the Program in its efforts to generate public benefits by increasing the utilization or efficiency of domestic freight or passenger transportation on Marine Highways are:

- designation of Marine Highway Corridors;
- designation of Marine Highway Projects; and
- providing Marine Highway Grants (when funding is available).

For qualitative and quantitative analyses in the PEA, several assumptions have been made based on best available data and what MARAD foresees to be probable in the near future. The successful development of new commercial Marine Highway services depends on vessel operators identifying markets where they can provide a timely, cost-competitive service. In this PEA, MARAD has identified a few port pairs per region that are representative of the probable candidates for new Marine Highway services. Because no market analysis was performed for these cases, the market assessments in this document are qualitative. The PEA does not identify specific cargo, shipping rates, or operating costs for a new service, but rather examines the potential environmental impact of those services, should they be established.

Through further development of the Program, site-specific projects may be identified that would require additional detailed NEPA analysis in the form of an Environmental Assessment (EA) or Environmental Impact Statement (EIS). The PEA is designed to serve as a guidance document that may be used to tier

from during future project-based NEPA analyses. This approach allows MARAD to focus on the larger-scale, known issues associated with the implementation of the Program rather than the smaller-scale, unknown issues that will be associated with the development of future projects as the Program progresses.

ES.3 PURPOSE AND NEED

The purpose of the Proposed Action is to fulfill MARAD's responsibilities and mission as authorized by the Secretary of Transportation to improve and strengthen the U.S. Marine Transportation System to meet the economic, environmental, and security needs of the Nation. MARAD's Proposed Action to further develop America's Marine Highway Program would be consistent with the agency's responsibilities.

The need for the Proposed Action results from the requirements of the Energy Act of 2007, which calls for the Secretary to designate short sea transportation routes as extensions of the surface transportation system in order to focus public and private efforts to use the waterways and relieve landside congestion along coastal corridors. Further development of the Program would enable more goods and people to travel by water, striking a balance between the demand and available capacity on highways, rail, and Marine Highway surface routes, and making it more likely that the U.S. would realize the benefits sought by Congress. The Program envisioned by DOT would fully comply with Congress' legislative requirements for short sea shipping by working to bring about a more diverse, energy-efficient, and climate-friendly transportation system through the creation and expansion of domestic water transportation services.

ES.4 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action is to develop further America's Marine Highway Program in order to relieve landside congestion, provide redundancy to nearby surface transportation facilities, and maximize the efficiency of the U.S. Marine Transportation System by increasing use of the existing capacity within the nation's navigable waters. The Proposed Action supports an overview of a variety of project types with the goal of developing and expanding Marine Highway services in a self-sustaining, commercially viable manner that recognizes public benefits these services create. Examples of benefits may include reduced congestion on highways and roads, fewer greenhouse gas emissions resulting from a more sustainable transportation system, improved safety, and additional sealift military resources that support our national defense.

The Program would continue to designate new Marine Highway Corridors, Projects, and Initiatives to increase the utilization of U.S. navigable waterways to reduce landside congestion. For the purposes of the PEA analyses, 18 Marine Highway Corridors, Connectors, and Crossings (Figure ES-1) are analyzed based on their location within the following five regions of the U.S.: West Coast, Great Lakes, Inland Waterways/Mississippi, Gulf Coast, and East Coast.

In evaluating ways to further develop the Program, a range of conceptual Marine Highway services were identified within each region. Each region includes three to five corridors, connectors, or crossings, each of which may include 10 or more ports. Because of the number of ports associated with each Marine

Highway, the approach to this PEA is to select representative pairs of ports ("port pairs") in each region and identify the potential Marine Highway services that could be provided between the two ports.

This analysis includes the identification of the types of vessels that could be used along with the capacity of the vessels and the expected frequency of trips between the port pairs. The following types of general vessels of varying capacities are used in the analysis:

- Ocean going vessels (OGV) of mid- to small size
  - Capacity of 600 to 800 20-foot equivalent units [TEUs]
  - Category 3 (C3) engine
  - Cruising speed of 20 knots
- Ocean going tug/barge (typically an articulated tug/barge [ATB] unit)
  - Capacity of 100 to 400 TEUs
  - Category 2 (C2) engine
  - Cruising speed of 12 knots
- Inland towboat/barges
  - Capacity of 100 to 350 TEUs
  - Category 2 (C2) engine
  - Cruising speed of 8 knots

Marine Highway services use existing waterways, ship channels, and ports. Channels and waterways are maintained by the U.S. Army Corps of Engineers. Because existing routes and port infrastructure are used in the operations of the Marine Highway services, there would be no dredging or major port infrastructure development associated with Marine Highway Projects. All vessel types that are used for Marine Highway services would comply with all environmental regulations, as appropriate.

For purposes of this PEA, trips by marine vessels versus trucks were analyzed for the long haul, point-to-point movement of cargo. It is assumed that any drayage movement at the origin/destination points would be accomplished by truck and would be similar regardless of long-haul mode. Rail transportation was not included in this analysis because it does not move a substantial portion of the containerized freight cargoes in the markets being examined.

ES.5 NO ACTION ALTERNATIVE

NEPA requires agencies to consider a "no action" alternative in their analyses and to compare the effects of not taking action with the effects of the action alternative(s). Under the No Action Alternative, the Program would not be developed further and DOT would not be in compliance with the Energy Act. Furthermore, the No Action Alternative would not satisfy the purpose and need for the Proposed Action as stated above. For the purposes of this document, the No Action Alternative serves as a baseline to compare the impacts of the Proposed Action.

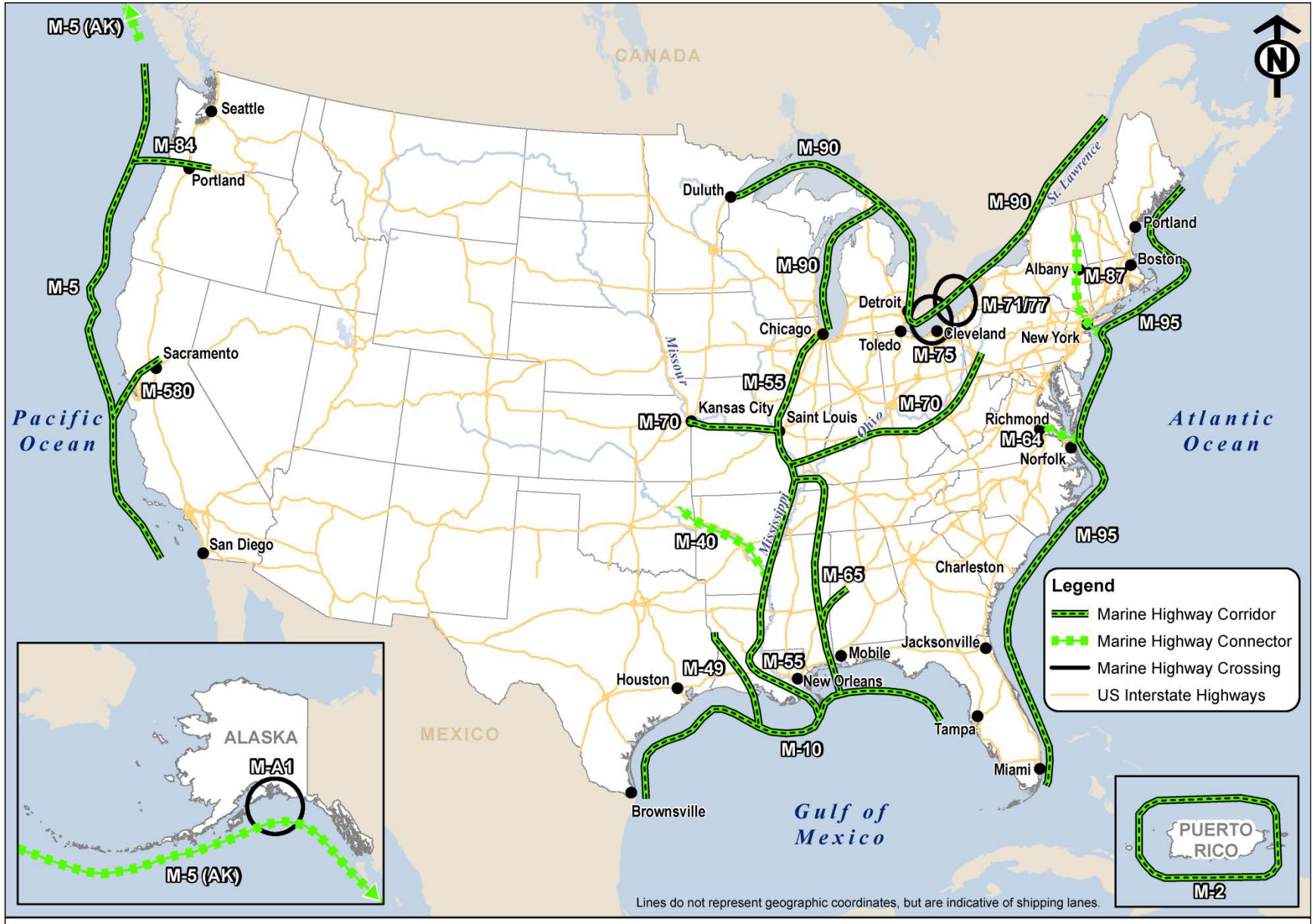

Figure ES-1
America's Marine Highway Corridors

ES.6 SUMMARY OF POTENTIAL IMPACTS

The environmental consequences on 12 resource areas of the conceptual Marine Highway services are evaluated, by region, in Chapters 4-8. The analysis included the potential environmental consequences of potential Marine Highway services between representative pairs of ports in each of the five regions. This approach provided a framework for identifying program-level environmental impacts, and revealed that as future site-specific projects are further developed, comprehensive environmental studies (i.e., biological assessments, air quality conformity analyses, noise modeling, etc.) would need to be conducted.

This PEA is designed to serve as a guidance document that may be used to tier from during future project-based NEPA analyses. This approach allows agencies to focus on the larger-scale, known issues associated with the implementation of the Program rather than the smaller-scale, unknown issues that would be associated with the development of future projects as the Program progresses.

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AK	Alaska
AL	Alabama
APE	area of potential effects
AR	Arkansas
ATB	articulated tug/barge
BMPs	best management practices
CA	California
CAA	Clean Air Act
CBRS	Coastal Barrier Resources System
CEC	Commission for Environmental Cooperation
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	carbon monoxide
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CPRA	Coastal Protection and Restoration Authority
CT	Connecticut
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
dB	decibel
dB re 1 µPa	decibels referenced 1 microPascal
dB re 20 µPa	decibels referenced 20 microPascals
dBA	A-weighted decibel
DE	Delaware
DoN	Department of the Navy
DOT	Department of Transportation
EA	Environmental Assessment
ECA	Emissions Control Area
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAF3	Freight Analysis Framework, Version 3
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FL	Florida
FMC	Fishery Management Council
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
F.R.	*Federal Register*
ft	foot/feet
GA	Georgia
GHG	greenhouse gas
HAPC	Habitat Area of Particular Concern
Hz	hertz
I-	Interstate
IBA	Important Bird Area
ID	Idaho
IL	Illinois
ILA	International Longshore Association
ILWU	International Longshore Warehouse Union
IN	Indiana
IWC	International Whaling Commission
KY	Kentucky
kW	kilowatt
LA	Louisiana
L_{dn}	day-night average sound level
LOA	length overall
L_{peak}	peak sound pressure level
m	meter(s)
MA	Massachusetts
MARAD	Maritime Administration
MARPOL	Marine Pollution – International Convention for the Prevention of Pollution from Ships
MBTA	Migratory Bird Treaty Act
MD	Maryland
ME	Maine
MI	Michigan
MMPA	Marine Mammal Protection Act
MN	Minnesota
MO	Missouri
MPA	Marine Protected Area
MS	Mississippi
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NC	North Carolina
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJ	New Jersey
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPDWRs	National Primary Drinking

	Water Regulations
NPS	National Park Service
NRHP	National Register of Historic Places
NY	New York
O_3	Ozone
OGV	ocean going vessel
OH	Ohio
OK	Oklahoma
OR	Oregon
OSHA	Occupational Safety and Health Administration
OTR	Ozone Transport Region
PA	Pennsylvania
Pb	lead
PCBs	polychlorinated biphenyls
PEA	Programmatic Environmental Assessment
PFMC	Pacific Fishery Management Council
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter and greater than 2.5 microns in diameter
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RI	Rhode Island
R.M.	River Mile
RMS	root mean square
RORO	Roll-on/Roll-off
RWQCB	Regional Water Quality Control Board
SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
SC	South Carolina
SEL	sound exposure level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
sq mi	square mile(s)
SWPPP	Storm Water Pollution Prevention Plan
TBT	tributyltin
TCPs	Traditional Cultural Properties
Tenn-Tom	Tennessee-Tombigbee
TEU	20-foot equivalent unit
THPO	Tribal Historic Preservation Officer
TIP	Tribal Implementation Plan
TN	Tennessee
TX	Texas
$\mu g/m^3$	micrograms per cubic meter
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USCG	U.S. Coast Guard
USFF	U.S. Fleet Forces
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VA	Virginia
VGP	Vessel General Permit
VOCs	volatile organic compounds
WA	Washington
WCG	Whatcom Council of Governments
WI	Wisconsin

1.0 INTRODUCTION

The United States (U.S.) Department of Transportation (DOT), Maritime Administration (MARAD) has established the America's Marine Highway Program (the Program) in order to supplement the surface transportation system with added capacity offered by the national waterway system and maximize the efficiency of the U.S. transportation system by incorporating a maritime component into the planning for the transport of passengers and cargo. The Program is a short sea transportation program designed to bring about a seamless and efficient transportation system through the expansion of America's inland, intracoastal, and coastal waterways and the Great Lakes-Saint Lawrence Seaway System.

1.1 Background

Traffic congestion imposes serious costs on society in a number of forms, including time wasted in travel, fuel consumed, and emissions generated in traffic backups; disruptions to supply chains; and diminishments to the public's quality of life. Accordingly, efforts to reduce congestion have high potential benefits to society, allowing for greater national productivity through improved reliability of deliveries and schedules, lower transportation costs, cleaner air, and a higher quality of life.

In recognition of the growing need to address concerns about land-based transportation efficiencies and sustainability, Congress enacted the Energy Independence and Security Act of 2007 (Energy Act) (Public Law 110-140, Sections 1121-1123). The goal of the Energy Act is for the U.S. to:

- achieve greater energy independence and security
- improve the energy performance of the Federal Government
- protect consumers
- promote research on greenhouse gas (GHG) capture and storage
- increase production of clean renewable fuels
- increase efficiency of products, buildings, and vehicles

DOT established America's Marine Highway Program to meet the requirements of the Energy Act. The Program was established on October 9, 2008 in an Interim Final Rule published in the *Federal Register* (F.R.) by DOT (MARAD 2008). The Interim Final Rule presented the Secretary of Transportation's intention to designate Marine Highway Corridors and short sea transportation projects to accomplish the following: expand domestic water transportation services as an alternative means of moving freight cargo; mitigate economic, environmental and energy costs due to landside congestion; and integrate the Marine Highways into the transportation planning process.

The Interim Final Rule also allowed the Secretary to identify and research improvements in efficiency and environmental sustainability. On April 9, 2010, the Program was finalized and implemented as the Final Rule (MARAD 2010a). The Final Rule addresses Marine Highway Corridors and establishes criteria, eligibility requirements and information to apply for designation as a Marine Highway Project. The Final Rule also "…sets forth the manner in which the Department of Transportation will identify and recommend solutions to impediments to expanded use of Marine Highways and lays the groundwork for coordinating with States, private transportation providers, and local and Tribal governments, and

conducting research related to Marine Highway development. The program should improve system capacity and efficiency, air quality, highway safety, and national security" (MARAD 2010a:18095).

1.1.1 America's Marine Highway Program

On August 11, 2010, the Secretary of Transportation designated 18 Marine Highway Corridors (including 11 Corridors, four Connectors, and three Crossings), eight Marine Highway Projects, and six Initiatives within five regions of the U.S. (see Figure 1-1, America's Marine Highway Corridors). These corridors identify routes where water transportation presents an opportunity to offer relief to corresponding landside routes that suffer from traffic congestion, excessive air emissions, or other environmental concerns and challenges. Corridors are generally longer, multistate routes, whereas Connectors represent shorter routes that serve as feeders to the larger Corridors. Connectors also provide relief to congested border crossings, bridges, or tunnels. Crossings are short routes that transit harbors or waterways and offer alternatives to much longer or less convenient land routes between points. It is anticipated that the number and locations of Marine Highway Corridors and Marine Highway Projects would expand over time as the Program progresses.

1.1.1.1 Marine Highway Projects

Marine Highway Projects represent new or expanded Marine Highway services, within existing shipping routes, that offer the promise of public benefit and long-term sustainability without continuous governmental operational support. When Marine Highway Grant funds are authorized by Congress, designated Marine Highway Projects are eligible to compete for those funds.[1] The Fiscal Year 2010 grant program was designed to help implement projects or components of a project designated under subsection (d) of Section 55601 of the Energy Independence and Security Act of 2007, and project components eligible for grant funding, as well as grant selection criteria, were listed in the 2010 Notice of Funding Availability on August 12, 2010 (MARAD 2010b).

[1] Marine Highway Grants were last awarded in September 2010. Should additional funding be made available, the Program will publish a notice in the *Federal Register*. MARAD published a Notice of Funding Availability in the *Federal Register* on August 12, 2010 (MARAD 2010b), the last time that Grant funds were authorized.

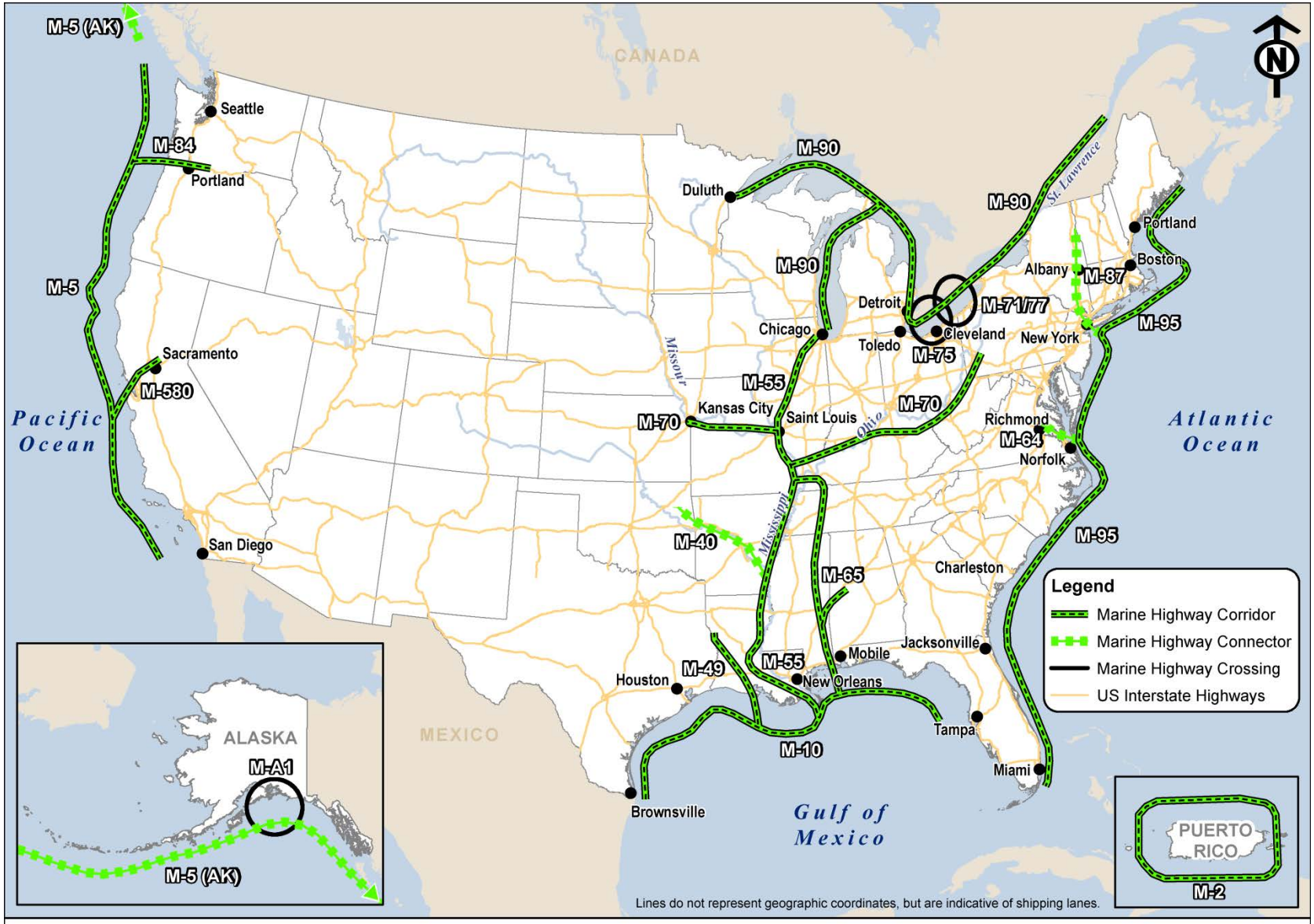

Figure 1-1
America's Marine Highway Corridors

The Marine Highway Projects that were designated by the Secretary in Fiscal Year 2010 are listed in Table 1.1-1. The goal for all Projects is that they lead to new Marine Highway services or expand existing services that can move more freight or passengers along America's coastlines and waterways. The services have the potential to reduce air pollution and traffic congestion along surface corridors, as well as provide jobs for skilled mariners and shipbuilders.

Table 1.1-1. Designated Marine Highway Projects

Corridor	Sponsor*	Project	Ports Serviced*	Attributes
M-95	CT DOT	Cross Sound Enhancements Project	New London, CT and Orient Point, Long Island, NY	Three passenger/vehicle ferries operating between New London, CT and Orient Point, Long Island, NY.
M-95	ME DOT	New England Marine Highway Expansion Project	Newark, NJ, Boston, MA, and Portland, ME	Expand on existing container-on-barge service by designing and constructing an articulated tug and barge that rigidly connects two vessels.
M-10	Ports of Brownsville, TX and Manatee, FL	Cross Gulf Container Expansion Project	Brownsville, TX and Manatee, FL	Expand the frequency and capacity of an existing container on-barge service by addressing efficiency improvements for transporting freight, especially overweight.
M-65	Port of Itawamba, MS	Tennessee-Tombigbee Freight Project	Itawamba, MS and Mobile, AL	New container-on-barge service to serve as the inland leg for new deep draft Gulf Coast container terminals.
M-95 and M-10	Port of Galveston, TX and SC State Ports Authority	Gulf Atlantic Marine Highway Project	Galveston, TX and SC State Ports	Distribute international and domestic containers between Gulf and South Atlantic Coasts, on a modern fleet of 10 U.S. flag vessels (vessels with a capacity of 300-500 20-foot equivalent units built in U.S. shipyards and crewed by U.S. mariners).
M-75	Detroit/Wayne County Port Authority	Detroit/Wayne County Ferry Project	Detroit, MI and Windsor, Ontario, Canada	Water-based passenger service development supplementing border crossings Ambassador Bridge and Detroit-Windsor Tunnel.
M-95	Port Authority of NY and NJ	Trans-Hudson Rail Service Project	NJ and Brooklyn, NY in New York Harbor	Expand quality and capacity of ongoing cross-harbor rail float service by adding second barge in service, plus capacity improvements at the rail yard terminals at each end of the service.
M-64	VA Port Authority	James River Container Expansion Project	Hampton Roads, VA and Richmond, VA	Expand existing container-on-barge service and initiate a container shuttle service between four terminals in Hampton Roads area.

Note: AL – Alabama; CA – California; CT – Connecticut; FL – Florida; IL – Illinois; MA – Massachusetts; MD – Maryland; ME – Maine; MI – Michigan; MS – Mississippi; NJ – New Jersey; NY – New York; OR – Oregon; RI – Rhode Island; SC – South Carolina; TX – Texas; WA - Washington; VA - Virginia

1.1.1.2 Marine Highway Initiatives

The Secretary designated six Initiatives in 2010 that, while not developed to the point of proposing specific services and routes required for project designation, offered promise of potential in the future. Marine Highway Initiatives are not eligible to compete for future Marine Highway Grants, but they are eligible to receive support from DOT in further developing the concepts through research, market

analysis, and other efforts to identify opportunities. Table 1.1-2 describes the Marine Highway Initiatives.

Table 1.1-2. Designated Marine Highway Initiatives

Corridor	Sponsor*	Initiative*	Project Snapshot*
M-95 and M-87	New York City Soil and Water Conservation District	Hudson River Food Corridor Initiative	Feasibility study to consider development of an intermodal option including refrigerated containers on barge to transport fresh produce from agricultural regions in North-Central NY to the NY-Newark Metropolitan area.
M-95	NJ DOT	NJ Marine Highway Initiative	Develop a system of waterborne, multimodal freight projects between five NJ hubs and the states of NY, MA, RI, CT, MD and VA.
M-95	Ports of New Bedford, MA, Baltimore, MD, and Port Canaveral, FL	East Coast Marine Highway Initiative	Develop a service that would transport both containerized and trailered freight along the I-95 Corridor.
M-5	Humboldt Bay Harbor, Recreation and Conservation District, CA	West Coast Hub-Feeder Initiative	Develop an intermodal distribution network along the coastlines of WA, OR, and CA.
M-5	Ports of Redwood City, Hueneme, and San Diego, CA and Humboldt Bay Harbor, Recreation and Conservation District, CA	Golden State Marine Highway Initiative	Improve efficiency of freight movement by development of a Marine Highway linking CA's deepwater ports and coastal harbors to form a 1,100 mile road and rail alternative for goods movement.
M-55	Heart of IL Regional Port District	IL-Gulf Marine Highway Initiative	Develop a service to employ tug/barges to transport cargoes including trailers, international and domestic shipping containers and rolling stock to support IL's robust manufacturing base.

Note: CA – California; CT – Connecticut; FL – Florida; IL – Illinois; MA – Massachusetts; MD – Maryland; NJ – New Jersey; NY – New York; OR – Oregon; RI – Rhode Island; VA - Virginia

1.1.2 Scope of the Programmatic Environmental Assessment

To further develop the Program as outlined in the Final Rule, MARAD is preparing this Programmatic Environmental Assessment (PEA) to consider the impact to the human and natural environment in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §4321 *et seq*.). NEPA requires Federal agencies to analyze the possible environmental impacts of actions that they implement, fund, permit, or license. The purpose of NEPA review is to inform Federal decision makers about the environmental impacts associated with their projects (e.g., impacts on air quality, water resources, endangered species, etc.). As described in this document, NEPA and other applicable regulations must be considered in assessing potential impacts of further development of the Program.

The Program does not develop or operate Marine Highway services. The private sector or state/local governments develop and operate Marine Highway services. Successful services must acquire economically competitive vessels, make their own routing decisions, and choose to begin or halt their service without any involvement from the Program. Further, successful services must be competitive with other modes of transportation.

The Program provides a set of tools to assist in the development or expansion of Marine Highway services. The primary tools used by the Program in its efforts to generate public benefits by increasing the utilization or efficiency of domestic freight or passenger transportation on Marine Highways are:

- designation of Marine Highway Corridors;
- designation of Marine Highway Projects; and
- providing Marine Highway Grants (when funding is available).

In the early stages of the Program, MARAD funded equipment purchases for two of the designated projects and evaluated them separately under NEPA:

- James River Container Expansion Project – an existing Marine Highway service between the ports of Hampton Roads, VA and Richmond, VA established to expand container-on-barge service and create a container shuttle service between four terminals in the Hampton Roads, VA area (MARAD 2011a).
- Tennessee-Tombigbee (Tenn-Tom) Freight Project – a new Marine Highway service between the ports of Itawamba, MS and Mobile, AL established to create container-on-barge service to support the intermodal inland leg for new deep draft Gulf Coast container terminals (MARAD 2011b).

In accordance with NEPA, DOT Order 5610.1C, and MARAD Order 600-1, MARAD determined that the James River Container Expansion Project and the Tenn-Tom Freight Project could be categorically excluded from further analysis under NEPA. Categorical Exclusions were prepared and signed on February 2, 2011 and March 28, 2011 for the James River Expansion Project and the Tenn-Tom Freight Project, respectively.

After completion of these two initial projects, MARAD determined that sufficient information on the types of projects that may be proposed under the Program was available and that a Programmatic NEPA document could be supported and completed.

1.1.2.1 Assumptions of the PEA

For qualitative and quantitative analyses in the PEA, several assumptions have been made based on best available data and what MARAD foresees to be probable in the near future. The successful development of new commercial Marine Highway services depends on vessel operators identifying markets where they can provide a timely, cost-competitive service. In this PEA, MARAD has identified a few port pairs per region that are representative of the probable candidates for new Marine Highway services. Because no market analysis was performed for these cases, the market assessments in this document are qualitative. The PEA does not identify specific cargo, shipping rates, or operating costs for a new service, but rather examines the potential environmental impact of those services, should they be established.

For purposes of this PEA, it was assumed that the following general types of vessels would be used for new Marine Highway services: oceangoing vessels (OGVs), articulated tug/barges (ATBs), and inland towboat/barges.

OGVs comprise larger ships (such as roll-on/roll-offs and lift-on/lift-offs) that are configured to transport between 600 and 800 20-foot equivalent units (TEUs). The main propulsion system of an OGV is classified as a C3 engine. C3 engines have been recently regulated to burn fuel with sulfur content no greater than 10,000 parts per million (ppm) until 2015, when they are required to transition to fuel with a sulfur content of 1,000 ppm. Alternatively, if the operator chooses not to burn the low sulfur fuel, after treatment technologies may be used to achieve equivalent sulfur reductions (i.e. scrubbers). Typical cruising speed for OGVs is assumed to be 20 knots. For the purposes of this PEA, OGVs were evaluated with a single 9, 564 kilowatt (kW) propulsion engine. This engine size is an average based on data for similarly sized OGVs included in the 2007 Port of Long Beach Air Emission Inventory. Further information on marine engine categories is described in Section 3.2.3, Maritime Vessel Emissions.

In general, ATBs and inland towboats are configured to transport between 100 and 400 TEUs and operate using C2 engines as the main propulsion system. C2 engines are similar to those found in locomotives and burn diesel fuel with a sulfur content of 15ppm. Typical cruising speed for a coastal ATB is 12 knots, whereas for an inland towboat the speed is assumed to be 8 knots. For the purposes of this PEA, ATBs were evaluated with a single 4,578 kW propulsion engine. This size is an average engine size for this type of vessel, and is based on data obtained from a vessel operator for the Port of New York (Bouchard Transportation 2012). In addition, for analysis purposes, we assume inland towboat/barges use the same fuel as ATBs and can transport between 100-350 TEUs in a voyage. Inland towboats were evaluated with a single 1496 kW propulsion engine.

Through further development of the Program, site-specific projects may be identified that would require additional detailed NEPA analysis in the form of an EA (Environmental Assessment) or Environmental Impact Statement (EIS). This PEA is designed to serve as a guidance document that may be used to tier from during future project-based NEPA analyses. This approach allows MARAD to focus on the larger-scale, identifiable issues associated with the implementation of the Program rather than the smaller-scale, unknown issues that would be associated with the development of future projects as the Program progresses.

To evaluate the Program on a nationwide scale, this PEA identifies potential Marine Highway services, regulatory requirements, and project-based studies that would be needed. The environmental regulations and permits most likely to be associated with a potential Marine Highway service are provided herein for informational purposes and to facilitate future planning efforts. The information provided in this document does not provide a comprehensive environmental analysis (i.e., biological assessments, air quality conformity analyses, noise modeling, etc.). Instead, comprehensive, project-specific environmental studies would be conducted for the preparation of NEPA documents associated with future projects. This PEA is designed to provide the necessary guidance for preparing future documents, which would result in time and cost savings.

1.2 Purpose and Need for Proposed Action

The purpose of the Proposed Action is to fulfill MARAD's responsibilities and mission as authorized by the Secretary of Transportation to improve and strengthen the U.S. Marine Transportation System to

meet the economic, environmental, and security needs of the Nation. MARAD's Proposed Action to develop further the Program would be consistent with the agency's responsibilities.

The need for the Proposed Action results from the requirements of the Energy Act of 2007, which calls for the Secretary to designate short sea transportation routes as extensions of the surface transportation system in order to focus public and private efforts to use the waterways and relieve landside congestion along coastal corridors. Further development of the Program is necessary to enable more goods and people to travel by water, striking a balance between the demand and available capacity on highways, rail, and Marine Highway surface routes, and to realize the benefits sought by Congress. The Program envisioned by DOT would fully comply with Congress' legislative requirements for short sea shipping by working to bring about a more diverse, energy-efficient, and climate-friendly transportation system through the creation and expansion of domestic water transportation services.

1.3 Public Involvement

Public participation is a fundamental part of the NEPA process as it not only provides for and encourages open communication between MARAD and the public, but also promotes better decision making. It was the intention of MARAD to: maximize the flow of public information throughout the NEPA process; more fully involve interested parties in the Proposed Action to further develop Program; and provide opportunities for local, state, and Federal agency outreach and communication.

Public involvement meetings provide opportunities for the general public, government agencies, and interest groups to learn about the Proposed Action, suggest alternatives to meet the need, provide input on the proposal, and identify any concerns or issues that should be addressed during the preparation of the NEPA document (i.e., the PEA). Public input is used to assist resource specialists in data collection and resource analysis during development of the PEA.

1.3.1 Scoping Meetings

Scoping meetings allow government agencies, special interest groups, and the general public in the potentially affected environment, or those with a specific interest in the issues or resources involved with the Program, to comment on the Proposed Action. In order to notify the public and local, State, and Federal agencies of the proposed project, a notice was published in the *Federal Register* [Docket Number MARAD-2012-0015] on February 23, 2012 announcing the project, scoping dates, locations, times, and dates of the 45-day public scoping period (MARAD 2012). In addition to a notice in the *Federal Register*, MARAD published notification of preparation of a PEA and notice of public scoping meetings via advertisements in nine local and regional newspapers coinciding with the nine locations of the public scoping meetings. The notices included information regarding the project, the public scoping meeting time, location and date, dates of the 45-day public scoping period (March 3 through April 16), and how to provide comments. In addition to advertisements, MARAD conducted letter notifications via email to Federal agencies known or expected to be interested in the Proposed Action. All public scoping meeting materials were posted to a temporary project website: http://amhpea.tecinc.com.

The public involvement meetings not only informed the public about the Proposed Action, but also assisted in identifying the issues and concerns that are of particular interest to the potentially affected communities. In addition, scoping meetings also provided a platform for MARAD to learn local and/or

regional concerns associated with the Program. Public scoping meetings were held between Tuesday, March 6, 2012 and Thursday March 29, 2012, at various locations throughout the U.S. Table 1.3-1 identifies the location, venue, date, and time of each public scoping meeting.

Table 1.3-1. Date, Time, and Location of Scoping Meetings

City/State	Date	Location	Time
East Coast/Gulf Coast			
Charleston, SC	Tuesday, March 6, 2012	North Charleston High School 1087 East Montague Avenue, North Charleston, SC 29405	6-8 p.m.
New Orleans, LA	Thursday, March 8, 2012	De La Salle High School 5300 Saint Charles Avenue, New Orleans, LA 70115	6-8 p.m.
Miami, FL	Tuesday, March 13, 2012	Florida Department of Transportation, District Six 1000 NW 111 Avenue, Miami, FL 33172	6-8 p.m.
Boston, MA	Thursday, March 15, 2012	Charlestown High School 240 Medford Street, Charlestown, MA 02129	6-8 p.m.
West Coast/Great Lakes/Inland Waterways/Mississippi			
San Diego, CA	Tuesday, March 20, 2012	Coronado Public Library 640 Orange Avenue, Coronado, CA 92118	6-8 p.m.
Portland, OR	Thursday, March 22, 2012	Roosevelt High School 6941 N Central Street, Portland, OR 97203	6-8 p.m.
Chicago, IL	Monday, March 26, 2012	Jones College Prep School 606 South State Street, Chicago, IL 60605	6-8 p.m.
Cleveland, OH	Wednesday, March 28, 2012	Horizon Science Academy Cleveland High School 6000 South Marginal Road, Cleveland, OH 44103	6-8 p.m.
St. Louis, MO	Thursday, March 29, 2012	Jennings Junior High School 8831 Cozens Avenue, St. Louis, MO 63136	6-8 p.m.

Public scoping meetings were conducted in an open house format with informational poster stations and fact sheet brochures containing additional information and prints of all the posters. MARAD representatives were present at the stations to discuss the Proposed Action and answer questions. Informative fact sheet brochures and comment forms were provided to each attendee. The posters and fact sheets explained the two ways to submit comments: (1) provide written comments on a comment form at the public scoping meeting, or (2) submit comments electronically to http://www.regulations.gov, Docket Number MARAD-2012-0015.

The public scoping meetings were attended by a total of 46 people. One person from local media attended the meeting in Charleston, SC. Representatives from the U.S. Environmental Protection

Agency (EPA); Department of Homeland Security, U.S. Coast Guard (USCG); Department of the Navy (DoN); and Oregon Department of Environmental Quality attended meetings.

1.3.2 Public Comments

The public had 45 days to submit comments. Of the comments received during the scoping period, six written comments were submitted at the public scoping meetings, one from Charleston, SC, one from Miami, FL, and four from San Diego, CA. Six comments were submitted online to the docket from agencies, private-sector, and nonprofit organizations. Most comments noted concerns and issues that should be addressed in the PEA. One comment was received from the California Air Resources Board, commending MARAD on the Program. Additional comments were received from Federal agencies including the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), and the EPA.

Most of the written comments received during the comment period from March 3 to April 16, 2012 expressed concerns and suggestions for analysis of a range of issues regarding the Program. Of these, the main issues included economic effects, threatened and endangered species issues, whale strike impacts, water quality, air quality, and public safety and security. The DoN expressed concern over training range interference. All comments received during the public scoping meetings, as well as written and emailed comments received during the scoping comment period, were considered in the preparation of this PEA.

1.4 Environmental Review Process

1.4.1 National Environmental Policy Act

In 1969, Congress enacted NEPA, which requires consideration of environmental issues in Federal agency planning and decision making. Regulations for Federal agency implementation of NEPA were established by the President's Council on Environmental Quality (CEQ). NEPA requires Federal agencies to prepare an EA or EIS for any Federal action, except those actions that are determined to be "categorically excluded" from further analysis. An EA is prepared for those Federal actions where the potential environmental impact is not known. The EA is a concise public document that provides sufficient analysis for determining whether the potential environmental impacts of a proposed action are significant, resulting in the preparation of an EIS, or if not significant, resulting in the preparation of a Finding of No Significant Impact (FONSI).

As the responsible party for oversight of all the Program, MARAD has prepared this PEA, together with its appendices and other documents incorporated by reference, to comply with NEPA; CEQ regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); DOT Order 5610.1C, *Procedures for Considering Environmental Impacts* (September 18, 1979); and MARAD Order 600-1, *Procedures for Considering Environmental Impacts* (July 23, 1985).

A programmatic document, such as this PEA, is prepared when an agency proposes to carry out a broad action, program, or policy. MARAD has determined that the implementation of the Program is a broad action with potential nationwide impacts. The programmatic approach creates a comprehensive, analytical framework that assesses potential environmental impacts from further implementation of the

Program. This PEA allows MARAD to focus on issues that need to be addressed from the regional, corridor-based scale, rather than more detailed impacts related to site-specific projects. This PEA describes the overall purpose of and need for the Program; identifies likely direct, indirect, and cumulative impacts associated with the Proposed Action; and identifies prudent programmatic conservation practices and measures. In addition, this PEA describes program-level environmental impacts, and defines those proposed project types that would require further site-specific analysis before the determination of environmental impacts could be reasonably made.

The intent of this PEA is to facilitate agency planning and provide an effective analytical foundation for environmental analyses that may be required for any site-specific Marine Highway segment or project that might be proposed in the future. This PEA is designed to be a valuable decision-making tool that reduces and eliminates redundant analysis and addresses cumulative impacts.

1.4.2 Applicable Laws and Regulations

In addition to NEPA, other laws and regulations may be applicable to a proposed Marine Highway Project.

1.4.2.1 Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996, (16 U.S.C. §4711 *et seq*.)

The Nonindigenous Aquatic Nuisance Prevention and Control Act, as amended by the National Invasive Species Act, is intended to identify and implement ways to prevent the unintentional introduction and spread of invasive species into waters of the U.S., to work toward minimizing economic and ecological impacts of established nonindigenous species, and to establish a program to assist States in the management and removal of such species. The Act directs the USCG to issue regulations to prevent the introduction and spread of aquatic invasive species into the Great Lakes and other U.S. waters through ballast water.

The USCG issued its Ballast Water Final Rule on March 23, 2012 (77 F.R. 17254-17320, summarized below), which established mandatory ballast water discharge standards for all vessels with ballast tanks operating on U.S. waters within the Exclusive Economic Zone (EEZ). Additional guidelines for those vessels traveling outside of the EEZ include the following:

- Avoid ballast operations in or near marine sanctuaries, marine preserves, marine parks, or coral reefs
- Avoid taking on ballast water:
  - with harmful organisms and pathogens, such as toxic algal blooms
  - near sewage outfalls
  - near dredging operations
  - where tidal flushing is poor or when a tidal stream is known to be more turbid
  - in darkness when organisms may rise up in the water column
  - in shallow water or where propellers may stir up the sediment
- Clean ballast tanks regularly
- Discharge minimal amounts of ballast water in coastal and internal waters

- Rinse anchors during retrieval to remove organisms and sediments at their place of origin
- Remove fouling organisms from hull, piping, and tanks on a regular basis and dispose of any removed substances in accordance with local, state, and Federal regulations
- Maintain a vessel-specific ballast water management plan
- Train vessel personnel in ballast water management and treatment procedures

Additionally, EPA currently regulates vessel discharges, including ballast water, with the Vessel General Permit (VGP). The current permit, the 2008 VGP is in effect until 2013 (see Section 1.4.3.11, *Clean Water Act*, for further discussion). EPA is proposing a Draft 2013 VGP and Small Vessel General Permit to authorize discharges incidental to the normal discharge of operations of commercial vessels.

1.4.2.2 Marine Mammal Protection Act (16 USC §1361 *et seq*.)

The Marine Mammal Protection Act (MMPA) protects marine mammals by strictly limiting their "taking" in waters or on lands under U.S. jurisdiction, and on the high seas by vessels or persons under U.S. jurisdiction. The term "take," as defined in Section 3 (16 USC §1362) of the MMPA and its implementing regulations, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The term "harassment" was further defined in the 1994 amendments to the MMPA as any act of pursuit, torment, or annoyance, at two distinct levels:

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

The incidental, but not intentional, taking of marine mammals by U.S. citizens is allowed if certain findings are made and regulations are issued. The MMPA is administered and enforced by the NMFS.

1.4.2.3 Marine Protected Areas

Executive Order (EO) 13158 defines Marine Protected Areas (MPAs) as areas where natural and/or cultural resources are given greater protection than the surrounding waters. In the U.S., MPAs span a range of habitats including the open ocean, coastal areas, intertidal zones, estuaries, and the Great Lakes. They also vary widely in purpose, legal authorities, agencies, management approaches, level of protection, and restrictions on human uses. The official definition of an MPA as presented in EO 13158 is "...any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein."

Two agencies are the primary managers of Federal MPAs. The Department of Commerce, NOAA manages national marine sanctuaries, fishery management zones, and, in partnership with states, national estuarine research reserves. The Department of the Interior manages MPAs through national parks and national wildlife refuges. States, territories, and commonwealths also establish MPAs for various purposes. Each state and territory has various bureaus, departments, and divisions that regulate the environment, manage fisheries, manage lands, and regulate commerce.

1.4.2.4 Endangered Species Act (16 USC §1531 *et seq*.)

The Endangered Species Act (ESA) of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals (including some marine mammals) and plants, and the habitats in which they are found. The ESA prohibits jeopardizing endangered and threatened species or adversely modifying critical habitats essential to their survival. Section 7 of the ESA requires consultation with NMFS and the USFWS to determine whether any endangered or threatened species under their jurisdiction may be affected by a proposed action. Generally, the USFWS manages land and freshwater species while NMFS manages marine species, including anadromous salmon. However, the USFWS has responsibility for some marine animals such as nesting sea turtles, walruses, polar bears, sea otters, and manatees.

1.4.2.5 Migratory Bird Treaty Act (16 USC §703)

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory and certain other birds, their eggs, nests, feathers, or young without an appropriate permit. The MBTA is the primary law that affirms or implements the nation's commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each convention protects selected species of birds that are common to both countries (e.g., they occur in both countries at some point during their annual life cycle).

1.4.2.6 Bald and Golden Eagle Protection Act (16 USC 668-668d, 54 Stat. 250)

The Bald and Golden Eagle Protection Act of 1940 prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Among other actions, a take includes disturbance to the degree that it substantially interferes with breeding, feeding, or sheltering behavior or results in injury (16 USC 668-668d, 54 Stat. 250).

With the recovery and ESA delisting of the bald eagle (*Haliaeetus leucocephalus*) in 2007, it is no longer protected under the ESA, and a new process for regulating take of both bald and golden eagles under the Bald and Golden Eagle Protection Act has been developed by USFWS. A final rule for two new permit regulations became effective in November 2009. 50 CFR Part 22.26 would allow take of both species of eagles (including disturbance and limited "take resulting in mortality"), and 50 CFR Part 22.27 would allow the take of nests of both species for eagle and human health and safety reasons, and in other limited circumstances. Under Part 22.26, the "take" of an eagle refers to the nonpurposeful disturbance, wounding or killing of eagles, which is associated with but is not the purpose of an activity. "Take" can only be authorized when it is compatible with the preservation of bald and golden eagle populations.

1.4.2.7 Magnuson-Stevens Fishery Conservation and Management Act (16 USC §1801-1882)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) established U.S. jurisdiction from the seaward boundary of coastal states out to 200 nautical miles (nm) for the purpose of managing fisheries resources. The MSA is the principal Federal statute that provides for the management of marine fisheries in the U.S. The purposes of the MSA include: (1) conservation and management of the fishery resources of the U.S.; (2) support and encouragement of international fishery agreements; (3)

promotion of domestic commercial and recreational fishing; (4) preparation and implementation of Fishery Management Plans (FMPs); (5) establishment of Regional Fishery Management Councils (FMCs); (6) development of fisheries that are underutilized or not utilized; and (7) protection of Essential Fish Habitat (EFH). Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with the Secretary of Commerce, through the NMFS, regarding potential effects to EFH, and NMFS must provide conservation recommendations (50 CFR § 600.920).

1.4.2.8 National Marine Sanctuaries Act (16 USC §1431 *et seq*.)

The National Marine Sanctuaries Act (NMSA) authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance as national marine sanctuaries. Sanctuaries are administered by NOAA, Office of National Marine Sanctuaries. Regulations at 15 CFR Part 922 further implement the NMSA and regulate the conduct of certain activities within sanctuaries; activities prohibited by regulation can only be undertaken by obtaining a permit. Section 304(d) of the NMSA further requires Federal agencies to consult with NOAA before taking actions, including authorization of private activities, "likely to destroy, cause the loss of, or injure a sanctuary resource."

1.4.2.9 Right Whale Ship Strike Reduction Rule (50 CFR 224.105)

Vessels 65 feet (ft) or greater in length are required to slow down while operating in the U.S. Mid-Atlantic waters where North Atlantic right whales, a federally endangered species, are known to migrate, calve, and nurse. All vessels 65 ft or longer must travel at 10 knots or less in coastal waters from Rhode Island to Georgia (GA) that are classified as Seasonal Management Areas to reduce the threat of ship collisions with North Atlantic right whales. The 10-knot speed restriction extends out to 20 nm around major Mid-Atlantic ports. The speed restriction also applies in waters off New England and the southeastern U.S., where the whales gather seasonally.

The speed restrictions are based on the migration pattern of the whales. Slow moving North Atlantic right whales, among the most endangered whales in the world, are highly vulnerable to ship collisions because their primary feeding and migration areas overlap with major East Coast existing shipping routes.

The speed restrictions apply in the following approximate locations at the following times, and are based on times when whales are known to be in these areas:

- Mid-Atlantic U.S. areas from Rhode Island to Georgia from November 1 to April 30
- Southeastern U.S. from St. Augustine, FL to Brunswick, GA from November 15 to April 15
- Cape Cod Bay from January 1 to May 15
- Off Race Point at the northern end of Cape Cod from March 1 to April 30
- Great South Channel of New England from April 1 to July 31

In addition, NOAA and the USCG have developed and implemented mandatory ship reporting systems. The systems are endorsed by the International Maritime Organization and require ships greater than 300 gross tons to report to a shore-based station when entering North Atlantic right whale critical habitat mandatory reporting areas. In return, ships receive a message about right whales, their

vulnerability to ship strikes, precautionary measures the ship can take to avoid hitting a whale, and locations of recent sightings (NOAA 2012a).

1.4.2.10 Marine Protection, Research and Sanctuaries Act (Ocean Dumping Act) (Public Law 92-532)

The Marine Protection, Research, and Sanctuaries Act, also known as the Ocean Dumping Act, prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment.

Ocean dumping cannot occur unless a permit is issued under the Act. In the case of dredged material, the decision to issue a permit is made by the U.S. Army Corps of Engineers (USACE), using the EPA's environmental criteria and subject to the EPA's concurrence. The Act gives the EPA the responsibility for regulating the dumping of all materials except dredged material and provides for control of both the transportation of material to be dumped and the dumping itself. Materials banned entirely from ocean disposal are radiological, chemical, and biological warfare agents and high-level radioactive wastes. Eleven ocean dumping sites in the Atlantic Ocean and the Gulf of Mexico are now used by approximately 100 permit holders for municipal and industrial wastes.

1.4.2.11 Clean Water Act (33 U.S.C. 1251 *et seq*.)

The Clean Water Act (CWA) of 1972 is the primary Federal law that protects the nation's waters, including lakes, rivers, aquifers, and coastal areas. The primary objective of the CWA is to restore and maintain the integrity of the nation's waters. Jurisdictional waters of the U.S. are regulated resources and are subject to Federal authority under Section 404 of the CWA. Jurisdictional waters are broadly defined to include navigable waters (including intermittent streams), impoundments, tributary streams, and wetlands. Areas meeting the waters of the U.S. definition are under the jurisdiction of USACE. Anyone proposing to conduct a project that requires a Federal permit or involves dredging or fill activities that may result in a discharge to U.S. surface waters and/or waters of the U.S. is required to obtain a CWA Section 401 Water Quality Certification, verifying that the project activities would comply with State water quality standards. Section 404 of the CWA requires a permit from the USACE for any discharge of excavated or fill material into 'waters of the U.S.'

Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES). Most States have been authorized by the EPA to implement NPDES permit programs and stormwater programs. The EPA or authorized State, therefore, regulates any construction activity under a Construction General Permit (CGP). The CGP sets provisions that must be met regarding stormwater regulations and requires a Storm Water Pollution Prevention Plan (SWPPP) to be enacted setting forth sediment, erosion, and pollution prevention measures. Under NPDES, the EPA or an authorized State regulates discharge of nonpoint source pollution. If the State or region has more stringent nonpoint source pollution standards, then these would be enforced by State Water Resources Control Boards (SWRCB) or Regional Water Quality Control Boards (RWQCBs). In general RWQCBs would protect surface, ground, and coastal waters from point and nonpoint pollution sources.

Section 10 of the Rivers and Harbors Act of 1899 regulates structures or work in, or affecting 'navigable waters of the U.S.,' structures including any pier, wharf, bulkhead, etc., and work that includes dredging,

filling, excavation, or other modifications to navigable waters of the U.S. The USACE is authorized to issue permits for structures in 'navigable waters of the U.S.'

2008 Vessel General Permit

The 2008 VGP was issued pursuant to the EPA's authority to issue permits under CWA Section 402. The CWA Section 402 and its implementing regulations contain standards that govern EPA's imposition of NPDES permit conditions.

The 2008 VGP regulates discharges incidental to the normal operation of vessels operating in a capacity as a means of transportation. The VGP includes general effluent limits applicable to all discharges; general effluent limits applicable to 26 specific discharge streams; narrative water-quality-based effluent limits; inspection, monitoring, recordkeeping, and reporting requirements; and additional requirements applicable to certain vessel types.

Recreational vessels as defined in Section 502(25) of the CWA are not subject to this permit. In addition, with the exception of ballast water discharges, nonrecreational vessels less than 79 ft in length, and all commercial fishing vessels, regardless of length, are not subject to this permit (EPA 2008a).

1.4.2.12 National Historic Preservation Act (16 USC §470)

Section 106 of the National Historic Preservation Act (NHPA) as amended requires that Federal agencies allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment whenever their undertakings may affect resources that are listed, or determined eligible for listing, on the National Register of Historic Places (NRHP). The governor of each State or territory appoints a State Historic Preservation Officer (SHPO) who is responsible for administering cultural resources programs within a given jurisdiction. Prior to the approval of an expenditure of any Federal funds for an undertaking that may affect a NRHP resource, consultation procedures should be initiated with the respective SHPO in accordance with NHPA.

Section 110 of the NHPA outlines Federal agencies' responsibilities to preserve cultural resources. Section 110 requires Federal agencies to create and integrate a preservation plan into their overall facilities and environmental management plans that would identify, evaluate, and nominate cultural resources to the NRHP, as well as protect resources from unnecessary harm. Section 110 also requires Federal agencies to use historic properties to the maximum extent feasible.

1.4.2.13 Coastal Zone Management Act (16 USC § 1451 *et seq*.)

The Coastal Zone Management Act (CZMA) is administered by NOAA's Office of Ocean and Coastal Resource Management, provides management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. Applicable to 34 states, each State is tasked with creating and administering their Coastal Zone Management Plan (CZMP), which must address the protection of natural coastal resources, wildlife, and fish; include provisions to allow for public and local comment on decisions involving coastal resources; and manage development of and public access to coastal areas.

The CZMA requires that any Federal activity within or outside of the coastal zone, which affects any land or water use or natural resource of the coastal zone, be consistent to the maximum extent practicable

with the enforceable policies of a State's CZMP. Federal agencies, must consult with, cooperate with, and, to the maximum extent practicable, coordinate their activities with other interested Federal agencies (NOAA 2012b).

1.4.2.14 Coastal Barrier Resources Act (Public Law 97-348, 16 USC §§3501–3510; amended by the Coastal Barrier Improvement Act [Public Law 101-591])

The Coastal Barrier Resources Act is administered by the USFWS to preserve the ecological integrity of areas that protect the U.S. mainland from storms and provide important habitats for fish and wildlife, and protect coastal barrier islands on the Atlantic and Gulf Coasts, as well as barrier islands within the Great Lakes. The Act created the Coastal Barrier Resources System (CBRS), comprised of barrier islands and coastal areas within 24 states, in which Federal financial assistance for development-related activities in designated areas is prohibited.

1.4.2.15 Executive Orders

EO 11990 (Protection of Wetlands) is in place to preserve the beneficial value of wetlands by minimizing any degradation, destruction, and loss to any wetland area. All Federal projects are to consider the proposed project's effect on the survival and quality of wetlands. The USACE, EPA, and USFWS together administer the wetlands requirements. The USACE's definition of a wetland uses the 'three-parameter test' as a regulatory definition of wetlands and for determining jurisdictional boundaries of wetlands for regulatory purposes. The three parameters used are hydrophytic vegetation, hydric soils, and wetland hydrology. If all three conditions are present the USACE defines this area as wetland habitat. In order to determine presence or absence of wetland habitat, a jurisdictional delineation would have to be completed.

The National Ocean Council established the Interagency Ocean Policy Task Force (Task Force), led by the Chair of the CEQ, to develop recommendations to enhance the nation's ability to maintain healthy, resilient, and sustainable oceans, coasts, and Great Lakes resources. In response to the Task Force recommendations, EO 13547 (Stewardship of the Ocean, Our Coasts, and the Great Lakes) was signed on July 19, 2010. The recommendations included the following (CEQ 2010):

- Provide our nation's first ever National Policy for the Stewardship of the Ocean, our Coasts, and the Great Lakes
- Provide a strengthened governance structure to provide sustained, high-level, and coordinated attention to ocean, coastal, and Great Lakes issues
- Provide a targeted implementation strategy that identifies and prioritizes nine categories for action that the U.S. should pursue:
    - Ecosystem-Based Management
    - Coastal and Marine Spatial Planning
    - Inform Decisions and Improve Understanding
    - Coordinate and Support Federal, State, Tribal, Local, and Regional Management of the Ocean, Our Coasts, and the Great Lakes
    - Resiliency and Adaptation to Climate Change and Ocean Acidification
    - Regional Ecosystem Protection and Restoration

  - Water Quality and Sustainable Practices on Land
  - Changing Conditions in the Arctic
  - Ocean, Coastal, and Great Lakes Observations, Mapping, and Infrastructure

- Provide a framework for effective coastal and marine spatial planning that establishes a comprehensive, integrated, ecosystem-based approach to address conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources

EO 13547 supports the enhanced sustainability of ocean and coastal economies, preserves our maritime heritage, supports sustainable uses and access, provides for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification, and coordinates with national security and foreign policy interests. EO 13547 provides for the development of coastal and marine spatial plans that build upon existing Federal, State, tribal, local, and regional decision making and planning processes. The proposed Marine Highway should comply with Council-certified coastal and marine spatial plans, as described in the final recommendations and subsequent guidance from the National Ocean Council.

EO 11988 (Floodplain Management) is in place to reduce long- and short-term adverse impacts associated with development and modification of floodplains. If the proposed activity of a project is determined to have impacts associated within a 100-year floodplain, then this activity is subject to EO 11988.

2.0 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action in this PEA is to develop further the Program in order to relieve landside congestion, provide redundancy to nearby surface transportation facilities, and maximize the efficiency of the U.S. Marine Transportation System by increasing use of the existing capacity within the nation's navigable waterways. The Proposed Action supports an overview of a variety of project types with the goal of developing and expanding Marine Highway services in a self-sustaining, commercially viable manner that recognizes public benefits these services create. Examples of benefits may include reduced congestion on highways and roads, fewer GHG emissions resulting from a more sustainable transportation system, improved safety, and additional sealift military resources that support our national defense.

The Program would continue to designate new Marine Highway Corridors, Projects, and Initiatives to increase the utilization of U.S. navigable waterways to reduce landside congestion. For the purposes of the PEA analyses, the 18 Marine Highway Corridors, Connectors, and Crossings are analyzed based on their location within the following five regions of the U.S.:

- West Coast
- Great Lakes
- Inland Waterways/Mississippi
- Gulf Coast
- East Coast

In evaluating ways to develop the Program, a range of conceptual Marine Highway services were identified within each region. Each region includes three to five corridors, connectors, or crossings, each of which may include 10 or more ports. Because of the number of ports associated with each Marine Highway, the approach of this PEA is to select representative pairs of ports ("port pairs") in each region and identify the potential Marine Highway services that could be provided between the two ports. This analysis includes the identification of the types of vessels that could be used along with the capacity of the vessels and the expected frequency of trips between the representative port pairs. Because containers come in a variety of sizes, the capacity of each of the vessel types is based on the number of TEUs the vessel can carry. A TEU is a standard 20-ft long intermodal container with a width and height of eight ft. A 40-ft equivalent unit (FEU) is a standard 40-ft long intermodal container with a width and height of eight ft. Because one standard FEU is twice as long as a 20-ft container, a single FEU is counted as two TEUs. As discussed in Section 1.1.2.1, Assumptions, the following general types of vessels of varying capacities are used in the analysis:

- Ocean going vessels (OGV) of mid- to small size
  - Capacity of 600 to 800 TEUs
  - C3 engine
  - Cruising speed of 20 knots
- Ocean going tug/barge (typically an ATB unit)
  - Capacity of 100 to 400 TEUs
  - C2 engine

    - Cruising speed of 12 knots
- Inland towboat/barges
    - Capacity of 100-350 TEUs
    - C2 engine
    - Cruising speed of 8 knots

Marine Highway services use existing waterways, ship channels, and ports. Channels and waterways are maintained by the US Army Corps of Engineers. Because existing routes and port infrastructure are used in the operations of the Marine Highway services, there would be no dredging or major port infrastructure development associated with new Marine Highway Projects. All vessel types that are used for Marine Highway services would comply with all environmental regulations, as appropriate.

For purposes of this PEA, trips by marine vessels versus trucks were analyzed for the long haul, point-to-point movement of cargo. It is assumed that any drayage movement at the origin/destination points would be accomplished by truck and would be similar regardless of long-haul mode. Rail transportation was not included in this analysis because it does not move a substantial portion of the containerized freight cargoes in the markets being examined.

2.1.1 West Coast

The following section describes the conceptual Marine Highway services that have the potential to be established in the West Coast region. Table 2.1-1 describes the Marine Highway Corridors, Connectors, and Crossings on the West Coast with their associated land highway corridor(s); waterways; origin and destination(s); ports serviced; and transportation methods of goods. Figure 2-1 depicts the Corridors, Connectors, and Crossings within the region.

Table 2.1-1. Marine Highway Corridors, Connectors, and Crossings on the West Coast

Marine Highway	Land Highway Corridor	Waters	Origin	Destination	Ports Serviced*	Method of Transport
M-5	Parallels Interstate (I-) 5	Pacific Ocean coastal waters	San Diego, CA	Northernmost U.S. port in WA, connecting to AK	CA: San Diego, Los Angeles/Long Beach, San Francisco, Humboldt Bay; OR: Portland, Longview, Coos Bay; WA: Vancouver, Tacoma, Seattle, Olympia, Everett, Skagit County, Bellingham	Commercial vessel, rail, truck
M-580	I-580, I-80, and I-205	Pacific Ocean coastal waters	Sacramento, CA	Oakland, CA	CA: Oakland, Stockton, West Sacramento	Commercial vessel, rail, truck, barge
M-84	I-84 and I-5	Columbia and Snake Rivers	Astoria, OR	Lewiston, ID	OR: Astoria, St. Helens Portland, The Dalles, Arlington, Umatilla, Morrow	Commercial vessel, rail, truck, barge
M-5 Alaska Connector	Alaska-Canada Highway and Richardson Highway	Pacific Ocean coastal waters, Inside Passage	Puget Sound	Unalaska in the Aleutian Islands, AK	AK: Dutch Harbor, Kodiak, Anchorage, Valdez, Ketchikan	Commercial vessel, rail, truck, air
M-A1 Crossing	RT A1	Upper Cook Inlet and Matanuska and Susitna Rivers	Anchorage, AK	Talkeetna and Palmer, AK	AK: Anchorage, Knik, MacKenzie	Commercial vessel, rail, truck, air, barge

Notes: *Includes larger ports serviced within the corridor. Additional ports may also be serviced by implementation of short sea shipping practices along the Marine Highway Corridor.
AK – Alaska; CA – California; ID – Idaho; OR – Oregon; WA - Washington

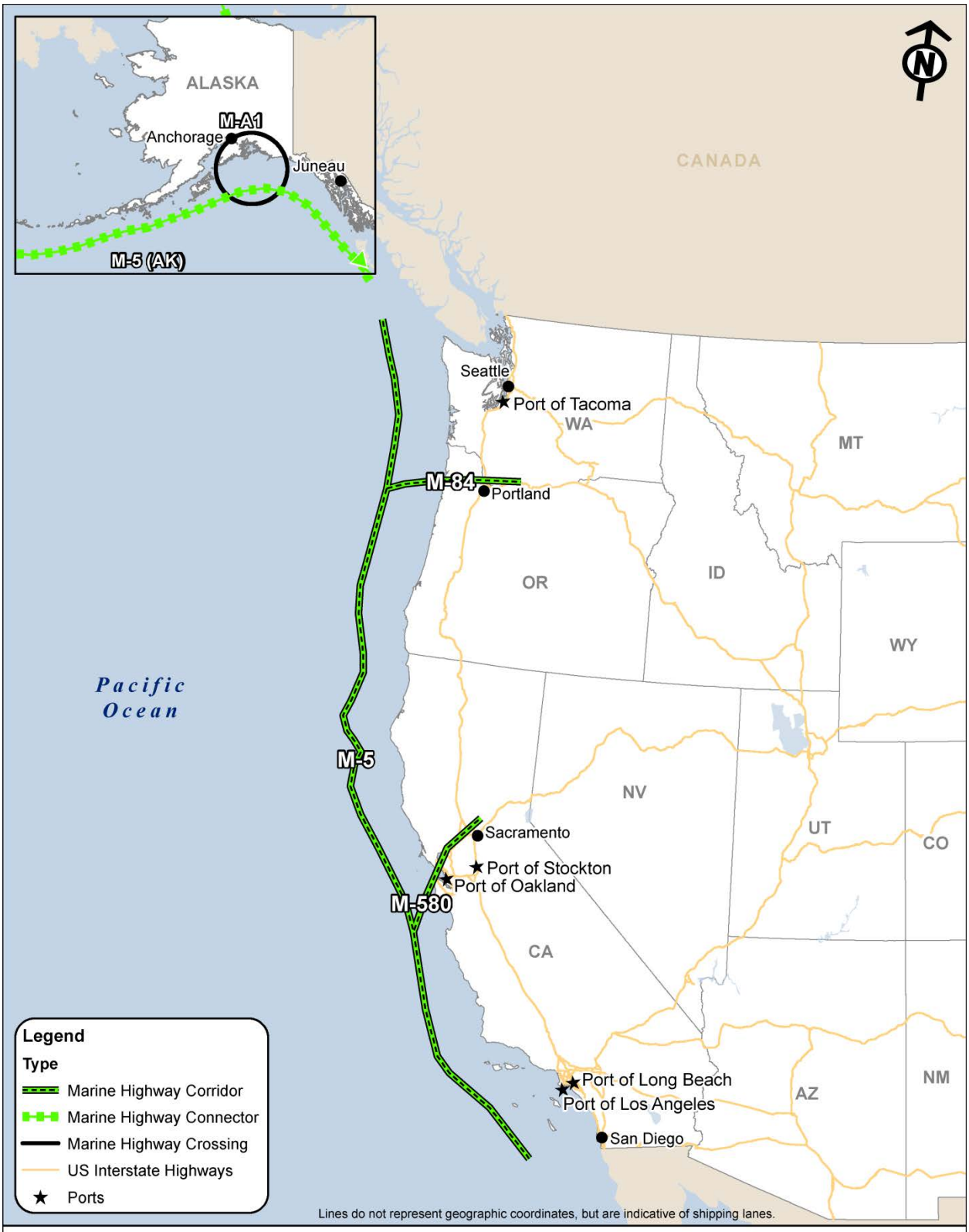

Figure 2-1
Marine Highway Corridors on the West Coast

The conceptual Marine Highway services are described in Table 2.1-2 and include the representative port pairs selected within the region, as well as the proposed volume and frequency of trips. Figure 2-1 shows the representative ports along the Marine Highway Corridors on the West Coast.

Table 2.1-2. Conceptual Marine Highway Services on the West Coast

Port Pair	Conceptual Marine Highway Services		
	Vessel Type	Volume (TEUs/Vessel)(1)	Frequency (round trips per week)
Los Angeles/Long Beach, CA to Tacoma, WA	ATB	300	1
	OGV	750	2
Oakland to Stockton, CA	Inland towboat/barge	350	2

Note: (1) 2.15 TEUs equal one truckload in terms of volume.

At the time this PEA was written, there was no container-on-barge traffic transiting the ports of Los Angeles/Long Beach, CA to Tacoma, WA or within the Stockton Ship Channel between the ports of Stockton and Oakland. The conceptual Marine Highway services would be a completely new service along this Corridor and between these port pairs.

Vessel Characteristic Assumptions

The conceptual Marine Highway service between Los Angeles/Long Beach, CA and Tacoma, WA would utilize ATB vessels and OGVs with capacities of 300 TEUs and 750 TEUs, respectively. The conceptual Marine Highway service between Oakland, CA and Stockton, CA would utilize inland towboat/barge vessels.

ATBs would move at speeds of approximately eight nautical miles per hour (knots). OGVs would move at speeds of approximately 20 knots. The length overall (LOA) for an ATB can range from 350 to 500 ft with a draft of up to 14 ft fully loaded (Rubright 2012). The LOA for an OGV ranges from 550 to 750 ft with a draft of 28 to 34 ft (Clarkson Research 2011).

Cargo

Primary southbound products to be moved as part of the proposed conceptual Marine Highway service would include those related to forest and food products including:

- Wood products
- Newsprint/paper
- Paper products
- Milled grain products
- Other foodstuffs

Primary northbound products from Los Angeles/Long Beach, CA and Tacoma, WA are manufactured food and beverages including:

- Milled grain products
- Other foodstuffs
- Alcoholic beverages in bottles

2.1.2 Great Lakes

The following section describes the conceptual Marine Highway services that have the potential to be established in the Great Lakes region. Table 2.1-3 describes the existing Marine Highway Corridors and Crossings on the Great Lakes with their associated land highway corridor(s), waters, origin and destination(s), ports serviced, and transportation methods of goods. Figure 2-2 depicts the Corridors and Crossings within the region.

Table 2.1-3. Marine Highway Corridors, Connectors, and Crossings on the Great Lakes

Marine Highway	Land Highway Corridor	Waters	Origin	Destination	Ports Serviced*	Method of Transport
M-90	I-90, I-80, and I-94	Great Lakes and Erie Canal	Albany, NY	Chicago, IL and Duluth, MN	Great Lakes ports in the U.S. and Canada	Commercial vessel, rail, truck, barge
M-75	I-75	Detroit River and Lake Erie	Detroit, MI	Lake Erie	MI: Detroit, Monroe OH: Toledo, Sandusky, Marblehead, Cleveland, Ashtabula Erie, PA	Commercial vessel, rail, truck, barge
M-71/77 Crossing	I-71 and I-77	Lake Erie	OH	Montreal, Canada	OH: Grand River, Toledo, Lorain, Cleveland, Ashtabula	Commercial vessel, rail, truck, barge

Notes: * Includes larger ports serviced within the corridor. Additional ports may also be serviced by implementation of short sea shipping practices along the Marine Highway Corridor.
MI – Michigan; MN – Minnesota; NY – New York; OH – Ohio; PA - Pennsylvania

The conceptual Marine Highway services are described in Table 2.1-4 and include the representative port pairs selected within the region, as well as the proposed volume and frequency of trips. Figure 2-2 shows the representative ports along the Marine Highway Corridors on the Great Lakes.

Table 2.1-4. Conceptual Marine Highway Services on the Great Lakes

Port Pair	Conceptual Marine Highway Services		
	Vessel Type	Volume (TEUs/Vessel)(1)	Frequency (round trips per week)
Oswego, NY to Toledo, OH	ATB	300	1
Duluth, MN to Sault Ste. Marie, Ontario	ATB	300	1
Toledo, OH to Montreal, Quebec	ATB	300	2

Note: (1) 2.15 TEUs equal one truckload in terms of volume

There is currently no regular container service along the Marine Highway Corridors on the Great Lakes. The conceptual Marine Highway services would be completely new services along this corridor and between these port pairs.

Vessel Characteristic Assumptions

The conceptual Marine Highway services listed in Table 2.1-4 would utilize ATB vessels with a capacity of 300 TEUs. ATBs move at speeds of approximately 12 knots. The LOA for an ATB can range from 350 to 500 ft with a draft of up to 14 ft fully loaded (Rubright 2012).

Figure 2-2
Marine Highway Corridors on the Great Lakes

Cargo

The proposed cargo within the conceptual Marine Highway includes machinery and transportation equipment.

2.1.3 Inland Waterways/Mississippi

The following section describes the conceptual Marine Highway services that have the potential to be established in the Inland Waterways/Mississippi region. Table 2.1-5 describes the Marine Highway Corridors and Connectors on the Inland Waterways/Mississippi with their associated land highway corridor, waters, origin and destination(s), ports serviced, and transportation methods of goods. Figure 2-3 depicts the Corridors and Connectors within the region.

Table 2.1-5. Marine Highway Corridors and Connectors on the Inland Waterways/Mississippi

Marine Highway	Land Highway Corridor	Waters	Origin	Destination	Ports Serviced*	Method of Transport
M-70	I-70	Ohio, Mississippi, and Missouri Rivers	Pittsburgh, PA	Kansas City, MO	Pittsburgh, PA; Cincinnati, OH; Indiana-Jeffersonville, IN; Evansville, IL; MO: St. Louis, Kansas City	Rail, truck, barge
M-40 Connector	I-40	McClellan-Kerr Arkansas River Navigation System along the Arkansas, Verdigris, and White Rivers	Catoosa, OK	Mississippi River near Napoleon, AR	AR: Pine Bluff, Little Rock, Fort Smith; OK: Muskogee, Catoosa	Rail, truck, barge
M-55	I-55	Mississippi and Illinois Rivers	New Orleans, LA	St. Louis, MO; Chicago, IL through LA, MS, AR, TN, MI, IL	IL: Chicago, Joliet, Peoria, America's Central Port, Beardstown; Memphis, TN; Vicksburg, MS; LA: Baton Rouge, Avondale, New Orleans	Commercial vessel, rail, truck, barge

Notes: * Includes larger ports serviced within the corridor. Additional ports may also be serviced by implementation of short sea shipping practices along the Marine Highway Corridor.
AR – Arkansas; IL – Illinois; IN – Indiana; LA – Louisiana; MI – Michigan; MO – Missouri; MS – Mississippi; OH – Ohio; OK – Oklahoma; PA – Pennsylvania; TN – Tennessee

Figure 2-3
Marine Highway Corridors on the Inland Waterways/Mississippi

The conceptual Marine Highway services are described in Table 2.1-6 and include the representative port pairs selected within the region, as well as the proposed volume and frequency of trips. Figure 2-3 shows the representative ports along the Marine Highway Corridors on the Inland Waterways/Mississippi.

Table 2.1-6. Conceptual Marine Highway Services on the Inland Waterways/Mississippi

Port Pair	Conceptual Marine Highway Services		
	Vessel Type	Volume (TEUs/Vessel)(1)	Frequency (round trips per week)
Peoria, IL to New Orleans, LA	Inland Towboat/Barges	100	2

Note: (1) 2.15 TEUs equal one truckload in terms of volume

Container-on-barge service connecting New Orleans and Baton Rouge and Memphis was operated for a number of years, but was discontinued around 2009. At the time this PEA was written, there was no existing service between the ports of Peoria, IL and New Orleans, LA. The conceptual Marine Highway service as listed in Table 2.1-6 would be a completely new service along this Corridor and between these port pairs.

Vessel Characteristic Assumptions

Vessels transporting cargo from Peoria, IL to New Orleans, LA would consist of inland towboat/barges with capacities of up to 100 TEUs. An inland towboat/barge moves at a speed of 8 knots. The LOA for an inland towboat/barge ranges from 350 to 500 ft with a draft of up to 14 ft fully loaded (Tyler 2012).

Cargo

The container-on-barge service would serve the agricultural, chemical, and industrial markets. Principal southbound products are primarily related to construction and agriculture equipment including:

- Small/medium machines
- Removable parts off the main units
- Automotive supplies
- Corn, soybeans, and distiller grains

Primary northbound products include:

- Parts and components
- Castings and tires
- Automotive parts

2.1.4 Gulf Coast

The following section describes the conceptual Marine Highway services that have the potential to be established in the Gulf Coast region. Table 2.1-7 describes the Marine Highway Corridors on the Gulf Coast with their associated Land Highway Corridor(s), waters, origin and destination, ports serviced, and transportation methods of goods for the Gulf Coast region. Figure 2-4 depicts the Corridors within the region.

Table 2.1-7. Marine Highway Corridors, Connectors, and Crossings on the Gulf Coast

Marine Corridor	Land Highway Corridor	Waters	Origin	Destination	Ports Serviced*	Method of Transport
M-10	I-10 and I-75	Gulf of Mexico and Gulf Intracoastal Waterway	Brownsville, TX	Port Manatee, FL	FL: Port Manatee, Jacksonville, Tampa, Pensacola; Pascagoula, MS; Mobile, AL; LA: Morgan City, New Orleans, St. Bernard Terminal, Freeport, Lake Charles; TX: Houston, Brownsville	Commercial vessel, rail, truck, barge
M-49	U.S. Highway 90 and I-49	Atchafalaya River and J. Bennett Johnson Waterway	Morgan City, LA	Shreveport, LA	LA: Morgan City, New Orleans, Greater Baton Rouge, Krotz Springs	Commercial vessel, rail, truck, barge
M-65	I-65	Mobile, Tennessee Tombigbee, and Black Warrior Rivers	Mobile, AL	Birmingham, AL	MS: Yellow Creek State Inland, Itawamba, Lowndes County; KY: Paducah-McCracken County Riverport	Rail, truck, barge

Notes: *Includes larger ports serviced within the corridor. Additional ports may also be serviced by implementation of short sea shipping practices along the Marine Highway Corridor.
AL – Alabama; FL – Florida; LA – Louisiana; MS – Mississippi; KY – Kentucky; TX - Texas

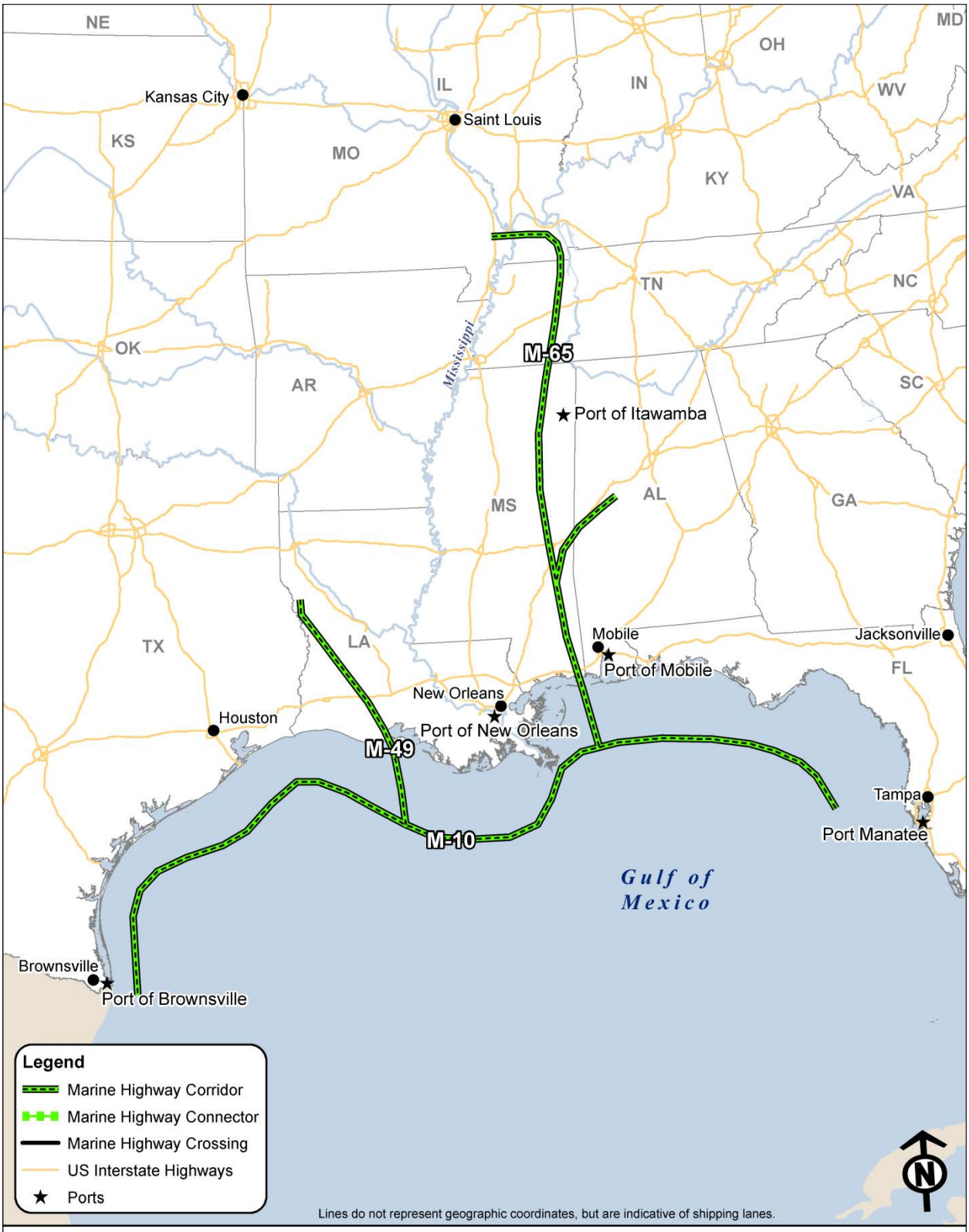

Figure 2-4
Marine Highway Corridors on the Gulf Coast

The conceptual Marine Highway services are described in Table 2.1-8 and include the representative port pairs selected within the region, as well as the proposed volume and frequency of trips. Figure 2-4 shows the representative ports along the Marine Highway Corridors on the Gulf Coast.

Table 2.1-8. Conceptual Marine Highway Services on the Gulf Coast

Port Pair	Conceptual Marine Highway Services		
	Vessel Type	Volume (TEUs/Vessel)(1)	Frequency (round trips per week)
Brownsville, TX to Port Manatee, FL via Mobile, AL	ATB	300	1
Fulton, MS (Port of Itawamba) to Mobile, AL	Towboat/Barges	100	2

Note: (1) 2.15 TEUs equal one truckload in terms of volume.

A container-on-barge service was operated from 2008 to 2011 on the M-10 corridor between Brownsville, TX and Manatee, FL, but currently there is no existing service. There is also no service along the Tenn-Tom Waterway between the ports of Itawamba, MS and Mobile, AL. The conceptual Marine Highway services listed in Table 2.1-8 would be completely new.

Vessel Characteristic Assumptions

The conceptual Marine Highway service between Brownsville, TX and Port Manatee, FL would utilize an ATB with a capacity of up to 300 TEUs. ATBs move at speeds of approximately 12 knots. The LOA for an ATB can range from 350 to 500 ft with a draft of up to 14 ft fully loaded (Rubright 2012). The conceptual service between the Port of Itawamba, MS and Mobile, AL would consist of inland towboat/barges with capacities of up to 100 TEUs. An inland towboat/barge moves at a speed of 8 knots. The LOA for an inland towboat/barge ranges from 350 to 500 ft with a draft of up to 14 ft fully loaded (Tyler 2012).

Cargo

The primary cargo to be moved along this conceptual Marine Highway service would be steel coils, steel wire and rods, ceramic tile, roll paper, gypsum board and related building products, bottled beverages, and ceramic plumbing fixtures. Cargo may also include department store merchandise, tires, steel products, tissue, cartons and waste paper.

2.1.5 East Coast

The following section describes the conceptual Marine Highway services that have the potential to be established in the East Coast region. Table 2.1-9 describes the Marine Highway Corridors and Connectors on the East Coast with their associated land highway corridor, waters, origin and destination, ports serviced, and transportation methods of goods. Figure 2-5 depicts the Corridors and Connectors within the region.

Table 2.1-9. Marine Highway Corridors, Connectors, and Crossings on the East Coast

Marine Corridor	Land Highway Corridor	Waters	Origin	Destination	Ports Serviced*	Method of Transport
M-95	I-95	Atlantic Ocean Coastal Waters and Atlantic Intracoastal Waterway	Miami, FL	Portland, ME	Portland, ME; MA: Boston, New Bedford; Providence/Quonset, RI; NY/NJ; Philadelphia, PA; Wilmington, DE; Baltimore, MD; Norfolk, VA; Wilmington, NC; Savannah/Charleston, SC; FL: Jacksonville, Cape Canaveral, Palm Beach, Miami, Key West	Commercial vessel, rail, truck
M-87 Connector	I-87	Hudson River	New York City, NY	Albany, NY	NY: Albany, Catskill, Kingston, Poughkeepsie, Newburgh, Yonkers, New York City	Commercial vessel, rail, truck, barge
M-64 Connector	I-64	Hampton Roads, the Chesapeake Bay, and James River	Norfolk, VA	Richmond, VA	VA: Norfolk, Newport News, Hopewell, Richmond	Commercial vessel, rail, truck, barge
M-2	I-2	Caribbean Sea	Puerto Rico	via San Juan, Mayguez, and Ponce	Puerto Rico: Ponce, Mayaguez Ceiba, Yabucoa, Guanica Guayama, Guayanilla, Arecibo, Fajardo, Jobos Bay	Commercial vessels Rail Truck Barge

Notes: *Includes larger ports serviced within the corridor. Additional ports may also be serviced by implementation of short sea shipping practices along the Marine Highway Corridor.
DE – Delaware; FL – Florida; MA – Massachusetts; MD – Maryland; ME – Maine; NC – North Carolina; NJ – New Jersey; NY – New York; PA – Pennsylvania; SC – South Carolina; VA - Virginia

Figure 2-5
Marine Highway Corridors on the East Coast

The conceptual Marine Highway services on the East Coast are described in Table 2.1-10 below and include the representative port pairs selected within the region, as well as the volume and frequency of trips proposed. Figure 2-5 above shows the representative ports along Marine Highway Corridors on the East Coast.

Table 2.1-10. Conceptual Marine Highway Services on the East Coast

Port Pair	Conceptual Marine Highway Services		
	Vessel Type	Volume (TEUs/Vessel)(1)	Frequency (round trips per week)
NY/NJ to Norfolk, VA	ATB	200	1
	OGV	600	2
Norfolk, VA to Port Canaveral, FL	ATB	200	1
	OGV	600	2
NY/NJ to Portland, ME	ATB	200	1
	OGV	800	2

Note: (1) 2.15 TEUs equal one truckload in terms of volume.

There currently is no Marine Highway service connecting the terminal facilities at the Port of New York/New Jersey (NY/NJ) and Norfolk, VA or Portland, ME, nor is there a service between Norfolk, VA and Port Canaveral, FL. The conceptual Marine Highway services listed in Table 2.1-10 would be completely new services along this Corridor and between these port pairs.

Vessel Characteristic Assumptions

The conceptual Marine Highway services listed in Table 2.1-10 would utilize ATB vessels and OGVs with capacities of 200 TEUs and 600 to 800 TEUs, respectively. ATBs would move at speeds of approximately 12 knots. OGVs would move at speeds of approximately 20 knots. The LOA for an ATB can range from 350 to 500 ft with a draft of up to 14 ft fully loaded (Rubright 2012). The LOA for an OGV ranges from 550 to 750 ft with a draft of 28 to 34 ft (Clarkson Research 2011).

Cargo

Principal southbound cargo in this region varies and could include:

- Wood products
- Newsprint/paper
- Prepared foods
- Other foodstuffs
- Furniture
- Miscellaneous manufacturing products

Primary northbound cargo in this region also varies and could include:

- Wood products
- Nonmetal mineral products
- Other foodstuffs
- Precision instruments
- Other agricultural products

- Newsprint/paper

2.2 No Action Alternative

NEPA requires agencies to consider a "no action" alternative in their analyses and to compare the effects of not taking action with the effects of the action alternative(s). Under the No Action Alternative, the Program would not be developed further and DOT would not be in compliance with the Energy Act. Furthermore, the No Action Alternative would not satisfy the purpose and need for the Proposed Action as stated above. For the purposes of this document, the No Action Alternative serves as a baseline to compare the impacts of the Proposed Action.

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3.0 DEFINITIONS AND RESOURCES

In compliance with NEPA and CEQ regulations, the scope of analysis in this PEA focuses only on those resources potentially subject to impacts. Comments received during scoping were considered while developing the list of resources to be analyzed in this PEA.

This chapter provides definitions for the resources that could potentially be affected by the Proposed Action and Alternatives. The affected area consists of the five regions and the representative port pairs, as described in Sections 2.1.1 through 2.1.5. The five regions are discussed in Chapters 4 through 8. In order to avoid redundant resource definitions in Chapters 4-8, each resource is defined once in this chapter.

The following areas of analysis were not evaluated in detail in this PEA because they would not be affected by implementation of the Proposed Action: environmental justice, protection of children, and visual resources. A brief evaluation of these resources is provided below.

Environmental Justice and Protection of Children. Implementation of the Proposed Action would comply with EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations*; DOT Order 5610.2(a), *Actions to Address Environmental Justice in Minority Populations and Low-income Populations*; and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks.* Implementation of the Proposed Action would occur in already established Marine Highway Corridors and ports and would not affect human populations, including minority and low-income populations. The port areas are industrial areas with secured access restricted to port personnel and others authorized by the ports. Therefore, children would not be present in the affected environment and the Proposed Action would not result in health or safety risks to children.

Visual Resources. The conceptual Marine Highway services identified within all regions include a limited number of vessel trips consistent with the types and nature of vessels currently used within the Marine Highway Corridors and representative ports. In addition, the ports are already developed, typically in industrial/commercial areas. Therefore, implementation of the Proposed Action would have a negligible effect on visual resources within the areas of the ports. The Proposed Action would not adversely impact any scenic and visual qualities or coastal viewsheds in the port areas.

3.1 Noise

Noise is defined as any sound that interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Noise can be intermittent or continuous, steady or impulsive, as well as stationary or transient. Stationary noise sources are typically associated with specific land uses (e.g., schools or industrial facilities). Transient noise sources move through the environment, either along established paths (e.g., highways and railroads) or randomly (e.g., vocalizations). For underwater environments, stationary noise is generated by construction whereas transient noise is generated by vessel operations, precipitation, and marine mammals.

Perception of and responses to noise are highly variable and depend largely on the type of noise, the characteristics of the sound and its source, the sensitivity and expectations of the receptor, the time of day, and the distance and number of barriers between the noise source and the receptor (e.g., a person or animal). Sensitive receptors associated with noise are generally areas that can be substantially affected by noise. Examples of these types of areas include residential areas, schools, parks, libraries, and hospitals. Wildlife and their habitat can also be considered sensitive noise receptors.

3.1.1 Basics of Sound

The physical characteristics of sound include frequency, intensity, and duration. Frequency describes the sound's pitch and is measured in hertz (Hz), while intensity describes the sound's loudness. Because of the wide range of pressure and intensity encountered during measurements of sound, a logarithmic scale is used. In acoustics, the word "level" denotes a sound measurement in decibels (dB). A decibel expresses the logarithmic strength of a signal relative to a reference. Because the decibel is a logarithmic measure, each increase of 20 dB reflects a 10-fold increase in signal amplitude (i.e., 20 dB increase means 10 times the amplitude, 40 dB means 100 times the amplitude, 60 dB means 1,000 times the amplitude, etc.). Under most conditions, a change of 5 dB is required for humans to perceive a change in the noise environment (EPA 1974). Because the decibel is a relative measure, any value expressed in decibels is meaningless without an accompanying reference. In describing underwater sound pressure, the reference amplitude is usually 1 microPascal (µPa, or 10^{-6} Pascals), and is expressed as dB re 1 µPa. For airborne (in-air) sound pressure, the reference amplitude is usually 20 µPa and is expressed as dB re 20 µPa.

Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 to 15,000 Hz. However, all sounds throughout this range are not heard equally well. The human ear is most sensitive to frequencies in the 1,000 to 4,000 Hz range; sounds measured in these frequencies are termed "A-weighted" and are shown in terms of A-weighted decibels (dBA) (EPA 1974). Human hearing ranges from approximately 20 dBA (the threshold of hearing) to 120 dBA (the threshold of pain) (U.S. Air Force [USAF] 2011).

3.1.2 Noise Metrics

There are many different types of metrics used to measure and evaluate noise in the terrestrial (airborne) and aquatic (underwater) environment. Each metric has a different physical meaning or interpretation and was developed by researchers attempting to represent the effects of environmental noise. The metrics supporting the assessment of noise that would result from the establishment and operation of a Marine Highway system are briefly discussed below.

<u>Marine Noise along Shipping Routes</u>

Three metrics are commonly used in evaluating acoustic impacts on marine species: peak sound pressure level (L_{PEAK}), root mean square (RMS), and sound exposure level (SEL). Sound is created by acoustic energy, which produces pressure waves that travel through a medium, like air or water, and are sensed by the auditory system of the receptor (e.g., ear). This may be likened to the ripples in water produced by a stone being dropped into it. As the acoustic energy increases, the intensity or amplitude of the pressure waves increases, and the ear senses louder noise. The values of the pressure waves are

constantly changing, increasing to a maximum value above normal air pressure then deceasing to a minimum value below normal air pressure, in a repetitive fashion.

The L_{PEAK} is the maximum value of the continuously changing amplitudes, whereas the RMS amplitude is determined by squaring all of the amplitudes over a period of time, determining the mean of the squared values, and then taking the square root of the mean of the squared values (Illingworth and Rodkin Inc. 2009).

The SEL is a measure of the physical energy associated with a noise event, incorporating both the intensity and duration of the event. This metric is used to evaluate both airborne and underwater noise. SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. Its value represents all of the acoustic energy associated with the event as though it was present for 1 second. The SEL value is important because it is the value used to calculate other time-averaged noise metrics (USAF 2011).

The day-night average sound level (L_{dn}) is the energy-averaged sound level of all SEL values within a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10 p.m. and 7 a.m. to compensate for the annoyance associated with the occurrence of nighttime noise events. The L_{dn} is the preferred noise metric for land based activities of the U.S. Department of Housing and Urban Development, Federal Aviation Administration, EPA, and the Department of Defense (Federal Interagency Committee on Urban Noise [FICUN] 1980).

In the marine environment, sound pressure levels of 206 dB_{PEAK} re 1 µPa and 187 dB re 1 µPa cumulative SEL are the threshold criteria for potential injury to fish greater than 2 grams. For smaller fish, the criterion for the cumulative SEL is 183 dB re 1 µPa (Illingworth and Rodkin Inc. 2009). Current thresholds for determining impacts to marine mammals typically center around sound pressure levels of 180 dB_{RMS} re 1 µPa (impulse) and 190 dB_{RMS} re 1 µPa (impulse) for potential injury to cetaceans and pinnipeds, respectively; 160 dB_{RMS} re 1 µPa (impulse) for behavioral disturbance/harassment to cetaceans and pinnipeds; and 120 dB_{RMS} re 1 µPa (continuous) for behavioral disturbance/harassment of cetaceans and pinnipeds (Southall et al. 2007).

<u>Noise in the Marine Environment</u>

Wind and waves are common and interrelated sources of ambient noise in the ocean. Other factors being equal, ambient noise levels tend to increase with increasing wind speed and wave height. Surf noise is a form of wave noise localized near the land-sea interface. Precipitation on the ocean surface also contributes sound to the ocean. In general, noise from rain or hail is an important component of total noise during periods of precipitation. Rain can increase natural ambient noise levels and heavy precipitation associated with large storms can significantly affect ambient noise levels at a considerable distance from the storm's center. In addition, thunder is a loud, explosive event that has a short-term local effect on ambient noise. Noise from earthquake, volcanic, and hydrothermal vent activity can contribute significantly to ambient noise, particularly in geologically active areas. Movement of sediment by currents across the ocean bottom can also be a significant source of ambient noise (National Research Council 2003).

Biological sources of underwater noise are sounds created by animals and can contribute significantly to the ambient noise levels in certain areas of the ocean. Marine mammals are major contributors but some crustaceans (e.g., snapping shrimp) and fish (e.g., drumfish) can also be significant (National Research Council 2003).

Most man-made noises that may affect marine mammals or other marine animals come from a few general types of activities that occur on or beneath the ocean: transportation (surface vessels and aircraft), dredging, construction, hydrocarbon and mineral exploration and extraction, seismic surveys, sonars, explosions, and ocean acoustic studies. Surface vessels are a major contributor to ocean ambient noise.

Land Based Noise

Public annoyance is the most common impact associated with land based exposure to elevated noise levels. Most people are exposed to sound levels of 50-55 dBA (L_{dn}) or higher on a daily basis. Studies conducted to determine noise impacts on various human activities have revealed that sound levels below 65 dBA (L_{dn}) do not annoy approximately 87% of the population. When subjected to an L_{dn} of 65 dBA, approximately 12% of persons so exposed would be "highly annoyed" by the noise. The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA it is reduced enough to be essentially negligible (FICON 1992).

The characteristics of surrounding land uses and the existing noise environment influence the effect that the introduction of a new noise source would have on the area. Table 3.1-1 presents typical airborne noise levels generated by various activities. Although noise measurements are not available for specific representative port facilities, the potential for noise impacts can be drawn from the following:

- *Existing noise sources*: The existing noise sources and level of development surrounding each port hub associated with each Marine Highway strongly influences the existing baseline noise levels observed at each location. All potential port locations are in existing developed and active port areas that are near well-traveled roads and waterways. Many port locations may also have on-site railroad access and/or airports nearby. Typical port area background noise sources, at a minimum, would include automobiles or vessels and the operation of machinery/equipment for port operations and maintenance.
- *Sensitive noise receptors*: Sensitive noise receptors are those land uses that are particularly sensitive to noise. These types of sensitive receptors could be present at varying distances within the Marine Highway port communities and associated Marine Highways. The distance and barriers (e.g., intervening vegetation, topography, or development) between the port and a sensitive noise receptor would affect the received noise levels.

Table 3.1-1. Representative Airborne Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
–	110	Rock band
Jet fly-over at 1,000 ft	100	–
Gas lawn mower at 3 ft	90	–
Diesel truck at 50 miles per hour, 50 ft	80	Food blender/garbage disposal at 3 ft
Noisy urban area, daytime	70	Vacuum cleaner at 10 ft
Commercial area/Heavy traffic at 300 ft	60	Normal speech at 3 ft
Quiet urban area, daytime	50	Large business office/Dishwasher in next room
Quiet urban area, nighttime	40	Theater/large conference room
Quiet suburban area, nighttime	30	Library
Quiet rural area, nighttime	20	Bedroom at night/Concert hall (background)
–	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: California Department of Transportation 1998.

3.2 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants determined by the EPA to be of concern with respect to the health and welfare of the general public. The major pollutants of concern, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), total suspended particulate matter less than or equal to 10 microns in diameter and greater than 2.5 microns in diameter (PM_{10}), total suspended particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). The EPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants. Areas that violate a Federal air quality standard are designated as nonattainment areas.

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$] of air) or as a volume fraction (e.g., parts per million [ppm] by volume).

Existing air quality at a given location can be described by the concentrations of various pollutants in the atmosphere. The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year, except the annual standards, which may never be exceeded (Table 3.2-1). Further, States may define their own ambient air quality standards, which may be more restrictive than the NAAQS. Where applicable, State-specific standards would need to be used in the air quality analyses and associated NEPA documentation for project-based actions.

Table 3.2-1. National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
O_3	Primary and Secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over three years
CO	Primary	8-hour	9 ppm	Not to be exceeded more than once per year
		1-hour	35 ppm	
NO_2	Primary and Secondary	Annual	53 parts per billion (ppb)	Annual Mean
	Primary	1-hour	100 ppb	98th percentile, averaged over three years
SO_2	Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over three years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year
PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over three years
$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over three years
	Secondary	Annual	15 µg/m^3	Annual mean, averaged over three years
	Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over three years
Pb	Primary and Secondary	Rolling 3-month period	0.15 µg/m^3	Not to be exceeded

Source: EPA 2012a.

3.2.1 General Conformity Rule

The EPA designates an area as in attainment when the air quality meets or exceeds the NAAQS. Areas that violate the NAAQS are designated as nonattainment areas. Areas that have improved air quality from nonattainment to attainment are designated as attainment/maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are treated as attainment areas for regulatory purposes. Varying levels of nonattainment have been established for O_3, CO, and PM_{10} to indicate the severity of the air quality problem (i.e., the classifications range from moderate to serious for CO and PM_{10}, and from marginal to extreme for O_3). Figure 3-1 shows the nonattainment and maintenance areas for the U.S. in relation to the Marine Highways (EPA 2012a).

Federal actions occurring in nonattainment or maintenance areas must comply with the General Conformity Rule per Clean Air Act (CAA) Section 176(c). The intent of this rule is to ensure that Federal actions do not adversely affect a State's plans for the timely attainment of air quality standards in areas with air quality issues. For any specific action proposed for the Program, it must be determined if a conformity determination is required, and, if it is, a conformity determination would be done to evaluate whether the action conforms to the applicable State Implementation Plan (SIP) or Tribal Implementation Plan (TIP) for pollutants in nonattainment and/or maintenance areas.

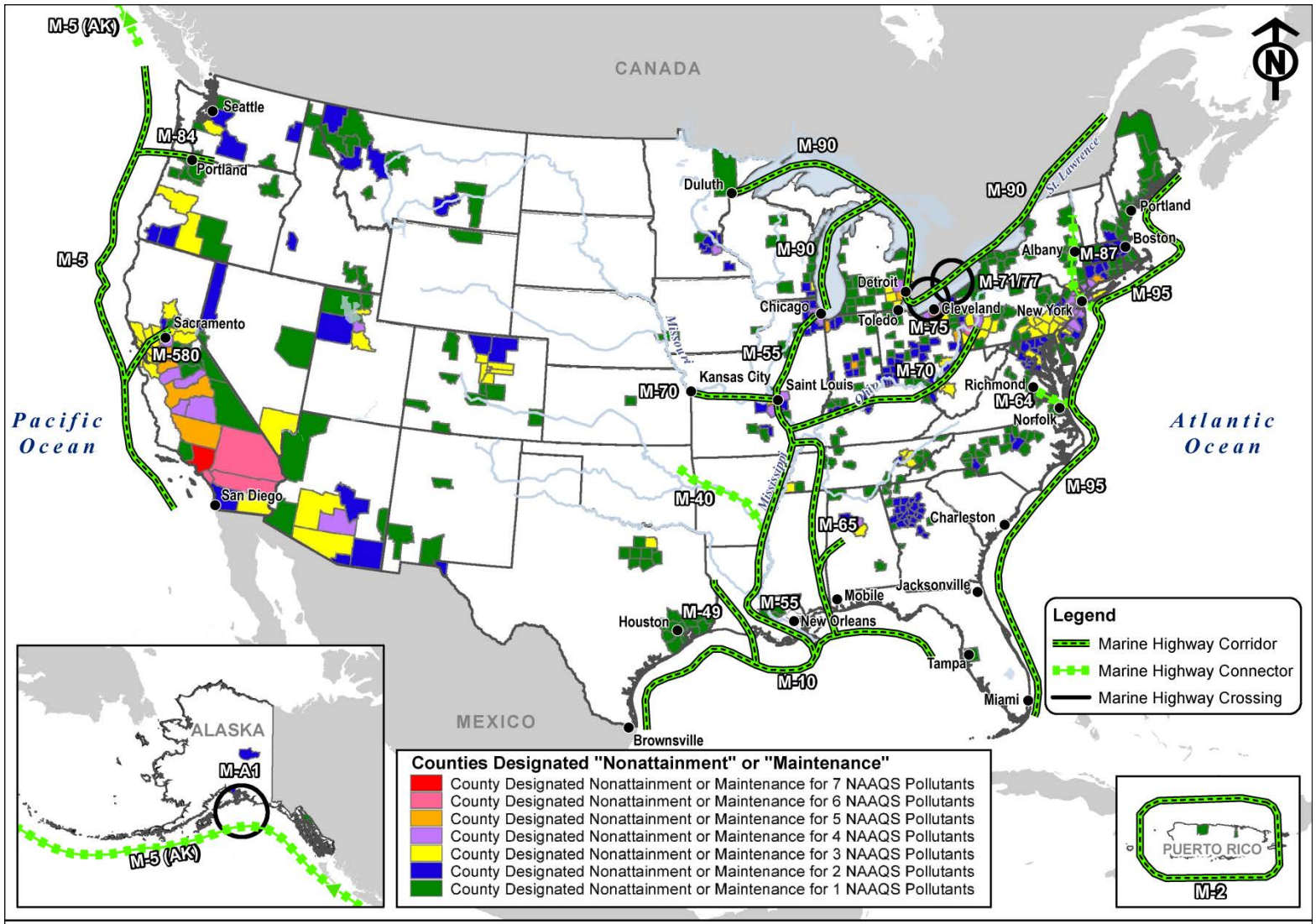

Figure 3-1
America's Marine Highways and
EPA-designated Nonattainment and Maintenance Areas for NAAQS

Source: EPA 2012a.

Threshold, or *de minimis*, levels of emissions have been established by the EPA to focus conformity requirements on those Federal actions with the potential to produce significant air quality impacts and vary by the severity of the nonattainment area. EPA's implementing regulation requires a conformity applicability analysis for nonattainment or maintenance area criteria pollutants to identify whether the annual total of direct and indirect emissions equals or exceeds the annual *de minimis* levels. Direct emissions are those caused or initiated by the Federal action and originate in a nonattainment or maintenance area and occur at the same time and place as the action and are reasonably foreseeable. Indirect emissions are those caused by the Federal action but may occur later in time and/or may be farther removed in distance from the action itself but are still reasonably foreseeable, and the Federal action agency can control and would maintain control over the indirect action due to a continuing program responsibility of the Federal agency. Reasonably foreseeable emissions are defined as projected future indirect emissions that are identified at the time the conformity determination is made, and the location of such emissions is known, and the emissions are quantifiable, as described and documented by the Federal action agency, based on its own information after reviewing any information presented to the Federal agency.

The final rule contains exemptions from the General Conformity Rule. Certain Federal actions are deemed by the EPA to conform because of the thorough air quality analysis required to comply with other statutory requirements. Examples of these actions include those subject to the New Source Review program and remedial activities under the Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA).

Other Federal actions that are exempt include those actions that would result in no increase in emissions, or an increase in emissions that is clearly *de minimis*. Examples include continuing or recurring activities, routine maintenance and repair, administrative and planning actions, land transfers, and routine movement of mobile assets.

3.2.2 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for Hazardous Air Pollutants (HAPs) which are regulated under Section 112(b) of the 1990 CAA Amendments. The *National Emission Standards for Hazardous Air Pollutants* regulate HAP emissions from stationary sources (40 CFR Parts 61 and 63). HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs); these are compounds emitted from highway vehicles and nonroad equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, EPA issued its first MSAT rule, which identified 21 compounds as being HAPs that required regulation. A subset of six of these MSAT compounds were identified as having the greatest influence on health and include benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. In February 2007, EPA issued a second MSAT rule, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health. The rule also identified several engine emission certification standards that must be implemented. Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for MSATs involve reducing their content in fuel and altering engine operating characteristics to reduce the volume of pollutants generated during combustion.

3.2.3 Maritime Vessel Emissions

Marine vessel emissions are regulated by engine type. For the purposes of this document, the vessel types analyzed include ATBs, inland towboat/barges, and OGVs. Often ATBs/inland towboat/barges and OGVs have different main propulsion engines and thus, are regulated differently by EPA.

ATBs consist of a barge that is interlocked with a tugboat. The tugboat pushes the barge which allows for many advantages over the typical towing of barges, such as increased maneuverability and safety. As mentioned in the Proposed Action assumptions in Chapter 2, ATBs are assumed to transport 100 to 400 TEUs in one voyage, travel at speeds up to 12 knots, and burn fuel with a sulfur content no greater than 15 ppm. Inland towboat/barges use the same fuel as ATBs can carry between 100 to 350 TEUs in a voyage and are assumed to travel at a speed of 8 knots.

OGVs will typically be small container ships that transport between 600 and 800 TEUs in one voyage. OGVs will travel at speeds up to 20 knots and are regulated to burn a fuel with a sulfur content of no more than 10,000 ppm until 2015, when the fuel sulfur content must be no more than 1,000 ppm.

Marine diesel engines and are divided into "categories" and "tiers" for the purposes of EPA's emissions reduction regulations. In general, category denotes engine size and is used when determining the fuel sulfur requirement. Tiers are used to denote levels of NO_x emission reductions. C1 engines are defined as greater than 50 horsepower (hp) and up to 5 liters per cylinder displacement. C2 engines are defined from 5 to 30 liters per cylinder. C3 engines are defined as at or above 30 liters per cylinder. In this PEA, it is assumed that ATBs and inland towboat/barges will have a C2 engine that meets Tier 2 standards and that OGVs will have a C3 engine that meets Tier 2 standards.

3.2.3.1 Category 3 Marine Diesel Engine Regulations

On April 30, 2010, EPA adopted standards, under the CAA, that apply to C3 engines installed on U.S. vessels and to marine diesel fuels produced and distributed in the U.S. In addition, the rule added two new tiers of engine standards for C3 engines: Tier 2 standards that begin in 2011 and Tier 3 standards that begin in 2016. Those standards coincide with the international standards contained in Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL), designating a North American Emissions Control Area (ECA). The ECA requires OGVs within 200 nm of shore to switch to a fuel with 1.0% sulfur content starting in August of 2012 then, in 2015, burn fuel that has no more than a 0.1% sulfur content. The areal extent of the ECA covers the majority of U.S. and Canadian Atlantic and Pacific coastal waters, French territories off the Canadian Atlantic Coast, the U.S. Gulf Coast, and the main, populated islands of Hawaii. The MARPOL engine and fuel standards are summarized in Table 3.2-2.

A U.S. Caribbean ECA, that surrounds Puerto Rico and the U.S. Virgin Islands, was created on July 15, 2011. The U.S. Caribbean Sea ECA will enter into force on January 1, 2013, and the fuel sulfur requirements will begin to apply on January 1, 2014 (EPA 2011). The same standards as noted in the North American ECA apply to the U.S. Caribbean.

On January 18, 2012, EPA published a Direct Final Rule that adds a provision to provide an incentive to repower Great Lakes steamships with new, more efficient, diesel engines. The rule identifies an automatic, time-limited fuel waiver that allows for the use of residual fuel through December 31, 2025 if

the main propulsion will be replaced with diesel engines. The automatic fuel waiver is available only to steamships that operate exclusively on the Great Lakes, that were in service on October 30, 2009 and that are repowered with a Tier 2 or better diesel engine.

In 2020, emissions from marine vessels operating in the ECA are expected to be reduced annually by 320,000 tons for NO_x, 90,000 tons for $PM_{2.5}$, and 920,000 tons for SO_x, which is 23%, 74%, and 86%, respectively, below predicted levels in 2020 absent the ECA.

Table 3.2-2. Emission Control Area Ship Engine and Fuel Standards (MARPOL Annex VI) For Marine Engines Rated Greater Than 30 Liters Displacement

	Effective Date	Fuel Sulfur	NOx
Emission Control Areas	July 2010	10,000 ppm (1 %)	-
	January 2015	1,000 ppm (0.1 %)	-
	January 2016	-	Tier III Aftertreatment

Source: EPA 2010a.

3.2.3.2 Category 2 Engine Regulations

In March 2008, EPA finalized a rule that further reduces emissions from marine diesel engines with a per-cylinder displacement below 30 liters. These include marine propulsion engines used on vessels from recreational and small fishing boats to towboats, tugboats and Great Lake freighters, and marine auxiliary engines ranging from small generator sets to large generator sets on oceangoing vessels. The rule sets Tier 3 emissions standards for newly built engines that are phasing in from 2009 and establishes Tier 4 standards for newly built commercial marine diesel engines above 600 kW beginning in 2014. The rule would cut $PM_{2.5}$ emissions from these engines by as much as 90% and NO_x emissions by as much as 80% when fully implemented. The C2 marine diesel engine sulfur and NO_x limits are summarized in Table 3.2-3.

Table 3.2-3. Tier 3 and 4 Standards for C2 Marine Diesel Engines

	Effective Date	Engine Power Rating (kW)	Fuel Sulfur	NO_x + HC (g/kWh)	NOx (g/kWh)	PM (g/kWh)
Tier 3	June 2012	< 3700	15 ppm (0.0015 %)	-	-	-
	2013			6.2	-	0.14
	2014			7.0-11.0	-	0.27
Tier 4	2014	>600-<3700		-	1.8	0.04

3.2.3.3 State Vessel Emission Regulations

Individual states may accept the Federal emission standards or apply more stringent standards. To date, the only state to get ahead of the Federal standards is California. The California Fuel Regulations for OGVs have been in force since July 2009. The California regulations are similar to the 2010 EPA C3 Marine Diesel Engine Regulations, which requires OGVs to burn a fuel with a 1.0% sulfur content starting in August of 2012 then, in 2014, burn fuel that has no more than a 0.1% sulfur content. It is assumed the California rule will sunset when the 2015 ECA requirements come into effect.

3.2.4 Air Quality Impact Analysis Methodology

The majority of sources to be considered for any Proposed Action under the Program would be mobile sources. These potential sources would include cargo marine vessels, harbor craft such as tugs, cargo-handling equipment, as well as highway trucks, which may either have their operations revised, replaced, or reduced due to implementation of a proposed Marine Highway service under the Program. Air emissions from marine vessels are generated by propulsion engines, auxiliary engines which run electrical generators for auxiliary vessel power requirements (e.g., lighting, etc.), and may include auxiliary boilers which provide heat for fuel treatment and other on-board uses (e.g., hot water) when at port.

When the marine vessel is en-route, emissions are generated by the propulsion engine(s) and possibly the auxiliary engine(s). At port, emissions are generated by the auxiliary engine(s) and possibly the boiler, if one is present. Tugs assist marine vessels (mainly OGVs) with maneuvering in and out of harbors and ports and berthing. These boats are operated using both propulsion and auxiliary engines. Diesel fuel is used to power the engines for most of these vessels. Cargo handling equipment would vary according to the type of cargo ship used, and the emissions would vary as well.

For this PEA, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping and hauling by heavy duty truck. Calculations have been generated only for the actual transport of goods using each transfer mode. Activities such as cargo handling at ports, intermodal transfers of material, and congestion at ports and along highways have not been considered.

A set of summary data tables from the calculations is provided in each region-specific section of the PEA, with the detailed methodology and calculations described in Appendix B. A general set of assumptions on the port pairs to be included, number and types of vessels to be used, cargo volumes, and speeds of the vessels have been provided in Section 2.0 of this PEA. Using these assumptions, the estimated annual amounts of criteria pollutants have been calculated for short sea shipping in each region. Separate calculations have been made for OGVs and for ATBs/inland towboat/barges. Similar calculations have been made for transport of the same quantity of goods by truck between the same port pairs. The calculations provide annual amounts of air pollutants and amounts of pollutant per TEU transported for each transit mode. All modes are provided in the tables for comparison purposes.

3.3 Land Use (Including Section 4(f) Properties and Coastal Zone Management)

Land Use refers to natural conditions or types of human activity occurring or permitted on a parcel of land. Generally, land use is regulated by zoning codes and master plans that are set up and administered by a local municipality. The purpose of master plans and zoning codes is to ensure compatible activities are conducted near each other and incompatible activities are separated (Department of Commerce 2009).

There are no universal land use categories; each municipality or locale refers to land use differently. Typically, land uses are characterized by types of uses and are divided into residential, public, commercial, and industrial. Residential refers to areas containing dwellings. Depending on the level of density, these may be single-family homes located on half an acre of land or more, or row houses with six or more dwellings per acre. Residential areas are considered to be the most affected by

incompatible land uses, most likely in the form of an industrial use (City of Dublin, Ohio Department of Land Use and Long Range Planning 2008).

Public uses are typified by government buildings, schools, and religious institutions. Commercial uses generally are in the form of stores, restaurants, bars, offices, and entertainment venues. These two land use types are compatible with either industrial or residential uses, depending upon the existing land use type and the proposed land use type.

Industrial use is variable and can range from light to heavy. Light industrial refers to warehouse, distribution centers, or any industrial use that has a low potential for environmental harm. Heavy industrial use refers to automobile or chemical manufacturing, energy production, or any use that has the potential for environmental harm. Industrial uses are generally not compatible with residential areas. Heavy industrial is most often secluded from all other uses because its potential for environmental harm is the greatest.

Section 4(f) of the DOT Act of 1966 (49 USC §Section 303 and 23 USC §Section 138) requires that "the Secretary shall not approve any program or project (other than any project for a park road or parkway under section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use." Section 4(f) applies to projects that receive funding from or require approval by an agency of the DOT.

To comply with Section 4(f), it must first be determined if the Proposed Action includes a Section 4(f) property. Section 4(f) properties include public parks and recreation areas, wildlife or waterfowl refuges, and publicly or privately owned historic sites listed on or eligible for listing on the NRHP. If a Section 4(f) resource is present, then it must be determined whether the Proposed Action uses the Section 4(f) resource. A use under Section 4(f) is considered taking permanent ownership of or applying a permanent easement to the property for transportation purposes. Additionally, a constructive use is one in which no land of the resource is incorporated into the project, but indirect impacts would substantially diminish features of the resource that qualify it as a Section 4(f) property. If there is a use of a Section 4(f) resource, then the DOT agency determines whether the impacts are *de minimis* (i.e., would not adversely affect the activities, features, or attributes of the Section 4(f) property). For proposed actions in which impacts are not *de minimis*, the next step would be to determine if there is any feasible and prudent alternative to the action. A feasible and prudent alternative means that it is technically possible to design the action to minimize the magnitude of impacts and harm to a Section 4(f) property. An alternative is not feasible and prudent if it creates unique or severe problems. If there is no feasible and prudent alternative to avoid the use of a Section 4(f) property, then planning must be undertaken to minimize harmful effects to a Section 4(f) property (Federal Highway Administration [FHWA] 2012a).

To comply with the CZMA, it must be determined if the Proposed Action affects any land or water use or natural resource of the coastal zone. The Proposed Action must be consistent to the maximum extent practicable with the enforceable policies of a State's CZMP.

In accordance with the Coastal Barrier Resources Act, Federal financial assistance for development-related activities in the CBRS is prohibited; therefore, it must be determined if the Proposed Action affects designated coastal barrier resources.

3.4 Infrastructure and Utilities

Port terminals include a number of buildings for general activities such as maintenance, administration, customs, and security. Much of the other port infrastructure is specifically sized to handle a specified cargo type and throughput. Typically, these components are sized to meet similar throughput requirements, so that a single component does not create a limitation on overall port operations. Key infrastructure components that need to be properly sized to maintain a consistent productivity throughout the port include the following:

- Quay – The quay defines the berthing capabilities of the vessels that call at the port. The length of the berth establishes the number and type of vessels that can be received.
- Container Yard/Storage Yard – In order to efficiently load and unload containers and other cargo, there needs to be ample area allotted for storage and handling. Factors such as cargo volume, dwell time, and storage density (i.e., container stack height) are used to determine the area needed.
- Gate – Trucks are received at the terminal through a gate, which typically contains multiple lanes in and out of the port. For throughput to move efficiently in and out of the port, it is important that the gate be adequately sized to handle the number of trucks anticipated for port operations. In addition to the physical components described, the number and efficiency of the equipment utilized for cargo handling has the capability to improve terminal throughput capacity, without modifying the physical components.

Utility services such as potable water supply, wastewater collection, and electrical supply require a network of components. This network includes pipelines, pumps, treatment units, and storage basins for potable water and wastewater systems and transmission lines, substations, transformers, and distribution lines for electrical systems.

3.5 Socioeconomics

Socioeconomics describes the basic attributes and resources associated with the human environment, particularly population, employment, income, and housing. For this Proposed Action, employment and income would be the main focus, with regard to long-haul trucking and new Marine Highway traffic.

3.6 Recreation

Recreational activities include all the possible uses that the public pursues in, on, and along the affected waters, in addition to potential land-based recreational opportunities that may be discussed in the Land

Use analysis. For this document, recreational resources include natural and man-made sites that offer residents and visitors opportunities to participate in diverse leisure activities on both water and land. Recreational resources potentially affected include Federal and State seashores, parks, beaches, wildlife lands, wilderness areas, wildlife sanctuaries, research reserves, scenic rivers, historic sites, and landmarks.

Recreational activities available to the public range from, but are not limited to, boating, surfing, kiteboarding, swimming, diving, fishing, walking, rafting, canoeing, wildlife viewing, and picnicking. In addition, land-side public access points such as marinas, piers, and boat ramps would be addressed in the affected environment.

3.7 Traffic and Transportation

Truck Traffic

The analysis of truck traffic describes vehicle movement throughout a road and highway network. The FHWA classifies the nation's roadways based on their road function. Each classification identifies the type of service the road provides and is used to establish design standards for roadways (FHWA 2012b). Road function classifications include:

- Interstate – These roadways provide the highest level of mobility and the highest speeds over the longest uninterrupted distance. These systems serve the movement of traffic regionally and between population and activity centers with a minimal level of access to adjacent properties. Design standards for Interstate systems typically include thicker, more heavy-duty pavement requirements than smaller roadway systems, due to the heavier volume of traffic and heavy-duty vehicles.
- Arterial – These roadways include freeways, multilane highways and other major roadways that supplement Interstate systems. They typically connect urbanized areas, cities, and industrial centers. Design standards for arterial roads are similar to Interstate system requirements, as heavy-duty traffic and high volumes are typically expected.
- Collector – Collector roads include both major and minor roads, and their primary function is to connect local roads and streets with arterial roadway systems. Collectors provide less mobility than arterials, as speed limits are generally lower and distances are typically shorter. Design standards for collector roads are typically not as thick as arterial roads, as the volume of heavy-duty vehicles is typically less on collector roadways.
- Local – The primary function of local roadways is to provide primary access to residential areas. They offer less mobility as local roads are typically shorter and speed limits are lower. Design standards are significantly less than the requirements for major roadway systems.

For this PEA, the roadways include the Land Highway Corridors (listed in Tables 2.1-1, 2.1-3, 2.1-5, 2.1-7, and 2.1-9) associated with the Program as well as the roadway systems surrounding the participating ports. Interstate and state highways, arterial and connector streets, railroads, airports, and subways are all part of the U.S. transportation network. The National Highway System consists of approximately 160,000 miles of roadway important to the nation's economy, defense, and mobility. The National Highway System includes interstate highways; Federal and State arterial highways in rural and urban areas, which provide access between an arterial and a major port, airport, public transportation facility,

or other intermodal transportation facility; strategic highways that provide defense access, continuity, and emergency capabilities for defense purposes; and intermodal connectors. The Interstate Highway System, often referred to as the Eisenhower Interstate System, is a separate system in the larger National Highway System and has a total length of approximately 46,800 miles. Interstate highways usually receive Federal and State funding, comply with Federal standards, and are owned, built, and operated by States or toll authorities, most of which are publicly owned (FHWA 2012c).

Vessel Traffic

According to the USACE, the U.S. Atlantic Coast is approximately 2,000 miles long, the Pacific Coast of the contiguous U.S. is approximately 1,300 miles long, and the Gulf Coast of the U.S is approximately 1,600 miles long. There are also 25,000 miles of navigable inland waterways throughout the U.S. Much of the commercially important inland waterways are connected to the Mississippi River system. There is an additional 10,210 miles of coastline around the Great Lakes, including all connecting channels, mainland, and islands of the U.S. and Canada (EPA 2012b). As of 2009, the nation's inland and Intracoastal Waterway system carried approximately one-sixth of the cargo moved between cities in the U.S. This system directly serves 38 states throughout the nation's heartland, the Atlantic seaboard, the Gulf Coast and the Pacific Northwest (USACE 2009a).

3.8 Biological Resources

The focus of the analysis is on biological resources that could be affected by the establishment and operation of a Marine Highway service within any of the five regions and the representative port pairs as described in Sections 2.1.1 through 2.1.5. The impacts of greatest concern are: (1) potential impacts on legally protected habitats (e.g., EFH, critical habitat); (2) potential injury or mortality to ESA-listed species (e.g., marine mammals, sea turtles) from ship strikes; and (3) habitat degradation from accidental collisions and spills. The potential for impacts to biological resources (e.g., marine mammals) from marine vessel operations and the associated underwater noise within the Marine Highway system is also addressed.

3.8.1 Vegetation and Wildlife

Vegetation and wildlife include upland plant communities and animals that could be affected by the Proposed Action. Vegetation and wildlife are discussed together because of the dependence between these two natural resources.

3.8.2 Migratory Birds

For purposes of this PEA, migratory birds are defined as any bird species offered protection under the MBTA. The MBTA prohibits taking, killing, or possession of migratory birds, their eggs, or nests. A bird species qualifies for protection under the MBTA by meeting one or more of the following four criteria:

(1) It (a) belongs to a family or group of species named in the Canadian convention of 1916, as amended in 1996; (b) specimens, photographs, videotape recordings, or audiotape recordings provide convincing evidence of natural occurrence in the U.S. or its territories; and (c) the documentation of such records has been recognized by the American Ornithologists Union or other competent scientific authorities.

(2) It (a) belongs to a family or group of species named in the Mexican convention of 1936, as amended in 1972; (b) specimens, photographs, videotape recordings, or audiotape recordings provide convincing evidence of natural occurrence in the U.S. or its territories; and (c) the documentation of such records has been recognized by the American Ornithologists Union or other competent scientific authorities.

(3) It is a species listed in the annex to the Japanese convention of 1972.

(4) It is a species listed in the appendix to the Russian convention of 1976 (USFWS 2011).

3.8.3 Essential Fish Habitat

Under the requirements of MSA, Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS regarding potential effects to EFH, and NMFS must provide conservation recommendations. EFH is defined by NOAA as aquatic habitat where fish spawn, breed, feed, or grow to maturity. This definition includes wetlands, coral reefs, seagrasses, and rivers. NMFS works with Regional FMCs to identify EFH for the various life stages of federally managed fish species (NOAA 2012c).

Habitat Area of Particular Concern (HAPCs) are a subset of EFH. FMCs are encouraged to designate HAPCs under the MSA. HAPCs are identified based on habitat level considerations rather than species life stages as are identified with EFH. EFH guidelines published in Federal regulations define HAPCs as types or areas of habitat within EFH that are identified based on one or more of the following considerations:

- The importance of the ecological function provided by the habitat;
- The extent to which the habitat is sensitive to human-induced environmental degradation;
- Whether, and to what extent, development activities are or would be stressing the habitat type; and
- The rarity of the habitat type (50 CFR 600.815(a)(8)).

The current HAPC types are: estuaries, canopy kelp, seagrass, rocky reefs, and "areas of interest" (a variety of submarine features, such as banks, seamounts, and canyons, along with Washington State waters) (PFMC 2012).

3.8.4 Marine Mammals

As discussed in Section 1.4.2.2, the MMPA protects marine mammals by strictly limiting their "taking" in waters or on lands under U.S. jurisdiction, and on the high seas, by vessels or persons under U.S. jurisdiction. Marine mammals are mammals that are well adapted for life in the marine environment. There are approximately 125 marine mammal species worldwide. Of those 125, eight species are under the jurisdiction of the USFWS (walrus, polar bear, sea otter, marine otter, West African manatee, Amazonian manatee, West Indian manatee, and dugong). The remaining species, comprising whales, dolphins and porpoises, seals, and sea lions, are under the jurisdiction of NMFS (NOAA 2012d).

3.8.5 Invasive Species

Invasive species are officially defined as "alien species whose introduction does or is likely to cause economic or environmental harm to human health" (EO 13112, 64 F.R. 6183 [February 8, 1999]). Any species removed from its native range has the potential to become invasive because the normal population controls (i.e., predation, disease, parasites, competition, etc.) that act to keep population levels in check are not present. Once removed from these controls, species populations can reach levels that interfere with or displace local flora and fauna (California Department of Fish and Game 2008).

Invasive species are those that dominate an ecosystem at the expense of other species, causing population crashes and ecological changes. Many invasive species are not indigenous (native) to North America, but are imported intentionally or by accident from another continent. Newly arrived species often exhibit population explosions due to lack of competition or natural control (USFWS 2006).

The introduction of foreign species to a new environment often occurs as a result of the unintentional transport of species. The ballast water of ships is one principal pathway of this type of introduction. Ballast is any material whose weight is utilized to balance or stabilize an object. A ship takes in water as ballast when its hold is empty for balance and stability and discharges it when it loads new cargo, maintaining equilibrium. It usually picks up ballast water at port, where water is shallow and often contains the eggs and larvae or organisms found in that geographic area. Occasionally, these organisms survive their migration to a new destination. When the water is discharged, these species have the potential to become invasive species in their new environment (MacPhee 2006).

3.8.6 Threatened and Endangered Species

Threatened and endangered species are defined as those plant and animal species that are regulated under the ESA. Impacts to federally-listed threatened and endangered species are evaluated using terminology defined under the ESA as follows:

- *No effect*. Listed species or designated critical habitat would not be affected or listed species or designated critical habitats are not present.
- *May affect/not likely to adversely affect*. Effects on listed species or designated critical habitat are insignificant, discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or beneficial. During consultation, USFWS or NMFS provides written concurrence of "not likely to adversely affect."
- *May affect/likely to adversely affect*. An adverse effect to a listed species or designated critical habitat may occur as a direct or indirect result of the alternatives to implement the Proposed Action or its interrelated or independent actions, and the effect is neither discountable nor insignificant; nor is it beneficial. The conclusion that a proposed project is "likely to adversely affect" requires initiation of formal Section 7 consultation and may also require the preparation of an EIS.
- *Likely to jeopardize proposed species/adversely modify proposed critical habitat*. Situations are identified in which the alternatives to implement the Proposed Action could jeopardize a proposed species or adversely modify critical habitat to a species. If this criterion is reached,

conference is required with USFWS or NMFS, and the preparation of an EIS may also be required (USFWS and NMFS 1998).

3.8.6.1 Critical Habitat

The ESA requires the Federal government to designate "critical habitat" for any species it lists under the ESA. "Critical habitat" is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation (16 USC § 1533 (b)(2)).

3.9 Geological Resources

Geological resources are defined as the topography, geology, and geological hazards of a given area. Topography is typically described with respect to the elevation, slope, aspect, and features of the land or sea floor surface within a given area. Long-term geological, seismic, erosional, and depositional processes typically influence the topographic relief of an area. The geology of an area includes bedrock materials, mineral deposits, soils, paleontological resources, and unique geological features. Bedrock refers to consolidated earthen materials that may be made up of either igneous and metamorphic rocks or fragments of other rocks compressed and cemented together over time by pressure and dissolved sedimentary rocks. Soil lies above bedrock and consists of weathered bedrock fragments and decomposed organic matter from plants, bacteria, fungi, and other living things. The value of soil as a geologic resource lies in its potential to support plant growth, especially agriculture. Mineral resources are metallic or nonmetallic earth materials that can be extracted for a useful purpose, such as iron ore that can be refined to make steel, or gravel that can be used to build roads. Paleontological resources are the fossilized remains of plants and animals. Rarer fossils have major scientific value and often include vertebrate fossils or rarer invertebrate fossils. Unique geologic features include landforms such as a lava fields, rock tower, volcanic cinder cone, or other aspects of the landscape that have been developed from wind and erosion.

3.10 Water Resources

Water resources are generally divided into water quality, surface water features, groundwater, wetland features, and floodplains. Water quality includes both physical (odor, taste, color, and physical attributes) and chemical (organic and inorganic characteristics) parameters of all water resources. Water quality may be impacted by toxics, which include heavy metals, carcinogens, and other organic and inorganic chemicals that are harmful to flora and fauna. The EPA regulates all public drinking water supplies through the National Primary Drinking Water Regulations (NPDWRs), which are legally enforceable standards under Section 304(a)(1) of the CWA. Contaminants regulated under NPDWRs by the EPA include various microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, and radionuclides. In addition to NPDWRs, EPA has established regulations and provides guidance to States to protect human health and aquatic life in all lakes, rivers, streams, and other surface water features

(EPA 2012c). State-specific surface water quality standards may need to be assessed in more detail as specific projects arise under the Program.

The CWA refers to surface waters as 'waters of the U.S.,' and defines it as the nation's most valuable natural resource that is relied on for drinking, manufacturing, recreation, energy development, agriculture, fishing, and tourism among various other uses that are all essential to public health and the economy. Water quality categories utilized by EPA in U.S. water bodies refer to uses within the water body such as swimming, propagation of aquatic life, etc. (NOAA 2008). The nationally developed EPA standards for water quality are: good (water fully supports all designated use), threatened (water currently supports all designated uses, but one or more may become impaired in the future without pollution-control measures), and impaired (water cannot support one or more of its designated uses) (NOAA 2008).

Lakes, streams, rivers, and other drainage features make up surface hydrology of a given watershed. Groundwater is classified as any source of water beneath the surface of the earth and can be used for drinking water as well as agricultural and industrial uses, while water quality refers to the chemical and physical character of surface and groundwater. Wetland features are those subject to permanent or periodic inundations or prolonged soil saturation and include marshes, swamps, and similar features.

Floodplains include flood zones, which are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. The 100-year floodplain is the land that is predicted to flood during a 100-year storm, which has a 1% chance of occurring in any given year. The 500-year floodplain is the land that is predicted to flood during a 500-year storm, which has a 0.2% chance of occurring in any given year.

3.11 Cultural Resources

A cultural resource is any aspect of a cultural system that is valued by or representative of a culture or that contains significant information about a culture (National Park Service [NPS] 1998). Cultural resources include sites, buildings, structures, districts, and objects that are associated with significant people or events, demonstrate design or construction associated with a significant movement, or have the potential to yield prehistoric or historic data that are important to a culture, subculture, or community for scientific, traditional, religious, or any other reasons (NPS 2008). Cultural resources usually fall within three categories: archaeological, architectural, and native properties. Archaeological resources are generally found below the surface of the ground and yield information about both prehistoric and historic human activity. Architectural resources are categorized as aboveground resources that are of historic or aesthetic significance. Native resources are related to religious, traditional, or cultural practices of Native groups, such as Native Americans, Native Hawaiians, and Native Alaskans. A fourth type of cultural resource is known as Traditional Cultural Properties (TCPs). TCPs derive their significance from the role they play in a community's historical beliefs, traditions, and customs (Parker and King 1998).

Historic Places and Properties

The ACHP's implementing regulations for complying with Section 106 of the NHPA are set forth in 36 CFR Part 800. These procedures essentially define a four-step process for Federal agencies to meet the statutory responsibilities of Section 106. First, the Federal agency conducting the action should establish whether the proposed action constitutes an undertaking. As defined in 36 CFR 800.16(y), an undertaking is an action funded in whole or in part under the direct or indirect jurisdiction of the Federal government, or any action requiring Federal licensing or permitting. Second, properties listed on or eligible for inclusion in the NRHP within the area of potential effects (APE) of the undertaking should be identified. An APE is the geographic area or areas within which an undertaking may directly or indirectly affect the characteristics that qualify a property for listing on the NRHP [36 CFR 800.16(d)]. To do this, an APE should be established and the records of the SHPO should be searched to determine if there are any NRHP-listed or eligible resources within the APE. An APE cannot be established until specific sites are selected. Third, the effects of the Proposed Action on NRHP-eligible or listed cultural resources should be assessed. If no eligible or listed properties are in the APE or no effects on eligible or listed properties in the APE are found, then the Federal agency notifies the SHPO of the finding. If the SHPO does not object to the finding within 30 days, then the Federal agency has fulfilled its responsibilities under Section 106 and the process is completed. If it is determined that there may be effects to significant cultural resources, then the Federal agency assesses the effects by applying the criteria of adverse effect [36 CFR 800.5(a)]. If it is determined that there would be no adverse effect to NRHP-listed or eligible cultural resources within the APE, the Federal agency documents the finding and provides it to the SHPO for review. If the SHPO agrees with the finding within 30 days, then the Federal agency has fulfilled its responsibilities under Section 106 and the undertaking may be implemented. If it is determined that there would be an adverse effect to NRHP-listed or eligible cultural resources within the APE, then the SHPO is notified by letter and provided with supporting documentation. The fourth and last step in the process is consultation with the SHPO and ACHP to resolve the adverse effects.

A NRHP-eligible resource is any resource, 50 years or older, that is related to a person or event significant to our past, is a representative example of a significant architectural design or form of construction, or has the ability to yield historical information. Resources that are less than 50 years of age but are of exceptional significance to our past may also be eligible to the NRHP. Additionally, to be eligible for inclusion in the NRHP a resource must retain integrity. Integrity is evaluated based on seven aspects: location, design, setting, material, workmanship, feeling, and association.

3.12 Hazardous Materials and Waste Management

Hazardous materials are defined and regulated in the U.S. primarily by laws and regulations administered by the EPA, the U.S. Occupational Safety and Health Administration (OSHA), DOT (primarily through the DOT Pipeline and Hazardous Materials Safety Administration, also known as PHMSA), and the U.S. Nuclear Regulatory Commission. Each has its own definition of a "hazardous material."

OSHA defines a hazardous material as any substance or chemical which is a "health hazard" or "physical hazard" including chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous

membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics (29 CFR 1910.1200). The Occupational Safety and Health Act of 1970 assigned national worker protection authority to OSHA. Title 29 CFR Part 1910.1200, the Hazard Communication Standard, requires that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is made available to employers and employees. A comprehensive hazard communication program requires container labeling and other forms of warning, Material Safety Data Sheets, and employee training.

The EPA incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment (40 CFR 355 contains a list of more than 350 hazardous and extremely hazardous substances).

The DOT defines a hazardous material as any item or chemical which, when being transported or moved, is a risk to public safety or the environment (49 CFR 100-180).

The Nuclear Regulatory Commission regulates items or chemicals which are a "special nuclear source," byproduct materials, or radioactive substances (10 CFR 20).

Hazardous materials and wastes are federally regulated by the EPA in accordance with the Federal Water Pollution Control Act as amended by the CWA, the Toxic Substances Control Act, the Resource Conservation and Recovery Act (RCRA), CERCLA, and the CAA.

Under Title 49 CFR Parts 171-177, the U.S. Congress issued the Hazardous Materials Transportation Act of 1974 and the Hazardous Materials Uniform Safety Act of 1990, delegating the responsibility for regulating hazardous materials to DOT. DOT governs the classification, description, packaging, marking, labeling, placarding, and proper condition of hazardous materials being offered or accepted for transportation in interstate or intrastate commerce. This regulation allows hazardous materials requiring special shipping, storage, and handling requirements to be quickly identified. In cases of an emergency that may involve hazardous materials, first responders have immediate indicators of their presence.

The Toxic Substances Control Act of 1976 gave the EPA the broad authority to regulate chemical substances that are not covered by other laws and that have the potential to create adverse health or environmental effects such as chlorofluorocarbons, because they deplete stratospheric O_3, and polychlorinated biphenyls (PCBs), because of their chronic health effects.

RCRA of 1976 (40 CFR §§240-280) provides a "cradle to grave" approach to solid and hazardous waste regulations. RCRA regulates transportation and tracking of hazardous waste; establishes standards for storage and treatment by waste generators; provides an identifying procedure for hazardous waste; provides minimum technology standards for treatment, storage, and disposal facilities; establishes land disposal prohibitions and restrictions; regulates the management of used oil; and provides an enforcement mechanism.

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4.0 WEST COAST

This chapter describes the existing environmental conditions in and around Marine Highway Corridors on the West Coast for resources potentially affected by implementation of the Proposed Action as described in Chapter 2. In addition, this chapter identifies and evaluates the potential impacts of implementing the Proposed Action.

Two port pairs were selected in the West Coast region for further analysis: Los Angeles/Long Beach, CA to Tacoma, WA and Oakland, CA to Stockton, CA. The Port of Los Angeles is one of the largest and busiest port terminals in the world. It is located on over 7,500 acres of land and water, with 43 miles of waterfront. It is a multicargo port with the capability to handle containers, dry bulk, liquid bulk, break bulk, automobiles, and cruise passengers (Port of Los Angeles 2012). The Port of Long Beach is adjacent to the Port of Los Angeles in San Pedro Bay and it is also one of the busiest port terminals in the world. It is located on 3,200 acres of land and is equipped to handle multiple cargo types, similar to the Port of Los Angeles (Port of Long Beach 2012a, 2012b). The Los Angeles-Long Beach port complex is the nation's largest ocean freight hub and its busiest container port complex (Khoo and Nguyen 2011).

The Port of Tacoma is a large multicargo port, located in South Puget Sound encompassing 2,400 acres that includes six container terminals (Port of Tacoma 2012). The Port of Oakland is a multicargo port encompassing 1,210 acres located on the mainland shore of San Francisco Bay (Port of Oakland 2012). The Port of Stockton is located on the San Joaquin River and covers a 2,000 acre operating area. The Port of Stockton handles dry bulk, liquid bulk, break bulk, general cargo, heavy lift cargo, and containers.

The USACE Navigation Data Center maintains statistics on waterborne commerce, including the volume of cargo that transits the major U.S. ports. The Port of Los Angeles ranks first in the nation in throughput with over 5.4 million TEUs, and the nearby Port of Long Beach ranks second, with a throughput of over 4.7 million TEUs. In the West Coast region, the Port of Oakland ranks third (and fifth nationally) with 1.6 million TEUs (USACE 2010a).

4.1 Noise

4.1.1 Affected Environment

<u>Land Based Noise</u>

The principal noise sources at industrial ports are marine vessels, cranes, fork lifts, trucks/trains, and container handling equipment. A 2011 noise study conducted at the Port of Long Beach indicated that the daily noise levels observed at the port range between 64.1 dB and 71.8 dB with the least amount of noise being generated on Sunday when port operations are lower (Khoo and Nguyen 2011). Noise studies were not available for other ports, and because of the programmatic approach to this EA, specific noise studies were not conducted for this PEA; however, it is reasonable to assume that other industrial ports that use similar equipment would have noise levels in the same range as those of the Port of Long Beach.

Marine Noise along Shipping Routes

In the aquatic environment land uses as well as in-water activities contribute to ambient noise levels. Noise measurements are not available along the Marine Highway Corridor or within the specific port locations identified within the West Coast region. However, ambient noise levels have been measured in similarly developed ports and the open ocean along the West Coast (Illingworth and Rodkin Inc. 2009) and are assumed to be representative of noise levels found along Marine Highway Corridors on the West Coast. These noise levels are presented in Table 4.1-1.

Table 4.1-1. Ambient Noise Levels Measured in Representative Port Areas

Environment	Ambient Noise Levels
Large marine bay, heavy industrial use, and boat traffic	120 – 155 dB_{PEAK}, 133 dB_{RMS}
Large marine bay and heavy commercial boat traffic	147 – 156 dB_{PEAK}, 132 – 143$_{RMS}$
Large marine inlet and some recreational boat traffic	115 – 135 dB_{RMS}
Open ocean	74 – 100 dB_{PEAK}
Large marine bay, nearshore, heavy commercial, and recreational boat traffic	113 dB_{PEAK}
Large marine bay, offshore, heavy commercial, and recreational boat traffic	116 dB_{PEAK}
Marine surf	138 dB_{PEAK}

Source: Illingworth and Rodkin Inc. 2009.

4.1.2 Environmental Consequences

4.1.2.1 Proposed Action

Annoyance is a subjective impression of noise wherein people apply both physical and emotional variables. Human health effects such as hearing loss and noise-related awakenings can result from exposures to noise. For the Proposed Action, noise is evaluated for land based noise at ports and noise along shipping routes.

Land Based Noise

No project-based noise metrics have been collected in association with the identified conceptual Marine Highway services. Therefore, potential noise impacts evaluated herein are qualitative in nature and based on the activities normally associated with shipping ports.

Land based noise impacts attributable to the conceptual Marine Highway services identified in the West Coast region may result from increases in the amount vessels using the port facilities and the increased use of cranes and other machinery used to load and unload cargo. Using the parameters and assumptions presented in Section 2.0 and Table 2.1-2, the anticipated weekly increases in vessel trips in each port is summarized in Table 4.1-2.

Table 4.1-2. Anticipated Weekly Increases in Vessel Trips in Port Areas

Port	Number of Vessel Trips
Los Angeles/Long Beach	1 (ATB)
	2 (OGV)
Tacoma	1 (ATB)
	2 (OGV)
Oakland	2 (Towboat/barge)
Stockton	2 (Towboat/barge)

Although no expansion of port facilities is anticipated, the increase in cargo load at the ports may result in increased noise at the ports currently impacted by port-associated noise. Any increases in ambient noise levels would be associated with typical existing operational noise and would occur during similar timeframes as existing noise. Because the increase in new vessel trips and operation of equipment would be minor compared with existing levels at the ports, the associated increase in noise would be minor. Therefore, land based noise impacts associated with the Proposed Action are not anticipated to be significant.

Marine Noise along Shipping Routes

The operation of the conceptual Marine Highway services as described for the West Coast region would be expected to result in a small increase in vessel traffic along the nearshore area of the Pacific Coast by an estimated one or two vessel trips per week. These vessels would be expected to be smaller and quieter than the larger container ships already in operation along the coast and therefore would not be expected to result in noise increases above *de minimis* levels. The noise produced by these vessels is dependent on the size of the vessel and the rate of speed as well as specific design characteristics (e.g., engine size, propeller placement) (NOAA 2004a). Underwater noise from commercial ships is generated during normal operation, most notably from propeller cavitation (when air spaces created by the motion of propellers collapse) (McKenna et al 2012). Incorporating noise reduction measures into ship design and operation, such as reducing engine size and vessel speed and placement of propellers lower in the water, may mitigate the impact of minor increases in noise from Marine Highway vessel trips.

Whether or not, and how, human-generated sounds in the ocean affect marine life has become an issue of increasing public concern. Increased noise levels associated with shipping can interfere with communication, foraging, prey evasion, and other important life history functions in marine mammals. It can also disrupt their behavior and may become compounded with other human-induced stressors with detrimental effects (Wright 2008).

Ship traffic associated with Marine Highway Corridor on the West Coast would occur at such a distance from the shoreline as to make the noise impacts negligible to humans and wildlife in shoreline communities and natural and recreational areas.

As site-specific projects are further developed for the Program, project-based noise analyses may need to be conducted to quantify noise impacts to the marine environment. The following sources should be used to conduct the project-based noise analyses:

- Existing Marine Noise Sources: Underwater noise at any given point along the Marine Highway Corridors on the West Coast can be the result of human activities such as transportation (surface vessels and aircraft), dredging, construction, and sonars, or from natural sources such as precipitation, geologic processes and biological sources (National Research Council 2003). It is assumed that all Marine Highway traffic would occur along existing shipping routes that are already subject to noise impacts from surface vessels.
- Sensitive Noise Receptors: Sensitive noise receptors in the marine environment are those species and habitats that are particularly sensitive to noise such as marine mammals, sea turtles, important breeding areas, and EFH. The location and vulnerability of sensitive

receptors in the marine environment is temporal as many of these species are highly migratory and may be present in specific areas in larger concentrations at specific times of the year. Additional factors such as substrate and marine topography can also influence noise transmission in the marine environment and subsequent impacts to sensitive receptors. The NOAA Fisheries Acoustics Program is developing acoustic exposure policy guidelines; however, it is currently unknown when this guideline would become finalized.

4.1.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Therefore, there would be no impacts to noise under the No Action Alternative.

4.2 Air Quality

4.2.1 Affected Environment

Regional

Air quality within the West Coast region is highly variable, ranging from very good to deteriorated, with a strong south to north and west to east alignment that relates to the predominately rural northern coastal region and interior areas compared to the heavily populated and industrialized southern coastal portion of the corridor. Table 4.2-1 summarizes the air quality in the regions surrounding ports in the West Coast region.

Table 4.2-1. Status of Compliance with NAAQS for Port Areas Included in the West Coast Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-5 Marine Corridor								
San Diego, CA	•			▫				
Los Angeles/Long Beach, CA	•	▫		▫	◊	•	•	
San Francisco, CA	•			▫			•	
Oakland, CA	•			▫			•	
Eureka/Humboldt Bay, CA								✓
Coos Bay, OR								✓
Astoria, OR								✓
Olympia, WA						▫		
Tacoma, WA				▫		▫	•	
Seattle, WA				▫		▫		
Everett, WA				▫				
Bellingham, WA								✓
M-580 Marine Corridor								
Oakland, CA	•			▫			•	
Stockton, CA	•			▫		▫	•	
West Sacramento, CA	•			▫		•	•	

Table 4.2-1. Status of Compliance with NAAQS for Port Areas Included in the West Coast Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-84 Marine Corridor								
Astoria, OR								✓
Longview, WA								✓
Vancouver, WA				▫				
Portland, OR				▫				
The Dalles, OR								✓
Arlington, OR								✓
Umatilla, OR								✓
M-5 (Alaska [AK]) Marine Connector								
Bellingham, WA								✓
Ketchikan, AK								✓
Juneau, AK						•		
Valdez, AK								✓
Anchorage, AK				▫		•		
Kodiak, AK								✓
Dutch Harbor, Unalaska, AK								✓
M-A1 (AK) Marine Crossing								
Anchorage, AK				▫		•		
Talkeetna, AK								✓
Palmer, AK								✓

Source: 40 CFR 81.
Notes: • denotes nonattainment designation. For $PM_{2.5}$, nonattainment can be for annual standard, 24-hour standard, or both.
▫ denotes maintenance area.
◊ denotes nonattainment for 2008 Pb standard.
✓denotes an area that is, and always has been, in attainment for all criteria pollutants.

States in the West Coast region have SIPs and there may also be applicable TIPs, developed to achieve or maintain attainment levels for various criteria pollutants. Any project proposed under the Program would need to address state-specific requirements included under these implementation plans. In addition, two of the larger urban areas, San Francisco and Anchorage, have their own regulations for air quality management and their own regulatory agencies. California has also subdivided the state into 35 Air Districts. Each of these districts has developed and maintains its own set of air emissions and air quality control regulations and has the power to enforce these regulations. Any proposed project under the Program may need to account for such local requirements in project-based NEPA documentation.

All of the states in West Coast region, as well as many localities, have specific requirements for permitting of air emissions sources. Permitting requirements for construction and operation of sources may need to be addressed in a project-based NEPA document. Additionally, construction activities, including building a mooring system or preparing land to erect a crane, may require a permit, depending on the site location and its air quality, as the activity may increase PM_{10} through ground disturbance. In most cases, a permit may not be required for temporary, small-scale construction measures.

Mobile sources include vehicles that operate on roads and highways ("on-road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earth-moving equipment, lawn and garden power tools, marine vessels, railroad locomotives, and airplanes. All the various forms of transportation used to haul freight and transport cargo are mobile sources that can contribute substantially to air pollution.

Cargo arriving at the port is distributed by truck or rail. Most of the port cargo distributed along the West Coast of the U.S. is transported by truck. Table 4.2-2 presents the Freight Analysis Framework, Version 3 (FAF3) program FAF3 data for truck hauling of freight in the four market areas in the West Coast region. The primary interstate routes in the West Coast region include the north to south I-5 and I-15, and the east to west I-10, I-80, and I-84. In Alaska, the primary roadways include Highway 1 and Highway 3.

The data used in this document for the volume of cargo hauled by truck was derived from the FAF3. FAF3 is a FHWA-funded and managed data and analysis program that provides estimates of the total volumes of freight moved into, out of, and within the U.S., between individual states, major metropolitan areas, sub-state regions, and major international gateways.

For purposes of this study, the West Coast region was subdivided into four market areas, including the I-5, I-580, I-84, and I-5 (AK) market areas.

Table 4.2-2. Bulk Commodity Data for Freight Hauled by Truck in the West Coast Region, FAF3 2007 Data

Market Area	Hauled by Truck in Ton Miles	
	North/East Bound	South/West Bound
I-5	26,129,300	26,131,420
I-580	937,830	1,343,750
I-84	3,638,120	3,638,120
I-5 (AK)	527,070	540,500
Total	31,232,320,000	31,653,790,000

4.2.2 Environmental Consequences

4.2.2.1 Proposed Action

The Proposed Action would shift land-based, long haul truck freight movements to Marine Highway services. Additional information about site-specific projects may be needed to fully assess the impacts of these changes to air quality both along the West Coast and locally. The assessment of air quality impacts for site-specific projects in criteria pollutant nonattainment areas would require additional emissions analysis under the CAA General Conformity regulations.

As indicated in Section 3.2.6, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping with hauling by heavy-duty truck. These calculations only include emissions associated with the actual movement of cargo from the specified origin to the specified destination and do not take into account truck idling or the operation of auxiliary engines used by marine vessels when at berth. These operations require evaluation at the project level where the details associated with specific ports can be included to properly account for idling time and auxiliary

engine operations. Details on the resources used and the methodology for estimating emissions can be found with the calculations in Appendix B.

Tables 4.2-3 and 4.2-4 present the comparison of moving cargo using Towboat/barge versus trucks, ATBs versus trucks, and OGVs versus trucks. It should be noted that the truck data differs for each of the vessel scenarios based on the volume and frequency of cargo movement. Specific information on the distances, load capacities, and trip frequencies can be found in Appendix B. All trucks were assumed to be heavy-duty diesel trucks in the 33,000 pounds or greater vehicle class. The data tables below demonstrate that freight movement by an ATB from Los Angeles/Long Beach, CA to Tacoma, WA, by a C2 diesel engine would generate higher NO_x emissions and slightly higher volatile organic compound (VOC) emissions but would generate lower CO, SO_2, and PM_{10} emissions than the heavy-duty truck required to move the same number of TEUs. A 750-TEU OGV would generate slightly higher emissions of NO_x and lower emissions of VOCs, CO, and PM than heavy-duty truck transport. As with all marine vessels, the amount of criteria pollutants generated is a typically a function of the engine size, age, duty cycle, and fuel being consumed. Engine size was estimated for all three vessel types. Changes in engine size would influence emissions.

For the Oakland, CA to Stockton, CA trip, the towboat/barge with the same propulsion engine rating would generate lower emissions for all pollutants as compared to the movement of the same volume of cargo using heavy-duty truck transport.

As previously discussed, roadway congestion was not factored into the general set of calculations for this PEA; however, this congestion is a major contributor to air emissions in the West Coast region, particularly in the southern California region as well as along the I-580 corridor between Stockton and Oakland, and thus, could result in higher air emissions from truck transport.

4.2.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. There would be no operation of the conceptual Marine Highway services as identified for the West Coast region. Therefore, air quality in the West Coast region would not be impacted, either beneficially or negatively, from the implementation of the Program. There would be no air quality impacts under the No Action Alternative.

Table 4.2-3. West Coast Region Annual Emissions in Total Tons by Transport Type						
West Coast Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Los Angeles/Long Beach, CA to Tacoma, WA	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**
ATB	25.46	397.93	59.41	0.06	19.10	17.57
Truck[1]	15.74	187.09	67.59	0.36	89.11	15.09
OGV	53.19	997.58	117.02	0.58	50.00	46.00
Truck[2]	78.71	935.46	337.97	1.80	445.56	75.47
Oakland, CA to Stockton, CA	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**
Towboat/barge	0.37	20.58	5.55	0.00	0.89	0.82
Truck[3]	2.44	28.97	10.47	0.06	13.80	2.34

Notes: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.
[2] Comparison of moving cargo using trucks versus OGVs, based on volume and frequency of cargo movement.
[3] Comparison of moving cargo using trucks versus Towboat/barge, based on volume and frequency of cargo movement.

Table 4.2-4. West Coast Region Single Trip Emissions per TEU by Transport Type						
West Coast Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Los Angeles/Long Beach, CA to Tacoma, WA	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**
ATB	0.00082	0.01433	0.00190	0.00000	0.00061	0.00056
Truck[1]	0.00050	0.00600	0.00217	0.00001	0.00286	0.00048
OGV	0.00034	0.00719	0.00075	0.00000	0.00032	0.00029
Truck[2]	0.00050	0.00600	0.00217	0.00001	0.00286	0.00048
Oakland, CA to Stockton, CA	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**
Towboat/barge	0.00001	0.00032	0.00008	0.00000	0.00001	0.00001
Truck[3]	0.00003	0.00040	0.00014	0.00000	0.00019	0.00003

Notes: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.
[2] Comparison of moving cargo using trucks versus OGVs, based on volume and frequency of cargo movement.
[3] Comparison of moving cargo using trucks versus Towboat/barge, based on volume and frequency of cargo movement.

4.3 Land Use (Including Section 4 (f) Properties and Coastal Zone Management)

4.3.1 Affected Environment

Land Use (Including Section 4(f) Properties)

Nineteen of the 30 ports serviced by the Proposed Action in the West Coast region are located in urban areas. Eleven ports are located in either rural or suburban settings. Of these 11 ports, seven are located in suburban settings: Everett and Skagit County, WA; Astoria, St. Helens, Arlington, and Umatilla, OR; and Ketchikan, AK. The remaining four ports are in rural settings: Morrow, OR; and Dutch Harbor, Valdez, and Mackenzie, AK. Ports within rural or suburban settings are generally located along rivers near smaller towns as opposed to larger cities. The representative port pairs identified in Table 2.1-2 are located in urban, developed areas surrounded by similar land use (commercial/industrial).

Section 4(f) includes public parks or public recreations areas, waterfowl or wildlife refuges, and publicly and privately owned historic sites. Applicable parks and recreation areas must be owned or controlled by the government, open to the public, and officially designated as a park or recreation area. Applicable historic resources are significant on the national, State, or local level and are listed or eligible for listing to the NRHP.

Seventeen of the 30 ports serviced by the Program on the West Coast have NRHP-listed properties within the boundaries of the port or adjacent to it (refer to Section 4.11.1). Four of these ports have parks within half a mile (refer to Section 4.6.1). There are two parks and four NRHP-listed properties near the Port of Tacoma and two parks near the Port of Oakland (refer to Section 4.6.1 and 4.11.1).

Coastal Zone Management

Each state in the West Coast region, with the exception of Alaska, has an individual and unique CZMP. Therefore, coordination with the respective State entity may be the most efficient and effective approach for assessing compatibility with State CZMP policies for specific projects. The representative port pairs identified for this region in Table 2.1-2 would follow the CZMPs identified for California and Washington.

The CZMP for California was approved by NOAA in 1978 and draws its authority from three pieces of legislation: the California Coastal Act (State Coastal Conservancy Law, California Public Resources Code, Division 21, § 31000 *et seq*.), the McAteer-Petris Act (Title 7.2, Government Code, § 66600 *et seq*.), and the Suisun Marsh Preservation Act (California Public Resource Code § 29000-29014). The California Coastal Commission manages all development along the coast, with the exception of the San Francisco Bay area, which is managed by the San Francisco Bay Conservation and Development Commission. Protection of coastal resources is managed by the California Coastal Conservancy. California's coastal zone extends approximately 1,000 yards inland from the mean high tide point. Exceptions to this are in the San Francisco Bay area, where the coast line is 100 ft inland from the highest tide mark and also includes mudflats, open water, and marshes as a part of the coastal zone, and statewide significant estuaries and recreational areas where the coastal zone is considered to extend to the first ridge line or five miles inland, whichever is less. Of particular interest to the Coastal Commission are water quality, cumulative and secondary effects, coastal habitats, and general regional access. The San Francisco Bay

Conservation and Development Commission is also looking at the impacts of climate change to the coastal zone over the next 100 years (NOAA 2011a).

The CZMP for Washington was approved in 1976 and was the first CZMP approved in the nation. It draws its authority from the Shoreline Management Act of 1971 (Revised Code of Washington, Title 90, Chapter 90.58), which requires local governments to implement shoreline master plans that regulate streams, lakes over 20 acres, and marine waterfronts. It is managed by the Washington State Department of Ecology. WA's coastal zone encompasses the state's 15 counties that front saltwater. Of particular interest to the Department of Ecology is outreach to local governments in the forms of training, financial assistance, and technical assistance on topics such as wetlands management, coastal hazards, and shoreline planning. The Department of Ecology also solicits funds, provides technical assistance, and develops project proposals to restore and protect wetland habitats (NOAA 2011b).

The CZMA also requires that access to the coast be granted to the general public. For a detailed discussion of recreation areas along the coast, refer to Section 4.6.1.

4.3.2 Environmental Consequences

4.3.2.1 Proposed Action

Land Use (Including Section 4(f) Properties)

Establishing the conceptual Marine Highway service between the representative port pairs selected for the West Coast would be expected to increase the number of TEUs being shipped between the Los Angeles/Long Beach and Tacoma port pair from 0 to 300 TEUs per week and the Oakland to Stockton port pair from 0 to 350 TEUs per week. In addition, the amount of vessel traffic between the Los Angeles/Long Beach and Tacoma port pair would be estimated to increase from 0 to 750 per week with the establishment of that conceptual Marine Highway service. Because the Proposed Action would utilize existing ports and improvements to the infrastructure of the port pairs are not anticipated (refer to Section 4.4.2), there would be no impact on land use at the port or in the surrounding community.

No land use impacts are anticipated as a result of the conceptual Marine Highway services; however, site-specific actions proposed for implementation under the Program would be addressed in project-based NEPA documents, as necessary.

No impacts to Section 4(f) resources are anticipated with the Marine Highway services at the selected port pairs under the Proposed Action, as no infrastructure improvements are expected. However, should future projects under the Proposed Action identify the need to convert a Section 4(f) property to a non-Section 4(f) use, then a Section 4(f) study may be required.

Coastal Zone Management

Because the Proposed Action would utilize existing ports and existing routes to transport cargo, impacts to coastal zone resources are not anticipated. However, if the amount of traffic at selected ports increases to the point of requiring additional facilities along the coast or the amount of traffic results in changes to the environment along the coast, impacts to coastal resources are possible.

As specific projects are developed and sites are selected, information pertaining to environmental impacts to the coastal zones would be clearer. Site-specific actions proposed for implementation under the Program would be addressed in project-based NEPA documents, as necessary.

4.3.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region representative port pairs would not be implemented. Therefore, there would be no impact to land use, Section 4(f) properties, or the coastal zone.

4.4 Infrastructure and Utilities

4.4.1 Affected Environment

Infrastructure

Summaries of the existing infrastructure components at the representative port pairs are listed below.

The Port of Los Angeles has nine container terminals, with over 30 berths and 80 cranes (Port of Los Angeles 2012).

The Port of Long Beach has 80 berths and 66 post-Panamax gantry cranes for ship-to-shore container movement (Port of Long Beach 2012a, 2012b).

The Port of Tacoma has handling capabilities for container-type cargo and includes 10 berths, 32 ship-to-shore cranes, and a total of 68 gate lanes for truck traffic (Port of Tacoma 2012).

The Port of Oakland includes 10 container terminals with a combined 20 berths and 35 container cranes (Port of Oakland 2012).

The Port of Stockton has berthing space for 17 vessels. In 2011, the Port of Stockton handled 2.8 metric tons of cargo. The Port of Stockton has recently invested (jointly with the MARAD) in two 140-ton mobile harbor cranes and two barges sufficient to handle containerized traffic (Port of Stockton 2012).

Utilities

Water and wastewater services are typically provided by the local municipality, whereas electrical service is typically provided by private companies. As projects are further developed and project-based NEPA documents are prepared, the utility providers may need to be consulted to determine the available capacity.

As shown in Table 4.4-1, the utility providers for the representative port pairs selected for the West Coast region include:

Table 4.4-1. Utility Providers for the Representative Port Pairs in the West Coast Region

Port	Potable Water	Wastewater	Electrical Service
Los Angeles, CA	Los Angeles Dept. of Water and Power	City of Los Angeles Sanitation Dept.	Los Angeles Dept. of Water and Power
Long Beach, CA	City of Long Beach Water Dept.	City of Long Beach Water Dept.	Long Beach Gas and Electric

Table 4.4-1. Utility Providers for the Representative Port Pairs in the West Coast Region

Port	Potable Water	Wastewater	Electrical Service
Tacoma, WA	City of Tacoma Public Works	City of Tacoma Public Works	City of Tacoma Public Utilities
Oakland, CA	East Bay Municipal Utility District	East Bay Municipal Utility District	Pacific Gas and Electric Company
Stockton, CA	City of Stockton	City of Stockton	Pacific Gas and Electric Company

4.4.2 Environmental Consequences

4.4.2.1 Proposed Action

The implementation of conceptual Marine Highway service as described for the West Coast region has the potential to increase the number and type of vessel calls and cargo handling requirements at the participating ports, which in turn has the potential to impact the existing equipment, infrastructure, and utilities. The potential impact is dependent on the available capacity and the increase in demand.

No new utility services would be required as a result of implementing the conceptual Marine Highway services at the port pairs selected for the West Coast region. Additionally, the increases in water demand, wastewater flow, and electrical load associated with three additional vessels per week at the Ports of Los Angeles/Long Beach and Tacoma and two additional vessels at Oakland and Stockton would be nominal compared to utility requirements associated with the vessels currently received. Therefore, utility impacts associated with the Proposed Action are not anticipated to be significant. However, as site-specific projects are further developed, additional analysis may be required to confirm the condition and capacity of the on-site utilities, as well as establish the lines of communication with the utility providers to confirm capabilities of the off-site components.

The Ports of Los Angeles, Long Beach, Tacoma, and Oakland have ample capacity and appropriate existing facilities and equipment to handle any incremental cargo volume increases generated by the conceptual Marine Highway services. The Port of Stockton has already established the investments required to meet the goals of the conceptual Marine Highway services. Therefore, infrastructure impacts associated with the Proposed Action are not anticipated to be significant.

As future site-specific projects are further developed, it may be necessary to determine which physical components of the terminal infrastructure and cargo handling equipment would be impacted and perform the necessary assessments to determine if there is sufficient capacity within all the components to meet the increased cargo handling at the participating ports.

4.4.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified for the West Coast region would not be implemented. Therefore, no significant impacts to infrastructure and utilities would occur.

4.5 Socioeconomics

4.5.1 Affected Environment

Employment and Income

Ports provide a wide range of direct and indirect employment opportunities in and around the regions they are located. Direct port staff includes positions such as administrative, safety, customs, maintenance, and labor (stevedoring) personnel. Trucking jobs are also directly associated with the port activities. There are additional regional jobs associated with providing the goods and services necessary to support port operations. For example, nearly 1 million jobs in the State of California are related to trade through the Port of Los Angeles. The Port of Tacoma and The Port of Oakland are estimated to support approximately 113,000 jobs (Port of Tacoma 2012) and 50,000 jobs (Port of Oakland 2012), respectively, in their regions.

The U.S. Bureau of Labor and Statistics keeps statistics on the number of people employed regionally for specific industries. Table 4.5-1 contains estimates for the number of people employed in the Transportation and Warehousing Industry for the past 10 years in the West Coast region by port pair. These numbers are included to provide a general indication of the transportation industry in the regions. Although it is assumed that many of the transportation jobs in the port regions would be either directly or indirectly associated with the port, all jobs are not necessarily attributed to port operations.

Table 4.5-1. Transportation and Warehousing Regional Employment – West Coast Region (in thousands)

Year	Los Angeles/Long Beach, CA and Tacoma, WA	Oakland, CA and Stockton, CA
2002	216.1	48.6
2003	209.2	46.0
2004	209.1	44.1
2005	210.3	44.2
2006	214.4	45.1
2007	215.6	46.5
2008	212.1	45.9
2009	196.7	42.3
2010	195.5	40.5
2011	196.0	40.9

Source: U.S. Bureau of Labor Statistics 2012.

4.5.2 Environmental Consequences

In instances where the cargoes moved on a Marine Highway service are transferred from highways, the long-haul truck drivers no longer required for the diverted cargo volume represent the dislocation of direct trucking industry employment, income, and State, local, and Federal tax impacts of using the Marine Highway service. Induced impacts that would be displaced are the consumption purchases by the directly employed truckers that support induced jobs, such as jobs with restaurants, health care, clothing, housing, transportation services, etc. The associated income and value of local consumption expenditures may also be displaced as the long haul truck move is diverted to the Marine Highway. Finally, the indirect impacts that may be displaced by the use of the Marine Highway are the results of

the purchases by the local trucking operation for fuel, parts, repairs and maintenance, insurance, contract services, etc.

The lost direct, induced, and indirect jobs, income, and taxes that may result from the diversion of long haul truck movements to the Marine Highway service may be replaced with new jobs, income, and taxes created by the development of the Marine Highway service. For the purposes of the analysis in this PEA, the direct jobs, income, and taxes associated with the operation of a Marine Highway service are estimated by quantifying the jobs, income, and tax impacts associated with activities at the port such as: the terminal impacts of inspecting the trailer prior to loading the vessel as well as at the discharge port; the labor (stevedoring) required to load the truck trailers onto the vessel at the originating port and to discharge the vessel at the destination port; the tugs and pilots required to assist the vessel at the port of departure and the port of destination; and the U.S. crew that would be required on the vessel (or barge) to move the truck trailers on the vessel.

In addition to these direct impacts associated with the operation of a Marine Highway service, it is estimated that induced and indirect impacts would also be generated. Induced impacts would occur as a result of the purchases for food, housing, clothing, medical services, personal transportation services, etc. generated by the consumption expenditures and re-spending of the direct personal income earned by the directly employed. The indirect impacts would include the impacts of purchases of supplies and parts for the vessels, and purchases of goods and services, as well as contract services by the terminal operators.

The jobs, income, and tax impacts of the Marine Highway service in a specific Marine Highway Corridor are estimated by comparing the direct, induced, and indirect impacts associated with the cargo volumes currently moving on long haul trucks that would be diverted to the Marine Highway service to the direct, induced, and indirect impacts of moving the diverted cargo to a Marine Highway service.

4.5.2.1 Proposed Action

Employment and Income

The substitution of the conceptual Marine Highway service for long haul truck service between the Ports of Los Angeles/Long Beach, CA and Tacoma, WA and between the Ports of Oakland, CA and Stockton, CA is estimated to result in the creation of jobs and income associated with the proposed Marine Highway service and the loss of jobs and income associated with the reduction of long haul (one-way) trucking along these routes. The gains and losses associated with the cargo volumes listed in Table 2.1-2 are estimated in Table 4.5-2.

Table 4.5-2. Estimated Jobs and Income Impacts of the Marine Highway Service - West Coast Region

	Long Haul Trucking (Losses)	Marine Highway Service (Gains)	Net Impacts
Los Angeles/Long Beach, CA to Tacoma, WA			
Jobs			
Direct	472	514	42
Induced	504	720	216
Indirect	265	289	24

Table 4.5-2. Estimated Jobs and Income Impacts of the Marine Highway Service - West Coast Region			
	Long Haul Trucking (Losses)	**Marine Highway Service (Gains)**	**Net Impacts**
TOTAL JOBS	**1,241**	**1,523**	**282**
Personal Income (1,000)			
Direct	$21,240	$32,779	$11,539
Re-spending/Local Consumption	$45,980	$70,960	$24,980
Indirect	$10,820	$11,780	$960
TOTAL (1,000)	**$78,040**	**$115,519**	**$37,479**
Federal, State, and Local Taxes (1,000)	$23,178	$34,309	$11,131
Oakland, CA to Stockton, CA			
Jobs			
Direct	32	75	43
Induced	34	92	58
Indirect	18	42	24
TOTAL JOBS	**84**	**209**	**125**
Personal Income (1,000)			
Direct	$1,440	$4,076	$2,636
Re-spending/Local Consumption	$3,117	$8,823	$5,706
Indirect	$734	$1,714	$980
TOTAL (1,000)	**$5,291**	**$14,613**	**$9,322**
Federal, State, and Local Taxes (1,000)	$1,571	$4,340	$2,769

It is estimated that the operation of the conceptual Marine Highway service between the Ports of Los Angeles/Long Beach and Tacoma may result in a loss of 472 direct trucking jobs in the long haul sector, and the creation of 514 direct port industry jobs. The majority of the 514 jobs created would be with members of the International Longshore Association (ILA) and International Longshore Warehouse Union (ILWU) and with U.S. merchant mariners onboard the vessels and ATBs deployed on this service. The increase in induced jobs (about a 50% increase) reflects an increase in direct wages and salaries based on the relatively higher wage rates and annual salaries of members of the ILWU and the U.S. merchant mariners. Overall, it is estimated that direct jobs would increase by less than 10%, but direct wages and salaries would increase by 50%. The higher personal earnings per capita is estimated to result in a greater multiplier impact in terms of local purchases per capita, thus stimulating more induced jobs.

The operation of the conceptual Marine Highway service between the Ports of Oakland and Stockton is estimated to result in a loss of 32 trucking jobs in the long haul sector, and the creation of 75 direct port industry jobs. The majority of the port sector jobs would be held by members of the ILWU as well as crew on the vessels.

For both port pairs analyzed for the West Coast region, the estimated results of transitioning from the long-haul truck service to the conceptual Marine Highway service indicate that while there may be a loss of jobs and income, there would also be increases in both the overall number of jobs created and personal income. Therefore, no significant adverse employment or income impacts would be expected with the Proposed Action for the West Coast region.

These findings are based on general formulas used for calculating employment and income. A more in-depth assessment may be required for future site-specific projects in the West Coast region to better define the measureable logistics costs of the proposed Marine Highway services and to further assess the impacts to the logistics supply chains and strategies of the targeted users.

4.5.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the two representative port pairs would not be implemented. Therefore, there would be no impact to socioeconomics.

4.6 Recreation

4.6.1 Affected Environment

Regional

The West Coast region provides a wealth of coastal- and water-dependent recreational opportunities including beaches in southern California and fishing in Alaska. Public access to coastal and inland bodies of water is a vital component of regional quality of life and an important draw for tourism. The quality and accessibility of the coastal resources in this region greatly affect recreational opportunities.

The waterways potentially affected by projects in the West Coast region include coastal waters of the Pacific Ocean, Puget Sound, Inside Passage, and Upper Cook Inlet. The Columbia, Snake, Matanuska, and Susitna Rivers also would be potentially affected. Ports would be served in California, Oregon, Washington, and Alaska (refer to Section 2.1.1, *West Coast*, for additional detail).

Recreational opportunities, including boating and fishing, are protected and regulated by a number of State, regional, and local agencies.

Port Pairs

The Ports of Los Angeles and Long Beach are located adjacent to each other in San Pedro Bay. There are numerous recreational resources and opportunities supported by San Pedro Bay and the ports including an important recreational boating and fishing industry, beaches, restaurants, shopping, and water-related attractions, such as the Los Angeles Maritime Museum, Aquarium of the Pacific, the Queen Mary ocean liner, and the Scorpion Submarine military museum. The Port of Tacoma is located in southern Puget Sound, an area of important natural resources and recreational opportunities. Local recreational resources include Point Defiance Zoo and Aquarium located in waterfront, Point Defiance Park, and Dash Point State Park. Puget Sound supports important recreational boating, fishing, and tourism industries.

The Port of Oakland is located on the eastern shore of the San Francisco Bay. The bay supports large recreational boating, fishing, and tourism industries. Within the Port of Oakland, the public can visit Port View Park and Jack London Square for boating, fishing, walking, dining, and shopping activities. The Port of Stockton is located on the Stockton Deep Water Ship Channel on the San Joaquin River. The San

Joaquin River and Delta support recreational activities such as fishing, boating, camping, and wildlife viewing.

4.6.2 Environmental Consequences

4.6.2.1 Proposed Action

Regional

Given that the frequency of three vessel trips per week proposed for the conceptual Marine Highway service between the selected West Coast port pairs, and that the vessels would utilize existing shipping routes between existing ports, any new service associated with the Proposed Action would not be expected to impact recreational opportunities within the West Coast region. Compliance with existing environmental regulations would minimize any potential air pollution, underwater noise, marine mammal collisions, or water pollution, which would also minimize any effect on recreation.

Port Pairs

At the time this PEA was written, there was no container-on-barge traffic transiting between the Ports of Los Angeles/Long Beach and Tacoma or within the Stockton Deep Water Ship Channel between the Ports of Stockton and Oakland. The conceptual Marine Highway services would be a completely new service along this corridor and between these port pairs. However, given the frequency of vessel trips proposed for the conceptual Marine Highway service between the port pairs, and that the vessels would transit along existing shipping routes between existing ports, negligible impacts to recreation are anticipated.

4.6.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region representative port pairs would not be implemented. Therefore, there would be no change or significant impact to recreation.

4.7 Traffic and Transportation

4.7.1 Affected Environment

Truck Traffic

Los Angeles/Long Beach, CA to Tacoma, WA

The landside interstate connecting the ports of Los Angeles/Long Beach, CA and Tacoma, WA is I-5. I-5 is a major north-south corridor along the West Coast, with six lanes running in each direction. There are approximately 1,130 miles along I-5 between the two ports. At driving speeds of 55 to 65 miles per hour, this distance represents approximately 19 hours of driving time. Considering truck driver rest periods and hours of service limits, truck transit time is estimated to be two days minimum. This corridor contains several areas identified by the DOT as having significant annual truck hours of delay, most notably in the urban areas of California, Portland, OR, and Seattle, WA.

The Ports of Los Angeles and Long Beach are connected by the Los Cerritos Channel. The ports are located near downtown Long Beach, along a major Interstate system (I-47), with easy access to major roadways, including Long Beach Freeway (I-710), which connects to I-5, Terminal Island Freeway, and Harbor Freeway (I-110).

The Port of Tacoma is located just east of downtown Tacoma. The port is served by an arterial roadway system (Highway 509), with multiple access points to I-5 and I-705, within one mile of the port.

Oakland, CA to Stockton, CA

The landside Interstate network connecting the ports of Oakland, CA and Stockton, CA, is a combination of north-south corridors along I-880 and I-5 and east-west corridors along I-580 and I-205. The highway distance from Oakland to Stockton is approximately 75 miles. At driving speeds of 55 – 65 miles per hour, this represents approximately 1.5 hours of driving time. In addition to the congestion noted along I-5, I-580 has also been identified as one of the most congested highways in the nation, with significant annual truck hours of delay.

The Port of Oakland is located on the eastern shores of San Francisco Bay and serves as an important hub to the East Bay subregion of California. The roadway systems serving the Port of Oakland include the I-880 system and multiple arterials and collectors to the north and east of the port.

The Port of Stockton is served by a roadway system consisting primarily of collector roads with access to I-5 just east of the port.

<u>Vessel Traffic</u>

Los Angeles/Long Beach, CA to Tacoma, WA

The Marine Highway Corridor between the Ports of Los Angeles/Long Beach and Tacoma consists of the M-84 and M-5 corridors through Puget Sound and along the Pacific Coasts of Washington, Oregon, and California. The waterway distance associated with this route is approximately 1,500 miles.

Oakland, CA to Stockton, CA

The Marine Highway Corridor between the Ports of Oakland and Stockton is San Pablo Bay and the inland waterways of Suisun Bay and the San Joaquin River, comprising the M-580 connector. The waterway distance from Oakland to Stockton is approximately 75 miles.

4.7.2 Environmental Consequences

4.7.2.1 Proposed Action

The Proposed Action has the potential to reduce traffic congestion along the busy roadways traveled by long haul trucks in the West Coast region. By transferring the transportation of cargo from trucks to marine vessels, there is expected to be a decrease in the volume of freight transported by trucks on the nation's highways. Consequently, there would be an increase in the amount of vessel trips on the existing Marine Highway Corridors in the West Coast region.

This section identifies the number of truck miles and hours of long haul transport that may be reduced as a result of the implementation of the Proposed Action, as well as the additional vessel traffic that would be introduced to the existing Marine Highway Corridors.

Truck Traffic

Los Angeles/Long Beach, CA to Tacoma, WA

Based on the conceptual Marine Highway services outlined in Table 2.1-2, the implementation of the Marine Highway service between the ports of Los Angeles/Long Beach, CA and Tacoma, WA is estimated to reduce the number of weekly truck trips along the I-5 corridor by 1,800. This equates to a total reduction of 2,034,000 miles and 34,200 hours of truck traffic along this route each week.

This decrease in truck traffic along this corridor is expected to be negligible compared to the existing truck traffic. Nonetheless, there would be beneficial impacts from any reduction in traffic congestion associated with long haul truck miles.

Oakland, CA to Stockton, CA

Based on the conceptual Marine Highway services outlined in Table 2.1-2, the implementation of Marine Highway service between the ports of Oakland, CA and Stockton, CA is estimated to reduce the weekly truck trips along the I-5, I-205, I-580, and I-880 corridors by 700. This equates to a total reduction of 52,500 miles and 1,050 hours of truck traffic along this route each week.

This decrease in truck traffic along this corridor is expected to be negligible compared to the existing truck traffic. Nonetheless, there would be beneficial impacts from any reduction in traffic congestion associated with long haul truck miles.

Vessel Traffic

Los Angeles/Long Beach, CA to Tacoma, WA

Based on the conceptual Marine Highway services outlined in Table 2.1-2, vessel traffic is estimated to increase along this corridor by six vessel trips per week (three trips in each direction). For OGVs traveling at 20 knots, this route would require approximately 58 hours (2.4 days) for one-way operation. For the ATB vessels operating at 12 knots, the one-way operation would require approximately 97 hours (4.0 days). Assuming two OGVs and one ATB per passage per week, a total of 426 hours of additional vessel traffic would be seen along this corridor. As the ports of Los Angeles, Long Beach, and Tacoma handle millions of TEUs per year, this increase in vessel traffic would have negligible impact on the existing Marine Highway Corridor. Therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

Oakland, CA to Stockton, CA

Based on the conceptual Marine Highway services outlined in Table 2.1-2, the number of weekly vessel trips would increase along this corridor by four (two trips in each direction). For the towboat/barge vessels operating at 8 knots, the one-way operation would require approximately ten hours. For two round-trip vessels per week, the corridor should experience an increase of 40 hours of traffic per week. As the Port of Oakland already handles over 2.5 million TEUs per year and the Port of Stockton has

already implemented the upgrades necessary to handle increased vessel traffic, this increase in vessel traffic would have negligible impact on the existing Marine Highway Corridor. Therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

4.7.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region representative port pairs would not be implemented. Truck traffic would continue as it is today, with landside routes that suffer congestion.

4.8 Biological Resources

4.8.1 Affected Environment

Vegetation and Wildlife

Because the establishment and operation of the Marine Highway along the West Coast would occur in existing ports and along established shipping corridors, extensive stands of upland or submerged aquatic vegetation (SAV) are not anticipated to be present in the area that could be affected by the Proposed Action in the West Coast region. Upland areas within the ports are assumed to be developed and devoid of vegetation while vessel berthing areas and navigation channels are expected to be too deep for the establishment of SAV. Because of the broad geographic scale of the Proposed Action biological resources cannot be described in detail at this time. Site-specific analysis of vegetation and wildlife communities at each port location and along the shipping corridors may be conducted during the preparation of project-based NEPA documentation, as necessary, to determine the presence and composition of vegetation and wildlife communities in the project area. A general discussion of vegetation and wildlife on a regional scale is presented herein.

The composition of upland vegetation communities in the West Coast region varies by location and is largely dependent on temperature, soil type, and the availability of sunlight and water. Wildlife populations are generally determined by the habitat quality (e.g., size, composition, level of human disturbance) and food and water availability of the area. The broad ecological communities of North America have been categorized and mapped at three levels. Level I is the most general of the classification systems and presents a continental perspective, dividing North America in 15 ecoregions. Level II presents more of a national/regional perspective and divides the continent into 52 ecoregions, whereas Level III presents a regional perspective and divides the continent into approximately 200 ecoregions (Commission for Environmental Cooperation [CEC] 1997). Three ecoregions comprise the West Coast region under the Level III classification system, Strait of Georgia/Puget Lowland, Coastal Range, and Willamette Valley (CEC 2006). The vegetation and wildlife commonly associated with each of these ecoregions is described in the following paragraphs.

Strait of Georgia/Puget Lowland: This region occupies eastern Vancouver Island and lands adjacent to the Strait of Georgia in British Columbia and along the Puget Sound to Tacoma in Washington State. Much of the land in this ecoregion has been cleared and is currently characterized by stands of Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), western red

cedar (*Thuja plicata*), red alder alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and an understory of salal (*Gaultheria shallon*), Oregon grape (*Mahonia aquifolium*), and moss. Mixed stands of Douglas fir and western hemlock with occasional Garry oak (*Quercus garryana*), dogwood (*Cornus spp*), and arbutus species are common in the driest portions of the coasts and islands. Wildlife found in this region includes black-tailed deer (*Odocoileus hemionus*), American elk (wapiti) (*Cervus elaphus canadensis*), gray wolf (*Canis lupus*), black bear (*Ursus americanus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), beaver (*Castor canadensis*), and otter (*Lontra spp*) (Wiken et al. 2011).

Coastal Range: This ecoregion spans the coastal mountains of western Washington, western Oregon, and northwestern California and is dominated by coniferous forests. Sitka spruce (*Picea sitchensis*) and coastal redwood (*Sequoia sempervirens*) forests originally dominated the coastal areas, while a mosaic of western red cedar, western hemlock, and Douglas fir blanketed inland areas. Today, Douglas fir plantations are prevalent and the forests are intensively logged and managed. Other species native to the region include red maple, bigleaf maple, vine maple (*Acer circinatum*), rhododendron (*Rhododendron ferrugineum*), salal, salmonberry (*Rubus spectabilis*), and Oregon grape. Wildlife native to the areas includes black-tailed deer, Roosevelt elk (*Cervus canadensis roosevelti*), black bear, cougar (*Puma concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), beaver, Townsend's mole (*Scapanus townsendii*), northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), several species of shorebirds and waterfowl, chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*) (Wiken et al. 2011).

Willamette Valley: This ecoregion is located in northwestern Oregon. The Willamette Valley is distinguished from the adjacent Coastal Range by lower precipitation, less relief, and a different mosaic of vegetation. Vegetation in the region is a mosaic of oak savanna, oak woodlands, prairies, and Douglas fir forests. Garry oak, Douglas fir, madrone (*Arbutus menziesii*), and some valley ponderosa pine (*Pinus ponderosa*) are typical. Riparian areas contain black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), bigleaf maple, Douglas fir, western red cedar, and various shrubs. Almost all of the native prairies have been converted to other uses. Wildlife typical to this ecoregion includes black-tailed deer, red fox, coyote, raccoon, striped skunk (*Mephitis mephitis*), beaver, Oregon vole (*Microtus oregoni)* and grey-tailed vole (*Microtus canicaudus*) (Wiken et al. 2011).

Migratory Birds

The West Coast region is an important bird migration corridor known as the Pacific Flyway. The Pacific Flyway is used by over 350 species of birds and millions of individuals migrating annually between the Bering Strait and South America (Figure 4-1) (Audubon 2010). The hundreds of rest stops along the Flyway include large refuges as well as small, privately owned habitat areas that allow migratory birds to access natural habitat for refueling or breeding (Audubon 2012a). As such, it is not feasible to identify every bird species that may occur along the West Coast region. A project-based NEPA analysis would identify bird species that would occur in the Marine Highway Corridor and at specific ports.

The West Coast region contains 308 Important Bird Areas (IBAs), recognized by the National Audubon Society, many of which are associated with the coast or other watercourses. IBAs are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or

migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected. Identification of a site as an IBA indicates its unique importance for birds (Audubon 2012b).

The Los Angeles/Long Beach harbor area is used by numerous species of birds (USACE 2009b). Water-associated birds use the water for resting and foraging. Some species also rest or roost on breakwaters and other structures in the harbor.

Figure 4-1 Pacific Flyway (with Principal Routes)

Source: Texas Parks and Wildlife Department 2012a

A 2000 baseline study for the Port of Long Beach noted 69 species that are dependent on marine habitats and another 30 species that are not (USACE 2009b). The most abundant guild of birds was gulls, with western gull (*Larus occidentalis*) and Heermann's gull (*Larus heermanni*) the most common. The next most abundant guilds were aerial fish foragers such as elegant tern (*Sterna elegans*) and California brown pelican (*Pelecanus occidentalis californicus*); and waterfowl such as western grebe

(*Aechmophorus occidentalis*), Brant's cormorant (*Phalacrocorax penicillatus*), and surf scoter (*Melanitta perspicillata*). Birds reach their highest abundance in fall and winter (USACE 2009b).

The San Francisco Bay-Delta is an important wintering and stop-over site for the Pacific Flyway. More than 300,000 wintering waterfowl use the region and associated ponds (NOAA 2007). Bird guilds that use the open waters of the Bay-Delta include the diving benthivores, which feed in deeper water on benthic invertebrates; dabblers, which feed in the upper water column of shallow subtidal areas; piscivores, which feed on fish; and opportunistic predators (NOAA 2007). The majority of birds using the Bay-Delta are bay and sea ducks.

The dominant marine birds regularly inhabiting or using the areas of the Bay-Delta where sand mining occurs include cormorants (*Phalacrocorax spp*.), pigeon guillemot (*Cepphus columba*), herring gull (*Larus argentatus*), mew gull (*L. canus*), and California brown pelican. The California brown pelican was recently delisted but remains a Fully Protected species under the California Fish and Game Code (Fish and Game Code, § 3511, subd. (b)(2)). Among the diving benthivores guild, canvasback (*Aythya valisineria*), greater scaup (*A. marila*), lesser scaup (*A. affinis*), and surf scoter are the most common, although canvasback abundance has declined in recent years (NOAA 2007). Ospreys (*Pandion haliaetus*) are also frequently observed throughout the Bay-Delta (NOAA 2007).

The Port of Stockton is located in the San Joaquin Valley and is associated with the Pacific Flyway. Representative birds include waterfowl (associated with the Pacific Flyway) that overwinter in valley wetlands. In addition, shorebirds (terns, plovers, sandpipers, egrets, and gulls) inhabit the near port area (EA Engineering 2011).

The Port of Tacoma area is highly developed and bird species are generally limited to those typically observed in the city's urban environment, including various songbirds, gulls, crows and ravens. Waterfowl that may be present include mallard, widgeon, green-winged teal, golden eye, pigeon guillemots, marbled murrelet, ring-necked duck, scaup, and Western grebe. Wading birds that may occur in nearshore areas in the vicinity of the port include great blue heron and dunlin (Port of Tacoma 2009).

<u>Fish</u>

The Pacific Fishery Management Council (PFMC) manages fisheries along the U.S. Pacific Coast. The PFMC has jurisdiction over the 317,690 square mile (sq mi) EEZ off Washington, Oregon and California and manages fisheries for approximately 119 species of salmon (*Salmo sp.*), groundfish, coastal pelagic species (sardines [*Sardinops sp.*], anchovies [*Anchoa sp.*], and mackerel [*Scomber sp*.]), and highly migratory species (tunas [*Thunnus sp.*], sharks, and swordfish [*Xiphias gladius*]). Species managed by the PFMC are listed in Table 4.8-1.

Table 4.8-1. Fish Species Managed by the PFMC	
Sharks and Skates	
Big skate	*Raja binoculata*
California skate	*R. inornata*
Leopard shark	*Triakis semifasciata*
Longnose skate	*R. rhina*
Soupfin shark	*Galeorhinus zyopterus*
Spiny dogfish	*Squalus acanthias*
Ratfish	
Ratfish	*Hydrolagus colliei*
Morids	
Finescale codling (Pacific flatnose)	*Antimora microlepis*
Grenadiers	
Pacific rattail (Pacific grenadier)	*Coryphaenoides acrolepis*
Roundfish	
Cabezon	*Scorpaenichthys marmoratus*
Kelp greenling	*Hexagrammos decagrammus*
Lingcod	*Ophiodon elongatus*
Pacific cod	*Gadus macrocephalus*
Pacific whiting (hake)	*Merluccius productus*
Sablefish	*Anoplopoma fimbria*
Rockfish	
Aurora rockfish	*Sebastes aurora*
Bank rockfish	*S. rufus*
Black rockfish	*S. melanops*
Black and yellow rockfish	*S. chrysomelas*
Blackgill rockfish	*S. melanostomus*
Blue rockfish	*S. mystinus*
Bocaccio	*S. paucispinis*
Bronzespotted rockfish	*S. gilli*
Brown rockfish	*S. auriculatus*
Calico rockfish	*S. dallii*
California scorpionfish	*Scorpaena gutatta*
Canary rockfish	*Sebastes pinniger*
Chameleon rockfish	*S. phillipsi*
Chilipepper	*S. goodei*
China rockfish	*S. nebulosus*
Copper rockfish	*S. caurinus*
Cowcod	*S. levis*
Darkblotched rockfish	*S. crameri*
Dusky rockfish	*S. ciliatus*
Dwarf-red rockfish	*S. rufinanus*
Flag rockfish	*S. rubrivinctus*
Freckled rockfish	*S. lentiginosus*
Gopher rockfish	*S. carnatus*
Grass rockfish	*S. rastrelliger*
Greenblotched rockfish	*S. rosenblatti*
Greenspotted rockfish	*S. chlorostictus*

Table 4.8-1. Fish Species Managed by the PFMC	
Greenstriped rockfish	*S. elongatus*
Halfbanded rockfish	*S. semicinctus*
Harlequin rockfish	*S. variegatus*
Honeycomb rockfish	*S. umbrosus*
Kelp rockfish	*S. atrovirens*
Longspine thornyhead	*Sebastolobus altivelis*
Mexican rockfish	*S. macdonaldi*
Olive rockfish	*S. serranoides*
Pink rockfish	*S. eos*
Pinkrose rockfish	*S. simulator*
Pygmy rockfish	*S. wilsoni*
Pacific ocean perch	*S. alutus*
Quillback rockfish	*S. maliger*
Redbanded rockfish	*S. babcocki*
Redstripe rockfish	*S. proriger*
Rosethorn rockfish	*S. helvomaculatus*
Rosy rockfish	*S. rosaceus*
Rougheye rockfish	*S. aleutianus*
Sharpchin rockfish	*S. zacentrus*
Shortbelly rockfish	*S. jordani*
Shortraker rockfish	*S. borealis*
Shortspine thornyhead	*Sebastolobus alascanus*
Silvergray rockfish	*Sebastes brevispinis*
Speckled rockfish	*S. ovalis*
Splitnose rockfish	*S. diploproa*
Squarespot rockfish	*S. hopkinsi*
Starry rockfish	*S. constellatus*
Stripetail rockfish	*S. saxicola*
Swordspine rockfish	*S. ensifer*
Tiger rockfish	*S. nigrocinctus*
Treefish	*S. serriceps*
Vermilion rockfish	*S. miniatus*
Widow rockfish	*S. entomelas*
Yelloweye rockfish	*S. ruberrimus*
Yellowmouth rockfish	*S. reedi*
Yellowtail rockfish	*S. flavidus*
Flatfish	
Arrowtooth flounder (turbot)	*Atheresthes stomias*
Butter sole	*Isopsetta isolepis*
Curlfin sole	*Pleuronichthys decurrens*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
Flathead sole	*Hippoglossoides elassodon*
Pacific sanddab	*Citharichthys sordidus*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*
Rock sole	*Lepidopsetta bilineata*

Table 4.8-1. Fish Species Managed by the PFMC	
Sand sole	*Psettichthys melanostictus*
Starry flounder	*Platichthys stellatus*
Salmonids	
Chinook or king salmon	*Oncorhynchus tshawytscha*
Chum salmon	*O. keta*
Coho or silver salmon	*O. kisutch*
Pacific Halibut	*Hippoglossus stenolepis*
Pink salmon	*O. gorbuscha*
Sockeye salmon	*O. nerka*
Steelhead	*O. mykiss*
Sea-run cutthroat trout	*O. clarki*
Highly Migratory Species	
Mahi-mahi (dolphinfish)	*Coryphaena spp.*
Marlin and Spearfish	
Marlins	*Makaira spp.*
Spearfishes	*Tetrapturus spp.*
Oceanic Sharks	
Hammerhead sharks	*family Sphyrnidae*
Mackerel sharks	*family Lamnidae*
Requiem sharks	*family Carcharhinidae*
Sailfish	*Istiophorus spp.*
Swordfish	*Xiphias sp*
Thresher sharks	*family Alopiidae*
Tuna and Related Spp	
Bonitos	*Sarda sp.*
Frigate and bullet tuna	*Auxis spp.*
Little cuna	*Euthynnus spp.*
Mackerels	*Scomber spp*
Moonfish (opah)	*Lampris sp.*
Oilfish (walu)	*Ruvettus pretiosus*
Pomfrets	*family Bramidae*
Skipjack tunas	*Katsuwonus sp.*
Slender tuna	*Allothunnus sp.*
Tunas	*Thunnus spp.*
Wahoo	*Acanthocybium sp.*
Coastal Pelagics	
Californian anchovy	*Engraulis mordax*
Jack mackerel	*Trachurus symmetricus*
Market squid	*Loligo opalescens*
Pacific sardine	*Sardinops sagax*
Pacific (chub) mackerel	*Scomber japonicus*

Sources: PFMC 2011a, 2011b, 1998, 1997.

The PFMC is also active in international fishery management organizations that manage fish stocks that migrate through its area of jurisdiction such as Pacific halibut (*Hippoglossus stenolepis*), albacore (*Thunnus alalunga*), yellowfin tuna (*Thunnus albacares*), and other highly migratory species.

Groundfish EFH along the U.S. Pacific Coast is described as all waters from the high tide line (and parts of estuaries) to 3,500 meters (m) in depth (PFMC 2012).

The east-west geographic boundary of EFH is defined to be all marine and estuarine waters from the U.S. Pacific Coast to 200 ft offshore (the EEZ). The southern boundary is the U.S.-Mexico maritime boundary. The northern boundary is more dynamic and variable due to the seasonal cooling of the sea surface temperature. The northern EFH boundary is defined by the position of the 10°C isotherm, which varies both seasonally and annually (PFMC 2012).

Salmon EFH includes all lakes, streams, ponds, rivers, wetlands, and other bodies of water that have been historically accessible to salmon. The description of EFH also includes areas above artificial barriers, except for certain barriers and dams that fish cannot pass (PFMC 2012).

EFH for highly mobile species such as tuna, swordfish, and sharks is described by species and lifestage because these species are usually not associated with the features that are typically considered fish habitat (such as seagrass beds, rocky bottoms, or estuaries) and range widely in the ocean in terms of area and depth. Their habitat is defined by temperature ranges, salinity, oxygen levels, currents, shelf edges, and seamounts (PFMC 2012).

The Port of Los Angeles/Long Beach is within an area designated as EFH for two FMPs, the Coastal Pelagics and Pacific Groundfish Management Plans (USACE 2009c). Of the 86 species that are federally managed under these plans, 11 are known to occur in Los Angeles Harbor (Table 4.8-2).

Table 4.8-2. Essential Fish Habitat Species in Los Angeles Harbor

Common Name	Scientific Name	Life Stages
Coastal Pelagics FMP		
California anchovy	*Engraulis mordax*	adult, larvae
Jack mackerel	*Trachurus symmetricus*	adult
Pacific sardine	*Sardinops sagax*	adult
Pacific (chub) mackerel	*Scomber japonicus*	adult
Pacific Groundfish FMP		
Bocaccio	*Sebastes paucispinis*	juvenile
Cabezon	*Scorpaenichthys marmoratus*	adult
California scorpionfish	*Scorpaena gutatta*	adult
English sole	*Parophrys vetulus*	adult
Leopard shark	*Triakis semifasciata*	adult
Olive rockfish	*Sebastes serranoides*	juvenile
Pacific sanddab	*Citharichthys sordidus*	adult

Source: USACE 2009c.

Under the Pacific Coast Salmon FMP, the entire San Francisco Bay-Delta Estuary has been designated as EFH for Spring-, fall/late fall- and winter-run Chinook salmon (Pacific salmon) (PFMC 2003). Winter- and spring-run Chinook salmon are listed under the Federal and State ESAs as endangered and threatened, respectively. These areas serve as a migratory corridor, holding area, and rearing habitat for both adult

and juvenile salmon. Likewise, the Pacific Pelagic FMP identifies the Bay-Delta as EFH for fish managed under their program, which includes Pacific herring, northern anchovy, and Pacific sardine (PMFC 1998).

The Port of Stockton area is EFH for two groundfish and Pacific salmon (California Department of Water Resources 2007). Species and lifestages that may occur in the port area include English sole and starry flounder juveniles and adults and Chinook salmon juveniles and adults.

The waters in the Port of Tacoma are designated EFH for groundfish, Chinook salmon, and coho salmon (PFMC 2011).

Marine Mammals

Two major groups of marine mammals are cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals, sea lions, and walruses). All marine mammals are protected under the MMPA; some marine mammals may be designated as "depleted" under the MMPA. Endangered and threatened marine mammals are further protected under the ESA and are discussed in the following section (Threatened and Endangered Species).

The waters of the West Coast region off Washington, Oregon, and California support a wide variety of marine mammals. Approximately 30 species, including seals and sea lions, sea otters, whales, dolphins, and porpoise are known to occur either seasonally or year-round (NMFS 2005). Table 4.8-3 lists marine mammal species occurring in the West Coast region. Species with an asterisk are protected under the ESA and are discussed under Threatened and Endangered Species.

Table 4.8-3. Marine Mammals Occurring in the West Coast Region

Common Name	Scientific Name
Pinnipeds	
California sea lion	*Zalophus californianus*
Guadalupe fur seal*	*Arctocephalus townsendi*
Northern elephant seal	*Mirounga angustirostris*
Northern fur seal*	*Callorhinus ursinus*
Northern or Steller sea lion*	*Eumetopias jubatus*
Pacific harbor seal	*Phoca vitulina richardsi*
Sea otters	
Northern sea otter	*Enhydra lutris kenyoni*
Southern sea otter	*Enhydra lutris nereis*
Cetaceans	
Baird's beaked whale	*Berardius bairdii*
Blue whale*	*Balaenoptera musculus*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*B. edeni*
Cuvier's beaked whale	*Ziphius cavirostris*
Dall's porpoise	*Phocoenoides dalli*
Fin whale*	*Balaenoptera physalus*
Gray whale	*Eschrichtius robustus*
Harbor porpoise	*Phocoena phocoena*
Humpback whale*	*Megaptera novaeangliae*
Killer whale	*Orcinus orca*
Long-beaked common dolphin	*Delphinus capensis*

Table 4.8-3. Marine Mammals Occurring in the West Coast Region	
Minke whale	*Balaenoptera acutorostrata*
Northern right whale dolphin	*Lissodelphis borealis*
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Sei whale*	*Balaenoptera borealis*
Short-beaked common dolphin	*Delphinus delphis*
Short-finned pilot whale	*Globicephala macrorhyncus*
Sperm whale*	*Physeter macrocephalus*
Striped dolphin	*Stenella coeruleoalba*

Source: NOAA 2011c.
Note: * indicates species protected under the ESA.

The greatest threats to marine mammal species are from ship strikes, encounters with fishing gear, hunting, viral infections, and toxic pollution. Ship strikes are more common to larger marine mammal species (i.e., whales). Strikes to pilot whale and dolphin species have been recorded, but are not as common (International Whaling Commission [IWC] 2011).

Many of the larger marine mammal species listed above prefer deeper, open ocean waters while others prefer nearshore environments and would be more likely to occur in the area that could be affected by the Proposed Action in the West Coast region. A project-based NEPA analysis would determine the likelihood of the above listed species to occur along the Marine Highway Corridor.

Marine mammals observed in the Outer Harbor of Los Angeles include the gray whale (*Eschrichtius robustus*), bottlenose dolphin (*Tursiops truncatus*), short-beaked common dolphin (*Delphinus delphis*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*). None of these species breed in the Harbor (USACE 2009c).

California sea lions (*Zalophus californianus*) are the most commonly observed marine mammal in the Harbor and are especially numerous adjacent to the municipal fish market in the Main Channel and in Fish Harbor. They also haul out and rest on buoys in the Harbor. Harbor seals (*Phoca vitulina*) are present in lower numbers. Neither species breeds in the Harbor. Outside of the protected area of the port, a variety of marine mammals use nearshore waters. These include the gray whale, which migrates from the Bering Sea to Mexico and back each year, and the blue whale (*Balaenoptera musculus*). Several species of dolphin and porpoise are commonly found in coastal areas near Los Angeles including the Pacific white-sided dolphin *(Lagenorhynchus obliquidens)*, Risso's dolphin (*Grampus griseus*), Dall's porpoise (*Phocoenoides dalli*), bottlenose dolphin, northern right whale dolphin (*Lissodelphis borealis*), and short-beaked common dolphin, with the short-beaked common dolphin being the most abundant (USACE 2009c).

Seven species of marine mammals occur within the San Francisco Bay-Delta. The harbor seal (*Phoca vitulina*), California sea lion, harbor porpoise (*Phocoena phocoena*), and gray whale are the most common that use the open waters of the Bay-Delta for migrating, foraging, and resting (NOAA 2007). While these species typically concentrate their activities in Central Bay and adjacent portions of South Bay and North Bay, some harbor seals, harbor porpoise, and California sea lions travel throughout the

Bay-Delta and up into the Sacramento River in search of salmon and other forage. There are no major haul-outs or rookeries in the North Bay for marine mammals (California State Lands Commission 2011).

With its inland location, the Port of Stockton does not support populations of marine mammals.

Marine mammals that may occur in the Port of Tacoma area include harbor seal, steller sea lion *(Eumetopias jubatus)*, harbor porpoise, killer whale *(Orcinus orca)*, humpback whale *(Megaptera novaeangliae)*, and gray whale (Port of Tacoma 2009).

Invasive Species

As discussed in Section 3.8.5, invasive species are officially defined as "alien species whose introduction does or is likely to cause economic or environmental harm to human health" (EO 13112, 64 F.R. 6183 [February 8, 1999]). Invasive species of concern along the U.S. Pacific Coast are summarized in Table 4.8-4.

Table 4.8-4. Invasive Species of the U.S. Pacific Coast

Common Name	Scientific Name
African clawed frog	*Xenopus laevis*
Alligatorweed	*Alternanthera philoxeroides*
Asian overbite clam	*Corbula amurensis*
Asian swamp eel	*Monopterus albus*
Atlantic oyster drill	*Urosalpinx cinerea*
Atlantic salmon	*Salmo salar*
Bryozoa	*Cryptosula pallasiana, Bugula neritina, Watersipora subtorquata*
Brazilian elodea	*Egeria densa*
Bullfrog	*Rana catesbeiana*
Caulerpa	*Caulerpa taxifolia*
Chain Sea Squirt	*Botrylloides diegensis*
Channeled apple snail	*Pomacea canaliculata*
Channeled whelk	*Busycotypus canaliculatus*
Chinese mitten crab	*Eriocheir sinensis*
Club sea squirt	*Styela clava*
Curly pondweed	*Potamogeton crispus*
Cyanobacteria	*Microcystis spp.*
Dwarf eelgrass	*Nanozostera japonica*
Eastern mudsnail	*Ilyanassa obsoleta*
English cordgrass	*Spartina anglica*
Eurasian watermilfoil	*Myriophyllum spicatum*
European frogbit	*Hydrocharis morsus-ranae*
European green crab	*Carcinus maenas*
Giant reed	*Arundo donax* (most commonly called *Arundo*)
Giant salvinia	*Salvinia molesta*
Golden mussel	*Limnoperna fortunei*
Green bagmussel	*Musculista senhousia*
Green sunfish	*Lepomis cyanellus*
Hydrilla	*Hydrilla verticillata*
Japanese littleneck clam	*Venerupis philippinarum*
Japanese seaweed	*Sargassum muticum*
Knotted wrack	*Ascophyllum nodosum*

Table 4.8-4. Invasive Species of the U.S. Pacific Coast	
Common Name	**Scientific Name**
Melaleuca	*Melaleuca quinquenervia*
Mosquitofish	*Gambusia affinis*
Mouse-eared ovatella	*Myosotella myosotis*
New Zealand mudsnail	*Potamopyrgus antipodarum*
Northern Pacific seastar	*Asterias amurensis*
Northern pike	*Esox lucius*
Northern snakehead	*Channa argus*
Orange or red sheath tunicate	*Botrylloides violaceus*
Orange-striped green anemone	*Diadumene lineata*
Paleyellow iris	*Iris pseudacorus*
Parrot feather milfoil	*Myriophyllum aquaticum*
Perennial pepperweed	*Lepidium latifolium*
Polychaete worm	*Ficopomatus enigmaticus*
Purple loosestrife	*Lythrum salicaria*
Quagga mussel	*Dreissena bugensis*
Red beard sponge	*Clathria prolifera*
Ribbed mussel	*Geukensia demissa*
Rough periwinkle	*Littorina saxatilis*
Sabellid polychaete	*Terebrasabella heterouncinata*
Sacramento pikeminnow	*Ptychocheilus grandis*
Saltcedar	*Tamarix ramosissima*
Saltmeadow cordgrass	*Spartina patens*
Sea lamprey	*Petromyzon marinus*
Shimofuri goby	*Tridentiger bifasciatus*
Shipworm	*Teredo navalis*
Small cordgrass	*Spartina maritima*
Smooth cordgrass	*Spartina alterniflora*
Soft-shell clam	*Mya arenaria*
Star sea squirt	*Botryllus schlosseri*
Striped barnacle	*Balanus amphitrite*
Tunicates	*Didemnum spp.*
Wakame	*Undaria pinnatifida*
Water hyacinth	*Eichhornia crassipes*
Water lettuce	*Pistia stratiotes*
Yellowfin goby	*Acanthogobius flavimanus*

Sources: California Department of Fish and Game 2008; Cohen 2011.

Threatened and Endangered Species

Protected species that occur in the West Coast region are identified in this section and listed in Table 4.8-5.

Table 4.8-5. Endangered Species Act Protected Marine Species of the West Coast Region

Name	Scientific Name	ESA Status	Population
Invertebrates			
Abalone, Black	*Haliotis cracherodii*	Endangered	All populations
Abalone, White	*H. sorenseni*	Endangered	All populations
Fish			
Coho salmon	*Oncorhynchus kisutch*	Threatened	Central CA, Southern OR, and Northern CA Coasts
Chinook salmon	*O. tshawytscha*	Threatened	Snake River Fall, Spring, and Summer; Puget Sound; Lower Columbia; Upper Willamette; Central Valley Spring; CA Coastal
Chinook salmon	*O. tshawytscha*	Endangered	Sacramento River Winter; Upper Columbia Spring
Chum salmon	*O. keta*	Threatened	Hood Canal Summer; Columbia River
Green sturgeon	*Acipenser medirostris*	Threatened	Southern
Pacific eulachon	*Thaleichthys pacificus*	Threatened	Southern
Sockeye salmon	*Oncorhynchus nerka*	Threatened	Ozette Lake
Sockeye salmon	*O. nerka*	Endangered	Snake River
Steelhead trout	*O. mykiss*	Threatened	South-Central CA, Central CA Coast, Snake River Basin, Lower Columbia, CA Central Valley, Upper Willamette, Middle Columbia, Northern CA
Steelhead trout	*O. mykiss*	Endangered	Southern CA; Upper Columbia
Seals, Sea Lions and Otters			
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened	All populations
Northern or steller sea lion	*Eumetopias jubatus*	Threatened	Eastern stock
Southern sea otter	*Enhydra lutris nereis*	Threatened	All populations
Whales			
Blue whale	*Balaenoptera musculus*	Endangered	All populations
Fin whale	*B. physalus*	Endangered	All populations
Humpback whale	*Megaptera novaeangliae*	Endangered	All populations
Killer Whale	*Orcinus orca*	Endangered	Southern resident
Sei whale	*Balaenoptera borealis*	Endangered	All populations
Sperm whale	*Physeter catodon*	Endangered	All populations
Sea Turtles			
Green sea turtle	*Chelonia myda*	Threatened	Breeding populations in FL and the West Coast of Mexico are listed as endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	All populations
Loggerhead sea turtle	*Caretta caretta*	Endangered	All populations
Olive ridley sea turtle	*Lepidochelys olivacea*	Endangered	All populations

Source: NMFS 2005.

No sea turtles have been observed within the Port of Los Angeles/Long Beach during more than 20 years of biological surveys (USACE 2009c). However, several species have regional distributions in southern California. Therefore, it is possible that sea turtles may be occasional visitors to the Outer Harbor areas of the Port of Los Angeles/Long Beach. Sea turtle species found in the eastern Pacific Ocean include loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and olive ridley sea turtles (*Lepidochelys olivacea*) (USACE 2009c).

Several turtle species have regional distributions in southern California. Therefore, it is possible that sea turtles may be occasional visitors to the San Francisco Bay-Delta area. Sea turtle species found in the eastern Pacific Ocean include loggerhead, green, leatherback, and olive ridley sea turtles. Other federally protected species that may occur in the waters off of the Port of Oakland include Green sturgeon (*Acipenser medirostris*), Delta smelt (*Hypomesus transpacificus*), Chinook salmon, steelhead trout, California gray whale, and Humpback whale (USACE 2009c).

Several federally listed species of fish occur in the waters near the port of Stockton including Sacramento River winter-run Chinook salmon (endangered), Central Valley spring-run Chinook salmon (threatened), Central Valley steelhead trout (threatened) and North American green sturgeon (threatened). Because of the ports inland location, sea turtles and marine mammals are not known to occur (USACE 2006). Aleutian Canada goose (*Branta canadensis leucopareia*) (Threatened) may also be found in near-port areas (EA Engineering 2011).

There are seven federally protected species that have potential to occur in the Port of Tacoma area: Chinook salmon, steelhead, bull trout, marbled murrelet, humpback whale, killer whale, and steller sea lion (Port of Tacoma 2009).

<u>Critical Habitat</u>

In October 2011, NMFS designated critical habitat for black abalone (76 F.R. 66806). The designated critical habitat includes approximately 360 square kilometers of rocky intertidal and subtidal habitat within five segments of the California coast between the Del Mar Landing Ecological Reserve to the Palos Verdes Peninsula, as well as on the Farallon Islands, Aňo Nuevo Island, San Miguel Island, Santa Rosa Island, Santa Cruz Island, Anacapa Island, Santa Barbara Island, and Santa Catalina Island. The designation includes rocky intertidal and subtidal habitats from the mean higher high water line to a depth of 6 m (relative to the mean lower low water line), as well as the coastal marine waters encompassed by these areas (Figure 4-2).

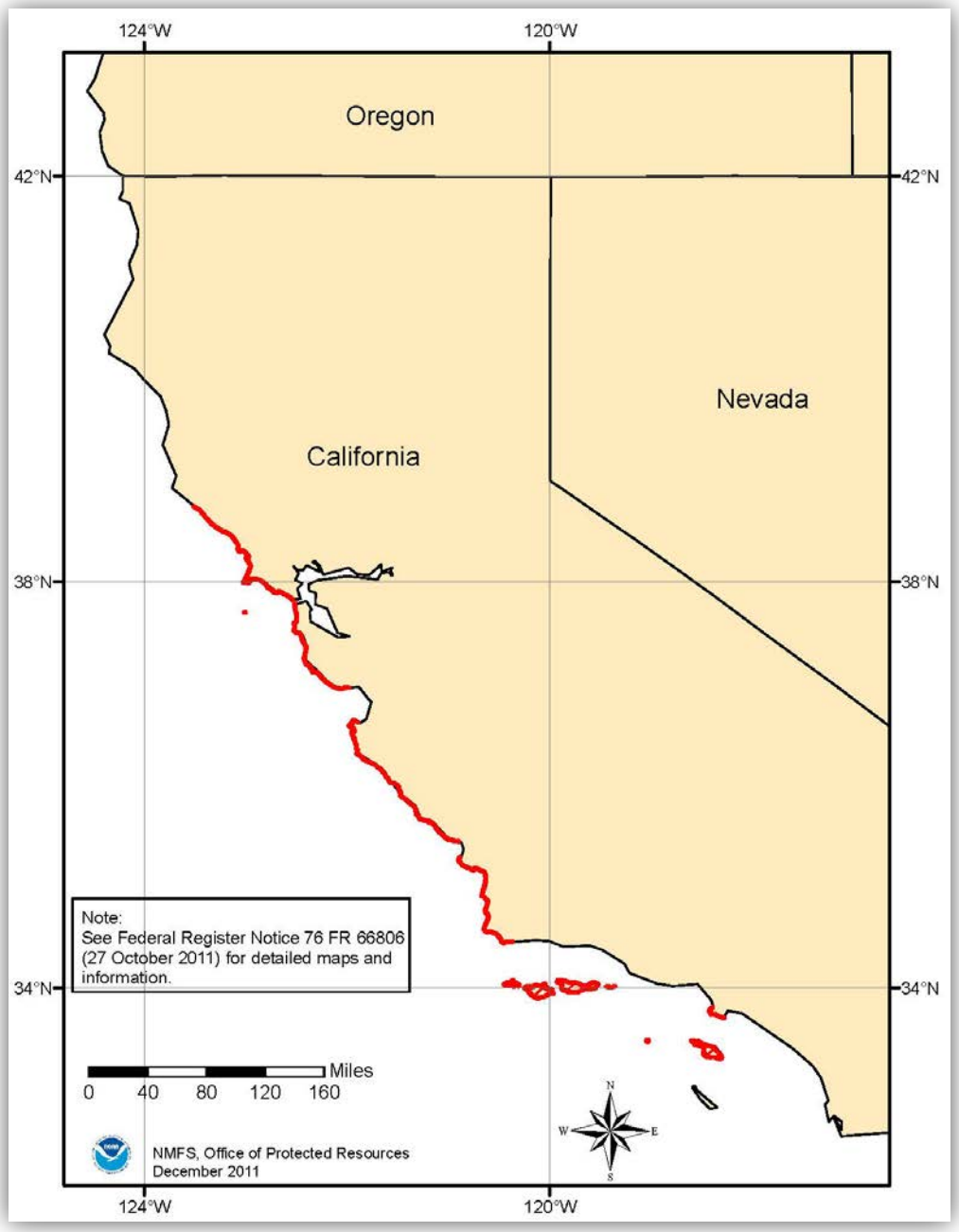

Figure 4-2 Black Abalone Critical Habitat

In September 2005, NMFS issued a final rule designating critical habitat for several West Coast salmon species including chum (*Oncorhynchus keta*), sockeye (*O. nerka*), chinook, and steelhead (70 F.R. 52630). The specific areas designated in the rule include approximately 20,630 miles of lake, riverine, and estuarine habitat in Washington, Oregon, and Idaho, as well as approximately 2,312 miles of marine nearshore habitat in Puget Sound, WA (Figures 4-3 through 4-6).

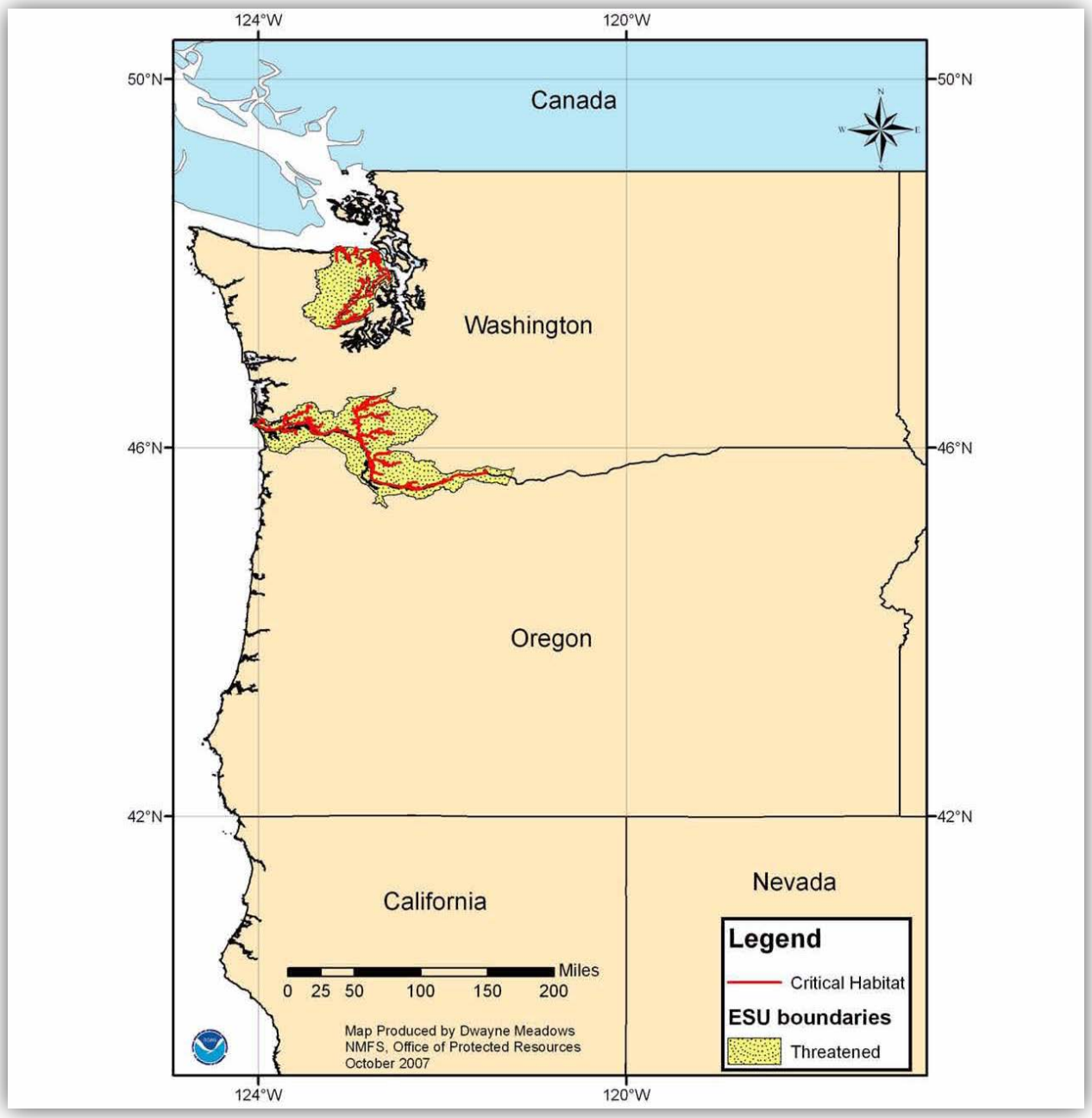

Figure 4-3 Chum Salmon Critical Habitat

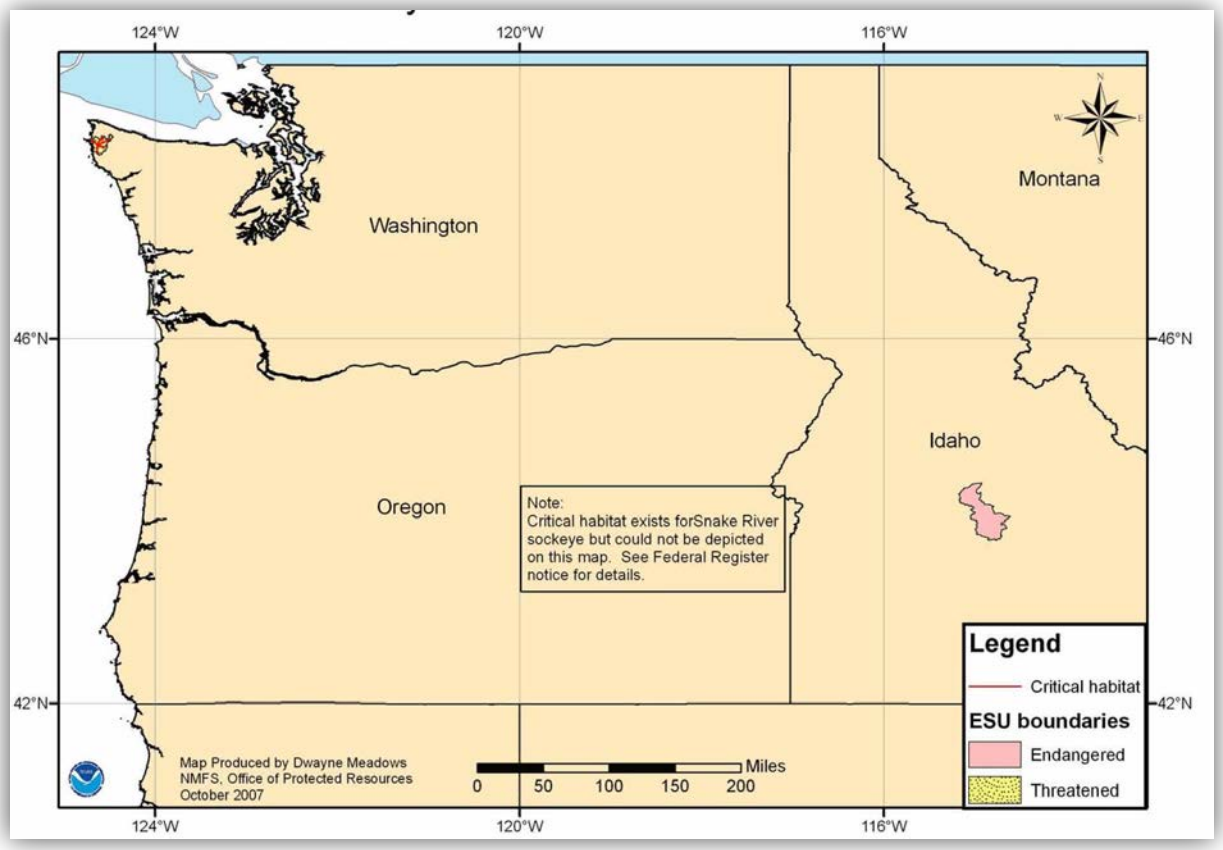

Figure 4-4 Sockeye Salmon Critical Habitat

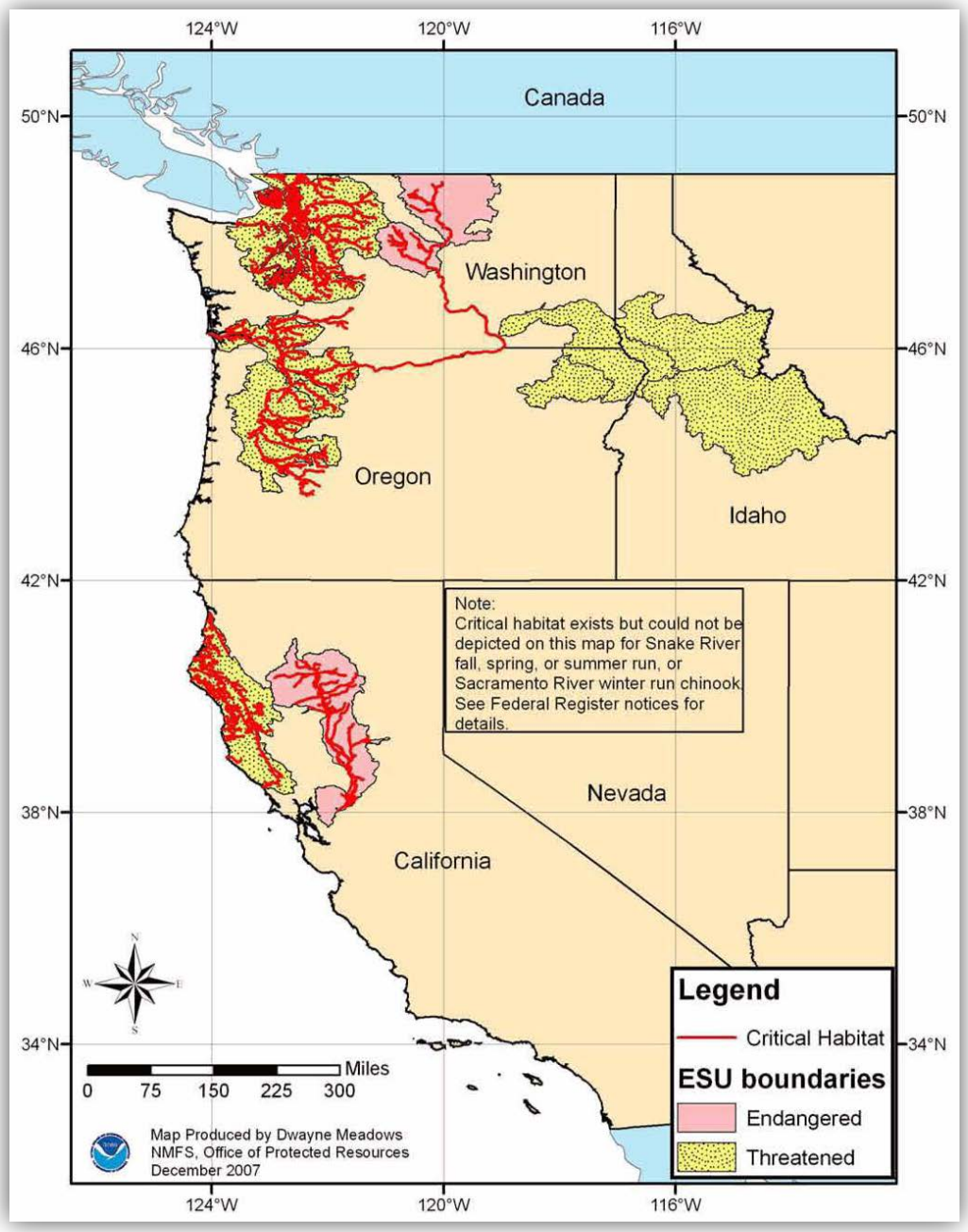

Figure 4-5 Chinook Salmon Critical Habitat

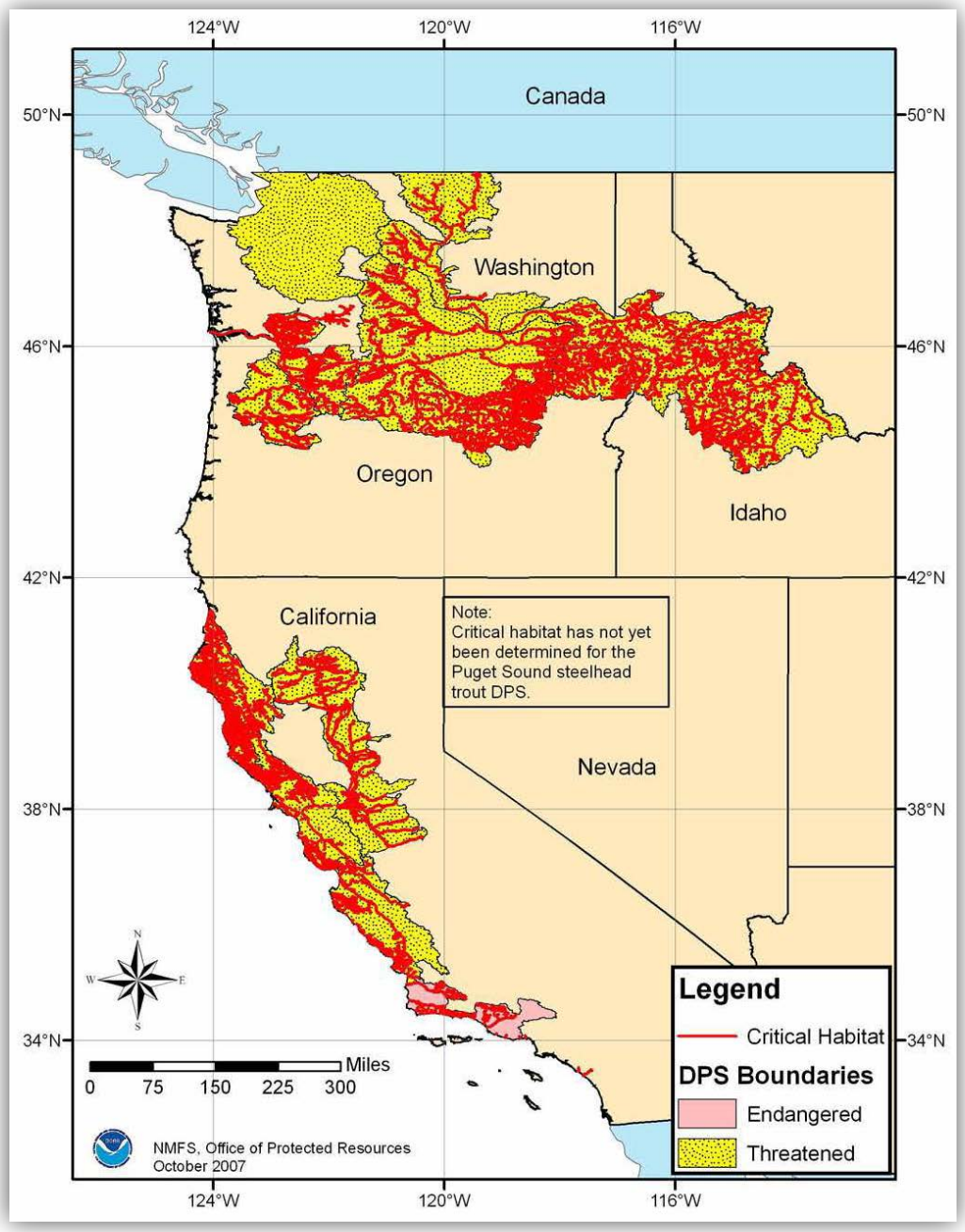

Figure 4-6 Steelhead Critical Habitat

In May 1999, NMFS designated critical habitat for coho salmon (64 F.R. 24049). Critical habitat for the Central California Coast coho salmon encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between Punta Gorda and the San Lorenzo River (inclusive) in California, including two streams entering San Francisco Bay: Arroyo Corte Madera Del Presidio and Corte Madera Creek. Critical habitat for the Southern Oregon/Northern California Coast coho salmon encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and the Elk River in Oregon, inclusive (Figure 4-7).

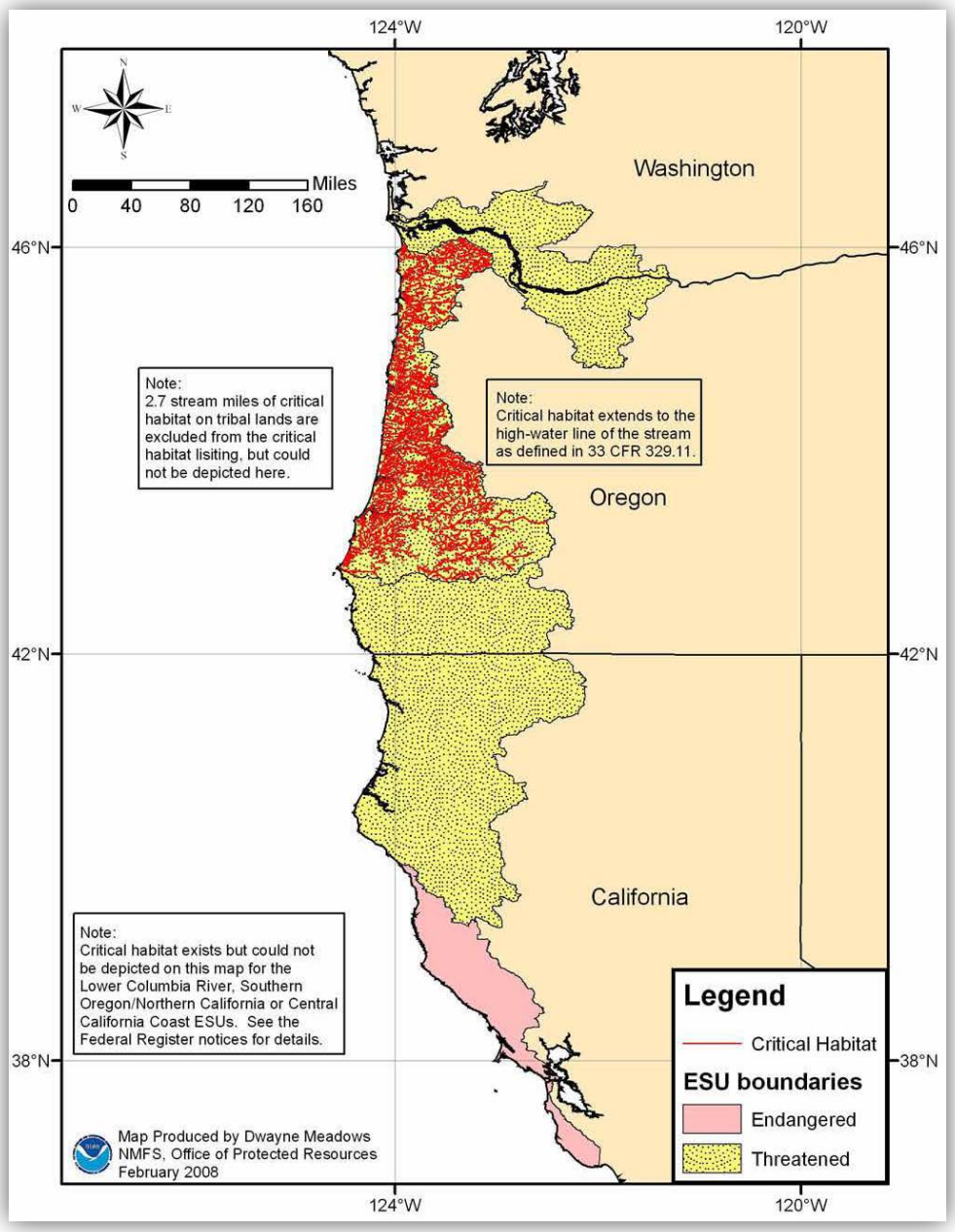

Figure 4-7 Coho Salmon Critical Habitat

In October 2011, NMFS issued a final rule to designate critical habitat for the southern Distinct Population Segment of Pacific eulachon (*Thaleichthys pacificus*) (76 F.R. 65324). Sixteen specific areas were designated as critical habitat within the states of California, Oregon, and Washington. The designated areas are a combination of freshwater creeks and rivers and their associated estuaries, comprising approximately 335 miles of habitat.

In October 2009, NMFS designated critical habitat for the green sturgeon (74 F.R. 52300). Specific designated areas include: Coastal U.S. marine waters within 60 fathoms depth from Monterey Bay, CA (including Monterey Bay), north to Cape Flattery, WA, including the Strait of Juan de Fuca, WA, to its U.S. boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays in California; the lower Columbia River estuary; and certain coastal bays and estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor) (Figure 4-8). This rule designates approximately 320 miles of freshwater river habitat, 897 sq mi of estuarine habitat, 11,421 sq mi of marine habitat, 487 miles of habitat in the Sacramento-San Joaquin Delta, and 135 sq mi of habitat within the Yolo and Sutter bypasses (Sacramento River, CA) as critical habitat for green sturgeon.

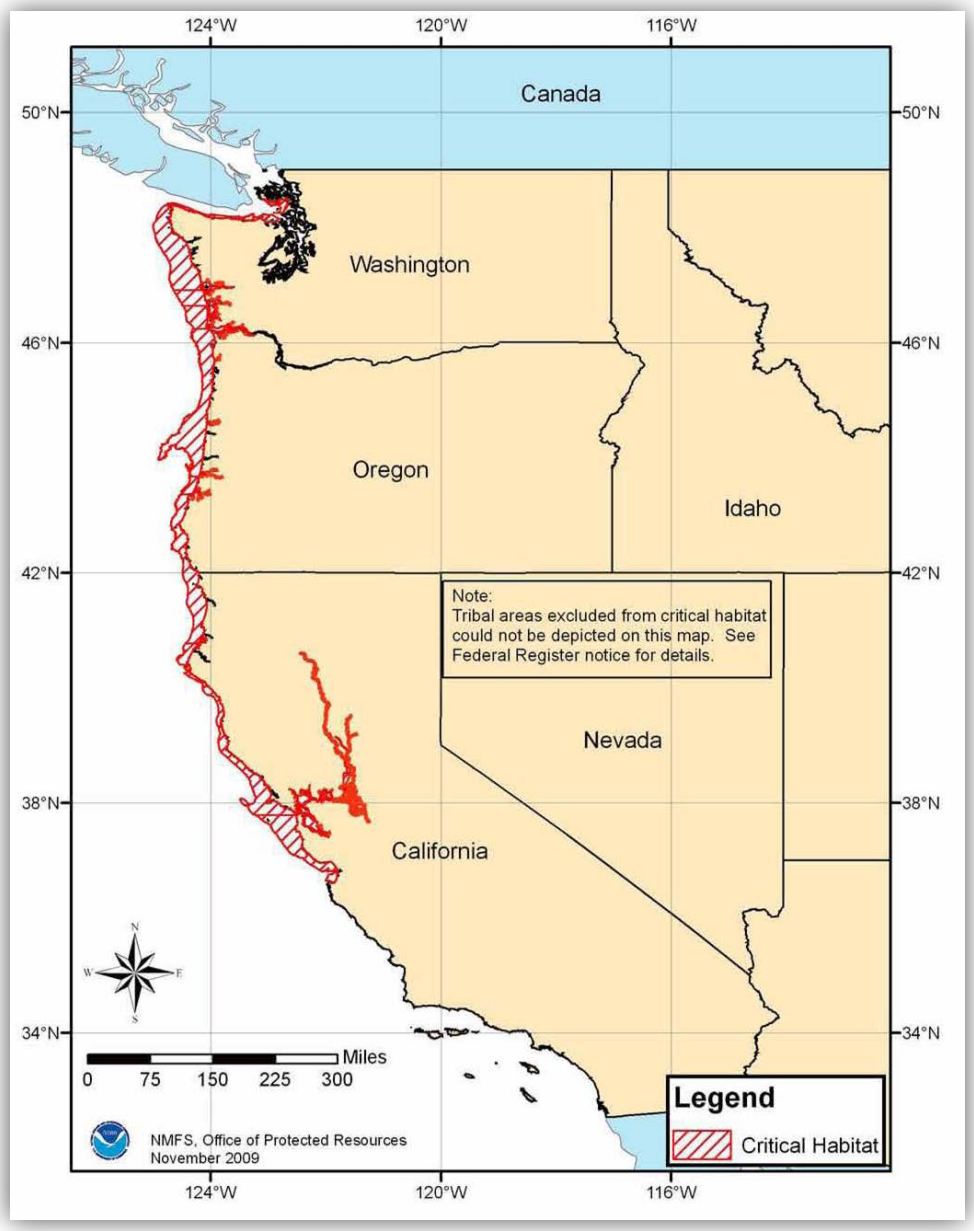

Figure 4-8 Green Sturgeon Critical Habitat

Steller sea lion critical habitat includes a 20 nm buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (Figure 4-9). NMFS has implemented a complex suite of fishery management measures designed to minimize competition between fishing and the endangered population of Steller sea lions in critical habitat areas (58 F.R. 45269).

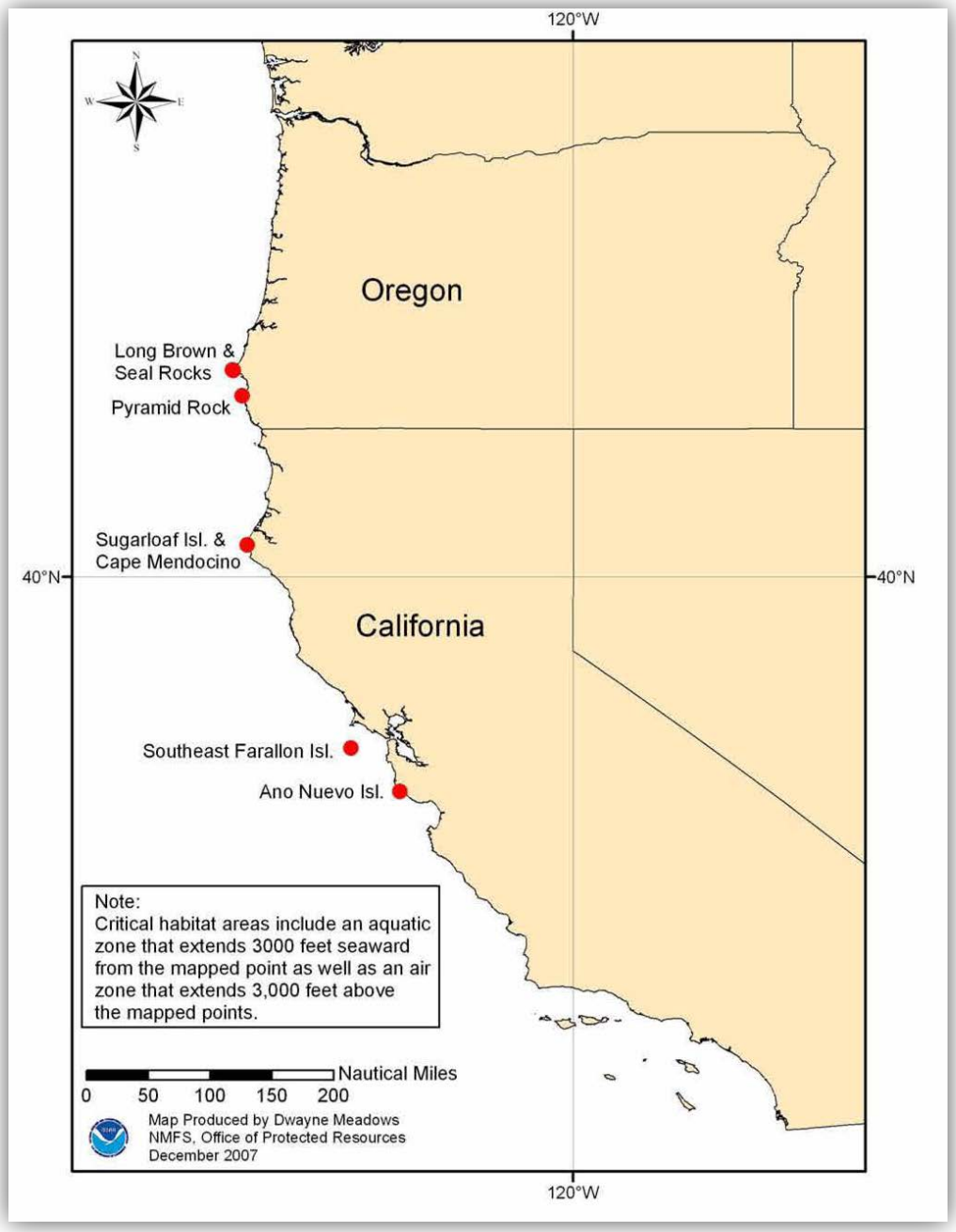

Figure 4-9 Steller Sea Lion Critical Habitat: Oregon and California Rookeries

In November 2006, NMFS issued a final rule designating critical habitat for the Southern Resident killer whale Distinct Population Segment (71 F.R. 69054). Three specific areas were designated: (1) the Summer Core Area in Haro Strait and waters around the San Juan Islands; (2) Puget Sound; and (3) the Strait of Juan de Fuca, which comprise approximately 2,560 sq mi of marine habitat (Figure 4-10).

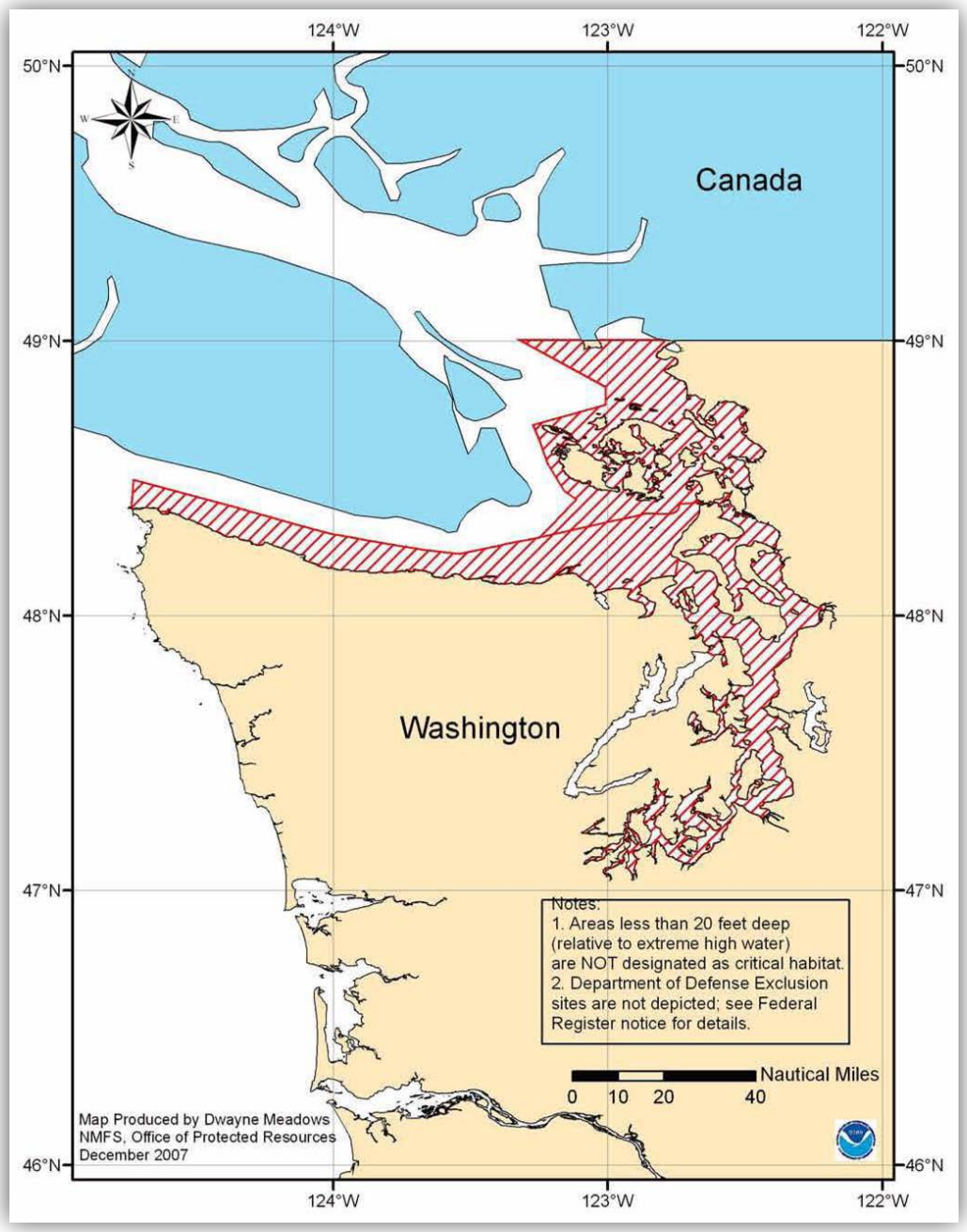

Figure 4-10 Southern Resident Killer Whale Critical Habitat

In 2012, NOAA and the USFWS designated a 41,914 sq mi area along the West Coast as critical habitat to protect endangered leatherback sea turtles (Figure 4-11) (77 F.R. 4170). The newly designated critical habitat is made up of two areas where leatherbacks are known to travel great distances across the Pacific to feed on jellyfish. The southern portion stretches along the California coast from Point Arena to Point Arguello east of the 3,000-m depth contour, while the northern portion stretches from Cape Flattery, WA to Cape Blanco, OR, east of the 2,000-m depth contour (Laeschke 2012).

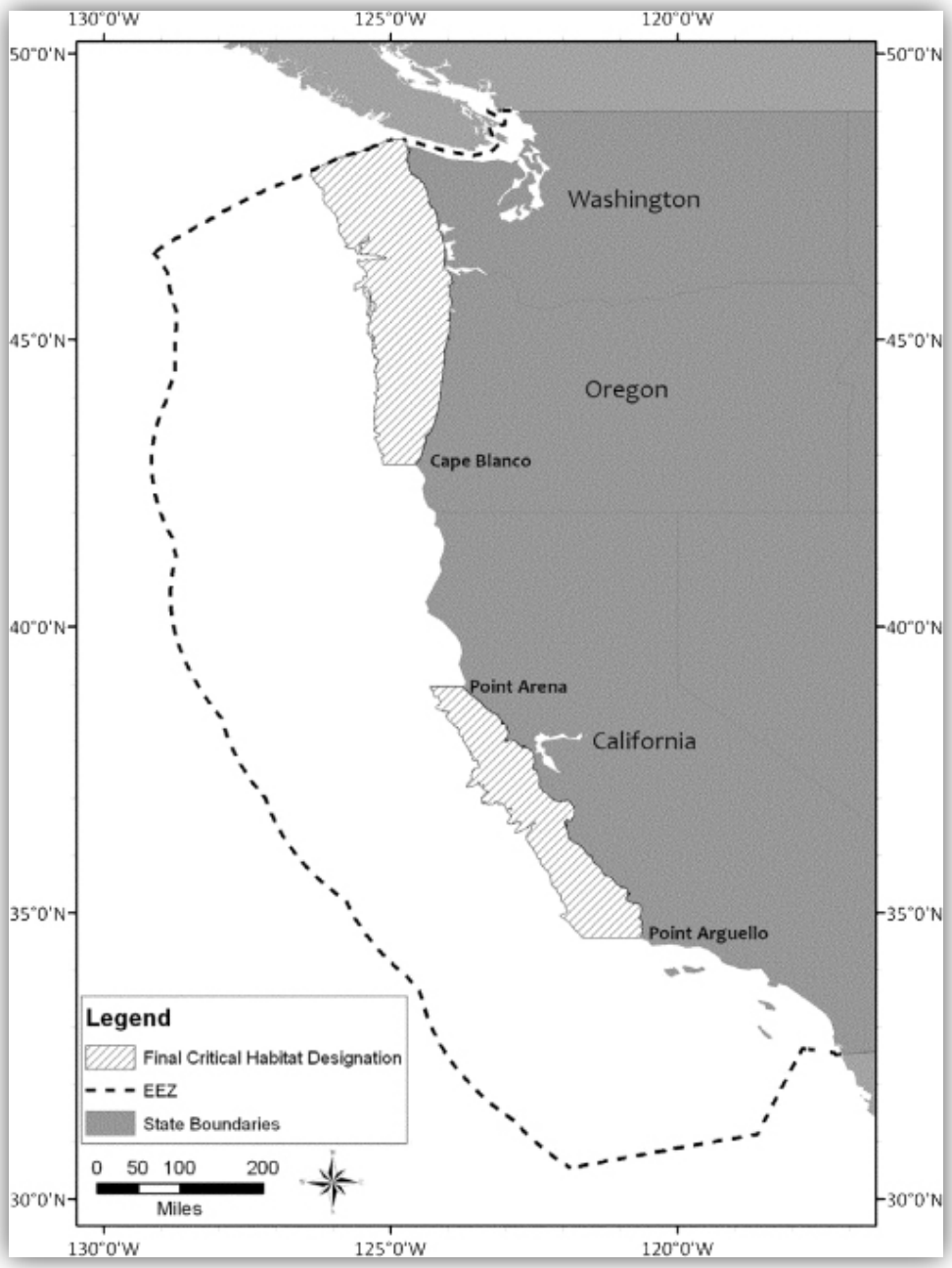

Figure 4-11 Leatherback Sea Turtle Critical Habitat

4.8.2 Environmental Consequences

4.8.2.1 Proposed Action

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to vegetation or wildlife. Likewise, the presence of SAV within established shipping corridors is also unlikely; therefore, the use of these existing corridors by the Proposed Action would not be expected to impact SAV.

As site-specific projects are further developed, additional project-based analysis of vegetation and wildlife may be required to confirm the presence and potential impacts to resources from operation of a Marine Highway service. Additionally, any impacts would be minimized through coordination with the various Federal and State agencies, if needed, and compliance with existing Federal, State, and port specific regulations promulgated to protect biological resources.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the West Coast region are anticipated to have minimal impacts to migratory birds along the Pacific Coast and in the port pair cities. The existing Marine Highway Corridors and port areas already support a large amount of shipping activity and no loss of habitat is anticipated from their increased use. The port areas are heavily developed to support water dependent uses and additional development is not anticipated as a result of the Proposed Action. Indirect impacts to migratory bird habitat may occur as a result of vessel wakes disturbing nesting or foraging areas; however, the infrequency of vessel trips and adherence to regulations on speed restrictions in sensitive nearshore areas would avoid or minimize any indirect impacts.

Coordination with Federal and State environmental regulatory agencies may be necessary under a project-based NEPA analysis to identify any migratory bird species habitat in the West Coast region that may be affected by future projects and to identify potential mitigation measures, if necessary, to ensure compliance with the MBTA.

Fish

Both of the port pairs selected for the West Coast region contain EFH. The Proposed Action would have no effect on EFH or fish species managed under the MSA in the port pair areas. Because existing ports and shipping routes would be utilized, no loss of aquatic habitat is anticipated as a result of the Proposed Action. The increased noise associated with the nominal increased vessel traffic is not expected to adversely impact EFH as the noise produced would be temporary. Additionally, fish are very motile and would avoid the area of noise if loud enough to cause annoyance.

Indirect impacts resulting from collisions and accidental spills have the potential to affect EFH. Human errors in design, fabrication, and operation are the cause of most serious accidents. Ship collisions would be minimized through adherence to the International Maritime Organization Convention on the

International Regulations for Preventing Collisions at Sea, 1972 (COLREGs). These regulations state the means that an oceangoing vessel must undertake to avoid a collision, such as keeping watch and maintaining reasonable speeds. In order to prevent a collision, COLREGs requires that vessels keep watch during all hours of the day. Under COLREGs, marine vessels are also required to carry certain navigation lights to help pilots and crew members carry out watches. Depending on the length of the vessel, the masthead light, sidelights, towing light, and all around lights must be visible from distances of between one and six miles. Vessels are also required to adhere to specific regulations regarding right-of-way and traffic separation schemes. Adherence to COLREGs would minimize the potential for ship collisions and subsequent indirect impacts to EFH. Furthermore, any accidental spills resulting from ship collisions would be responded to and contained as quickly as possible to reduce impacts to the surrounding environment. Therefore, impacts to EFH resulting from the operation of the conceptual Marine Highway services within the West Coast region would not be significant.

Marine Mammals

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the West Coast region is anticipated to have minimal impacts to marine mammals and would not be expected to result in takes or harassment as defined by the MMPA. Impacts to marine mammals would also be minimized through coordination with the various Federal and State agencies, as needed, and compliance with existing regulations promulgated to protect biological resources and prevent the release of pollutants to the environment.

For future site-specific projects developed as part of the Program, consultation may be required with NMFS and USFWS. In addition, analysis of noise impacts on marine mammals as well as an analysis of ship strike potential may be required to determine impacts to marine mammal species and to identify minimization and mitigation measures, if necessary.

Invasive Species

The Proposed Action would not be expected to result in invasive species impacts. The nominal increase in vessel traffic with operation of the conceptual Marine Highway services, as identified for the West Coast region, in conjunction with compliance with the USCG Final Ballast Water Rule and the EPA draft VGP would result in minimal potential for the introduction of invasive species.

The USCG and the EPA have Federal oversight of ballast water management through the Final Ballast Water Rule and the draft VGP, respectively. Individual states may adopt or enforce more stringent control measures over aquatic nuisance species (Maryland Sea Grant 2010).

The USCG Final Ballast Water Rule was issued in 2012 and applies to all vessels equipped with ballast water tanks that operate in U.S. waters and are bound for ports or places in the U.S. The rule requires mandatory ballast water management practices for all vessels that operate in U.S. waters and requires the reporting and recordkeeping of ballasting operations by all vessels (33 CFR § 151 Subparts C and D). The Final Rule also establishes a standard for the allowable concentration of living organisms in ballast water discharged from ships in waters of the U.S. Under the Final Rule, the USCG also amended its regulations for engineering equipment by establishing an approval process for ballast water

management systems. The numerical limits set by the discharge standard in this Final Rule were supported by reports from the National Academy of Science and the U.S. EPA Science Advisory Board in 2011 as the most stringent that vessels can practicably implement and that the USCG can enforce at this time. The EPA draft VGP is administered under the CWA and regulates 26 specific discharge categories as well as the discharge of fish hold effluent. The draft VGP also contains numeric ballast water discharge limits for most vessels to reduce the risk of invasive species in U.S. waters, more stringent requirements for exhaust gas scrubbers and the use of environmentally acceptable lubricants. Compliance with port-specific ballast water management plans and rules would further reduce potential impacts.

Threatened and Endangered Species

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the West Coast region would be expected to have no effect on, or may affect but would not be likely to adversely affect, threatened and endangered species along the Pacific Coast and in the port areas. The port areas already support a high level of shipping activity and no loss of habitat is anticipated from their increased use. In addition, the port areas are heavily developed to support water dependent uses. Indirect impacts to potential habitat could be minimized with speed restrictions in sensitive areas.

Coordination with Federal and State environmental regulatory agencies may be required for future site-specific projects under a project-based NEPA analysis to identify any protected species that may be affected by the Proposed Action and to identify potential mitigation measures, if necessary.

Critical Habitat

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services, as identified for the West Coast region, would be expected to have minimal impacts on critical habitat along the Pacific Coast. Marine Highway Corridors are located on existing shipping route that currently support a large amount of shipping activity; therefore, no loss of habitat is anticipated from their increased use. The services would comply with existing laws and procedures with regard to transit operations and cargo handling to ensure safe transport and minimize impacts to the aquatic environment and sensitive and/or important habitats.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any critical habitat in the area that may be affected by the Proposed Action and to identify potential mitigation measures, if necessary.

4.8.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region would not be implemented. The No Action Alternative would not result in significant impacts to vegetation and wildlife, migratory birds, EFH, marine mammals, invasive species, threatened and endangered species, or critical habitat.

4.9 Geological Resources

4.9.1 Affected Environment

Geology and soils are site-specific resources and their presence and composition would vary widely across the Marine Highway Corridor and at various port locations to the point where they cannot be described on a regional level. If necessary, site-specific conditions would be discussed in project-based NEPA documentation. The only geologic resource that can accurately be described on a regional level is the physiographic divisions. The U.S. Geological Survey (USGS) divides the North American continent into eight physiographic divisions based on terrain texture, rock type, and geologic structure and history. One physiographic division, the Pacific Mountain System (Pacific Border and the Lower California provinces), comprises the U.S. West Coast (USGS 2003).

The Pacific Border province extends along the Pacific coast from Canada to Southern California and consists generally of linear mountains along and near the coast with significant lowlands inland of the mountains. Two of the seven sections into which the province can be divided are lowlands (troughs) and five are mountainous regions. Mountains cover most of the area of the province and are nearly continuous along or very near the coast from Northern Washington to Southern California, interrupted by only a few significant bays and basins. Mountain ranges in this region tend to trend north-south or northwest-southeast. Nearly all the mountains of the province are part of the Coast Range, which runs parallel to the Pacific coast and extends almost unbroken from Alaska southward to Southern California. There are several types of mountains within the range. Some contain a high percentage of granitic material although most are composed of sedimentary rocks, several are complexly folded and faulted, and some have a more plateau-like than mountain-like character (Henry 2007).

Many of the mountains in the California Coast Ranges, particularly the Central California Coast Ranges and Southern California Coast Ranges, are separated by fault zones, and most of the mountains and valleys have been displaced by faulting and are now fault slices that have moved primarily horizontally. One of the most important controlling fault zones is the San Andreas. Activity along this zone makes the Pacific Border one of the most tectonically active provinces in North America. The San Andreas is a fault system or fault zone that consists of several closely spaced parallel faults within a zone ranging from less than one half mi to several miles wide. The San Andreas is one of the longest continuous fault zones, extending more than 600 miles, from the floor of the Pacific Ocean beyond Cape Mendocino, then inland paralleling the coast and stretching into the Gulf of California in western Mexico (Henry 2007).

The Pacific Border province extends along the entire Pacific coast of the conterminous U.S. except for a very small part of southwestern California, which is within the Lower California province. Most of this province is in Mexico, extending southward 800 miles down the Baja California Peninsula. The province is in the northern end of the granitic ridge that forms the Baja California Peninsula (Henry 2007).

4.9.2 Environmental Consequences

4.9.2.1 Proposed Action

The establishment and operation of the conceptual Marine Highway services within the West Coast region would utilize existing Marine Highway Corridors and port facilities, and no upgrades involving construction, dredging, or other activities that would affect geology and soils would be anticipated.

Additionally, port and terminal infrastructure improvements involving construction in the selected port pairs are not anticipated under the Proposed Action (see Section 4.4.2). Therefore, there would be no impacts to geology and soils.

4.9.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region would not be implemented. The No Action Alternative would not result in significant impacts to geology and soils.

4.10 Water Resources

4.10.1 Affected Environment

Water Quality

Major surface waters in the West Coast region include: the Pacific Ocean, San Joaquin Delta and Sacramento River in California; Columbia River in Oregon; the Puget Sound, Strait of Juan de Fuca, Nooksack River, Dungeness River, and Elwha River in Washington; and the Gulf of Alaska, upper Cook Inlet, Matanuska River, and Susitna River in Alaska. The overall condition of coastal waters in the West Coast region are rated fair to poor, benthic indices are rated good, and coastal habitat and fish tissue contaminants are rated poor (EPA 2008b).

Major surface waters associated with the Ports of Los Angeles and Long Beach are the Los Angeles/Long Beach harbor waters and the Dominguez Channel estuary. The EPA lists these waters as impaired due to sediment toxicity. The EPA water quality assessment for the Dominguez Channel estuary and Los Angeles/Long Beach harbor waters are listed as overall impaired (Port of Los Angeles and Port of Long Beach 2009). Causes for impairments in the Port of Los Angeles/Long Beach vicinity include exceedence of EPA's total maximum daily load limits for copper, zinc, lead, benzo(a)pyrenen, and chrysene (Port of Los Angeles and Port of Long Beach 2009).

The Port of Tacoma is located in Commencement Bay on the natural deepwater harbor in South Puget Sound. The port acts under a SWPPP and a Stormwater Management Program, which helps regulation of water quality. EPA water quality assessment in the vicinity of the Port of Tacoma for 2008 indicated that there were no impairment data for the water body (EPA 2008b). Total maximum daily loads were implemented in 1995 for fecal coliform, biochemical oxygen demand, copper, and temperature area within limits set by EPA (EPA 2008b).

The Port of Oakland, located on San Francisco Bay, has been working to improve water quality since 1992. Water pollution awareness has increased including testing and monitoring of stormwater flow to decrease pollution reaching the bay (Whatcom Council of Governments [WCG] 2012). Baseline data collection for Port of Oakland water parameters began in 2010. The Port of Oakland follows a Comprehensive Conservation Management Plan, which addresses increased pollutants, freshwater diversion, altered flow regime, and decline of biological resources (WCG 2012). The lead agency of the Management Plan is the San Francisco Bay RWQCB and it includes over 140 recommended actions (WCG 2012). The port also follows the Ballast Water Management Act of 2000, prohibiting ballast water

exchange from within the bay (WCG 2012). The proposed Marine Highway is subject to the requirements of the Port of Oakland Clean Water Program, San Francisco Bay RWQCB, Ballast Water Management Act of 2000, and the Comprehensive Conservation and Management Plan (WCG 2012). EPA water quality assessment for the vicinity of the Port of Oakland in 2006 showed the overall status of the water body to be impaired (EPA 2006a). The main causes of impairment for the 2006 reporting year were bacteria, nutrients, pathogens, and sedimentation (EPA 2006a).

The Port of Stockton is located in the San Joaquin Valley on the Stockton Deepwater Ship Channel approximately 75 nm east of the Golden Gate Bridge. The State Water Control Board has set guidelines within its Industrial General Permit, which the Port of Stockton has to comply with. The Port of Stockton has a Delta Environmental Enhancement Program and a Ballast Water Inspection Program aiming to improve water quality among other environmental parameters (Port of Stockton 2012). EPA water quality assessment for the Stockton Ship Channel listed it as impaired for multiple types of pesticides, dioxins, nuisance exotic species, and mercury (EPA 2006a). There is a total maximum daily load in place for dissolved oxygen on the Stockton Ship Channel due to organic enrichment and low dissolved oxygen (EPA 2006a).

Groundwater

Groundwater consists of water that is located beneath the ground surface. Groundwater is linked to surface water as water seeps through soil pores and into underground aquifers. The presence of groundwater is restricted to upland areas and is not expected to exist beneath much of the M-5 Connector that is located in open Pacific Ocean waters. The M-580 Corridor and M-84 Corridors connect through estuarine bay environments and travel inland, where aquifers may be present. Aquifer types and associated Marine Highway Corridors are presented in Table 4.10-1.

Table 4.10-1. Aquifers

Aquifer Present	Aquifer Type	Associated Corridor Aquifer
California Coastal Basin Aquifers	Unconsolidated sand and gravel aquifer	M-84
Central Valley Aquifer System	Unconsolidated sand and gravel aquifer	M-84
Pacific Northwest basin-fill aquifers	Unconsolidated sand and gravel aquifer	M-580
Willamette lowland basin-fill aquifers	Unconsolidated sand and gravel aquifer	M-580
Puget Sound Aquifer System	Unconsolidated sand and gravel aquifer	M-580

Source: USGS 2012.

Aquifers underlie ports associated with port pairs within the West Coast region. The California Coastal Basin Aquifers underlie the Port of Los Angeles/Long Beach, CA (USGS 2012). The California Coastal Basin Aquifers also underlie the Port of Oakland, and further inland the Central Valley Aquifer System underlies the Port of Stockton (USGS 2012). The Puget Sound Aquifer System underlies the Port of Tacoma (USGS 2012).

Wetlands

According to the National Inventory of Wetlands, there are estuarine and freshwater wetlands in the West Coast region. Estuarine and freshwater wetlands are associated with the Ports of Los Angeles/Long Beach, Oakland, Stockton, and Tacoma. The Port of Tacoma specifically was ordered by

the EPA to restore wetlands destroyed by unauthorized work at two locations in the Commencement Bay area (EPA 2010b).

Floodplains

The West Coast representative port pairs contain floodplains according to FEMA floodplain mapping (FEMA Map Panels 06037C2055F, 5301480025B, 06001C0062G, and 06077C0455F) (FEMA 2012). Because the port pair communities support water dependent uses, they are located at low elevations along the waterfront and are likely to have some degree of flooding associated with them. The ports along existing waterfront development, associated with M-580 and M-84, have already compromised floodplain functions for flood control at these locations.

4.10.2 Environmental Consequences

4.10.2.1 Proposed Action

Water Quality

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services, as identified for the West Coast region, would be expected to have minimal impacts on water quality. Moreover, Marine Highway Corridors are within U.S. territorial waters where Federal regulations prohibit vessels from dumping untreated sewage (NOAA 2008). Marine vessels traveling beyond 24 nm offshore can discharge black water (sewage) and gray water (non-sewage wastewater). However, discharge in open-ocean water would have minimal impact on nutrient levels of the major surface waters of the port pairs. In addition, impacts would be short-term as effluent dilutes and disperses once discharged (NOAA 2008).

Any impacts to water quality due to accidental release or vessel collision would be limited to the area of discharge and would be short-term in nature because of rapid dilution and dispersion.

There would not be an increase in vessel-to-vessel collisions or accidental oil spills because current Marine Highway Corridors are wide enough to allow vessels to avoid one another as concluded by a USCG navigational safety analysis (USCG 2011). Discharge of bilge and ballast water may include residual oil, lubricants, and fuel. However, compliance with CWA would eliminate and minimize any occurrences.

At the time this PEA was written, there is no Marine Highway service connecting terminal facilities between the ports of Los Angeles/Long Beach, CA to Tacoma, WA, or from Oakland, CA to Stockton, CA. Although these are major ports with consistent ship traffic, the proposed Marine Highway service between these ports has the potential to increase traffic within these ports. Although the increase in vessel trips would be minor, the additional trips may increase the potential for discharges of pollutants within port areas. Impacts to surface waters and water quality within port areas would be minimized through adherence to the CWA and the regulations of Annex IV of MARPOL.

Groundwater

Based on the type of services to be implemented under the Proposed Action, a large consumption of groundwater would not be required, nor would they involve activities that would result in contamination of groundwater. Therefore, no impacts to groundwater are expected to occur.

Wetlands

Increased ship traffic has the potential to increase erosion of sensitive wetland areas from increased wave action produced by ship wakes. Potential impacts to wetlands could be minimized by reducing vessel speeds in areas containing sensitive wetlands. In addition, vessels would be operating within existing shipping routes for travel to existing ports. The increase in vessel traffic/trips is expected to be minimal.

For future site-specific projects, wetland identification and impact determination may be conducted. Consultations with USACE and appropriate State agencies may be conducted and the necessary permits obtained.

Floodplains

The ports along the Marine Highway Corridors have existing infrastructure and land use associated with port functions and already have flood control at these locations. It is not likely that there would be any impacts to floodplains as a result of the Proposed Action. In addition, because facility development is not part of the Proposed Action, no impacts to floodplains would occur. For future site-specific projects, additional analysis may be necessary to determine impacts to floodplains.

4.10.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region would not be implemented. Therefore, there would be no significant impacts to water resources.

4.11 Cultural Resources

4.11.1 Affected Environment

Archaeological Resources

Under the Archaeological Resources Protection Act of 1979 (16 USC §470aa–mm), archaeological resources are defined as any material remains relating to past human life and being at least 100 years of age. Materials may relate to a variety of periods including, but not limited, to the pre-contact indigenous period, European settlement, or post-settlement periods. Materials may also relate to a variety of activities such as habitation sites, procurement sites, manufacturing sites, transportation sites, ceremonial sites, ruins, and battlefields. Depending on the nature of the proposed action, underwater archaeology may also need to be considered. Underwater archaeology includes archaeological resources embedded within land below the surface of a body of water. Shipwrecks are one aspect of underwater archaeology.

A search of online NRHP data did not reveal any listed archaeological resources within the vicinity of the ports serviced in the West Coast region (NPS 2012). Online databases of historic properties for the states of Oregon and Washington also did not reveal any previously inventoried archaeological resources near the serviced ports (Oregon State Parks 2012; Washington Department of Archaeology and Historic Preservation 2012). Online databases were not accessible for California or Alaska. Archaeological resources are considered to be extremely sensitive and vulnerable to looting; for these reasons, their locations are not disclosed to the general public.

Identification of archaeological resources is site-specific. Therefore, consultation or coordination with the SHPO or Tribal Historic Preservation Officer (THPO) concerning the presence of archaeological resources may be initiated if future site-specific projects may impact cultural or historical resources. In such instances, an area of potential effect (APE) would be defined and the records of the SHPO would be searched to determine if there are any listed or eligible archaeological resources. An archaeological survey of the APE may be necessary to identify archaeological resources in undisturbed areas of the APE that have not been previously surveyed. If the proposed undertaking has the potential to affect underwater archaeological resources, then the Automated Wreck and Obstruction Information System, created by NOAA, along with any State-specific entity specializing in underwater archaeology, should be consulted.

Native resources, as defined by NAGPRA, include human remains, funerary objects, sacred objects, or objects possessing cultural patrimony. TCPs, which are closely related to Native resources, are sites that derive their significance from the role they play in a community's historical beliefs, traditions, and customs (Parker and King 1998). They are objects or places that are significant because of their relationship with the culture, beliefs, and traditions of a community.

Fishing grounds are of great significance to Native Alaskans. Fishing was such a large part of life for early Alaskans that it penetrated into every aspect of their culture (USFWS 2009). Special consideration of impacts to fishing practices should be given to proposed Marine Highway Projects or Initiatives located off the coast of Alaska.

Native resources and TCPs are site-specific. Therefore consultation and coordination with SHPO, THPO, and/or the local community for identification of these resources should be initiated once specific sites are selected. Additionally, federally recognized tribes in the vicinity of the proposed project or those that historically had ties to land of the Proposed Action area should be contacted to identify Native resources and TCPs.

Architectural Resources

Generally, aboveground cultural resources are defined as architectural resources and include buildings (e.g., houses, schools, churches, stores, etc.), structures (e.g., bridges, dams, roads, silos), sites (e.g., battlefields, cemeteries, designed landscapes), objects (e.g., monuments, statuary, fountains, markers), and districts (concentrations of buildings, structures, sites, and/or objects united historically or aesthetically by plan or physical development).

A search of the NRHP database identified five ports in the West Coast region that have NRHP-listed properties within the boundaries of the port itself. The port of San Francisco has three NRHP properties

within its boundaries, the port of Tacoma has four, the port of Seattle has three, the port of Olympia has one, and the port of Ketchikan has one (NPS 2012).

Additionally, four ports in California (San Diego, San Francisco, Humboldt Bay, and Oakland), three ports in Oregon (Astoria, St. Helens, and Portland), three ports in Washington (Seattle, Tacoma, and Bellingham), and five ports in Alaska (Dutch Harbor, Anchorage, Valdez, Ketchikan, and Knik) have NRHP-listed properties within half a mile of the port boundary. Within the vicinities of the ports of St. Helens and Portland in Oregon and all the ports in Washington are previously inventoried properties whose eligibility status has not yet been determined (Oregon State Parks 2012; Washington Department of Archaeology and Historic Preservation 2012).

To more accurately determine which properties could be affected by the Proposed Action, a specific site should be identified and an APE defined. Therefore, consultation or coordination with the SHPO for the presence of architectural resources should be initiated once specific sites of Marine Highway Projects are selected. Once specific sites are selected, an APE should be defined and research should be conducted at the SHPO to determine if any architectural resources that are listed or eligible for listing on the NRHP are within the APE. An architectural survey to identify eligible architectural resources also may be necessary.

One of the representative port pairs in the West Coast region, the Port of Tacoma, has four NRHP-listed properties within the boundaries of the port itself (NPS 2012). Additionally, the ports of Oakland and Tacoma have NRHP-listed properties within half a mile of the port boundary. No NRHP-listed properties within the ports of Los Angeles/Long Beach and Stockton were identified.

4.11.2 Environmental Consequences

Impacts occur to cultural resources when there is a physical change to the resource itself or a change to the surrounding environment that changes the context of the resource. Examples of physical changes to resources include alterations or demolition. Changes to the context include alterations that change or diminish significant elements of a historic property's setting.

Assessing the effects of a Proposed Action on NRHP-eligible or listed properties in the APE through the Section 106 process would result in one of the following findings:

- *No effect*: the Proposed Action would not affect historic properties (i.e., listed or eligible for listing in the NRHP) or no historic properties are present in the APE
- *No adverse effect*: the Proposed Action would physically alter the historic property itself or alter the setting of the historic property, but the Proposed Action would not diminish the integrity of the resource. Similarly, Native resources or TCPs would retain their traditional, cultural, or religious significance.
- *Adverse effect*: the Proposed Action would damage or demolish the historic property or diminish the integrity of the historic property. Native resources or TCPs would have a diminished traditional, cultural, or religious significance.

4.11.2.1 Proposed Action

Archaeological Resources

No facility development is part of this Proposed Action. In addition, there is no dredging associated with the Proposed Action. Therefore, the Proposed Action is not expected to have adverse impacts on NRHP-listed or eligible archaeological resources. However, site-specific actions proposed for implementation under the Program may be addressed in project-based NEPA documents.

Effects to Native resources and TCPs can only be assessed in reference to a specific project and site. If any Native resources or TCPs are present in the APE of a project identified by the Program, potential effects would be determined in consultation, as necessary, with the affected tribe, THPO, or community, and with the SHPO.

No known archaeological sites were identified at or near the representative port pair locations. No construction, demolition, or other activities that would require ground disturbance are currently proposed at the port pair locations in the West Coast region. Therefore, there would be no impacts to archaeological resources resulting from the proposed Marine Highway services at the representative port pairs in the West Coast region.

Architectural Resources

Viewsheds and noise levels of NRHP-listed or eligible properties in the vicinity of a proposed Marine Highway service in the West Coast region would not be expected to change significantly because the OGVs to be used for the Proposed Action are the same types of vessels currently in use in the area. Therefore, the Proposed Action would not be expected to result in adverse impacts to NRHP-listed or eligible architectural resources.

However, as specific projects are developed and sites are selected, information pertaining to possible effects to architectural resources would be clearer. Site-specific actions proposed for implementation under the Program would be addressed in project-based NEPA documents.

At this time, no construction, renovations, or demolition is proposed for the representative port pairs in the West Coast region. Therefore, there would be no direct effects to NRHP-listed or eligible properties.

Indirect effects to a NRHP-listed or eligible property could occur when visual, audible, or atmospheric elements that are out of character with the resource alter its setting or characteristics that qualify it for listing on the NRHP. The introduction of ATB traffic between the port pairs of Los Angeles/Long Beach to Tacoma and Stockton to Oakland, where barges have not previously been used, could result in an increase in noise levels from increased marine vessel traffic. However, the increase in vessel trips would be minor and, as described in Section 4.1.2, noise impacts associated with the Proposed Action are not anticipated to be significant.

4.11.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the West Coast region would not be implemented. The No Action Alternative would not result in significant impacts to cultural resources.

4.12 Hazardous Materials and Waste

4.12.1 Affected Environment

Hazardous materials and wastes may be used and generated during the routine operation and maintenance of marine vessels in port areas. These substances may also be transported as cargo and, as such, may be present anywhere along the existing Marine Highway Corridors.

Hazardous Materials Management

Large commercial vessels routinely discharge ballast water, gray and black water, bilge water, and deck runoff consistent with applicable international and national standards. Discharges of sewage (also known as black water) and gray water, which is the effluent generated from wash basins and showers onboard ships, are regulated under MARPOL Annex IV. Discharges of black water are prohibited except for specific conditions stipulated under the Annex. In addition to the international standards established under MARPOL Annex IV, the U.S. regulates vessel discharges of gray water, bilge water, and a variety of other vessel discharges through the EPA's VGP (EPA 2008a).

Accidental spills of oil and fuel can also cause significant damage to the environment and extensive standards have been put in place to prevent such accidents and to respond to such incidents when they do occur. Regulations for the prevention of oil pollution are set out in Annex I to MARPOL as well as the CWA. Oily water separators are commonly used to prevent accidental discharges of oil. An oily water separator is a piece of shipboard equipment that allows a vessel's crew to separate oil from bilge water before the bilge water is discharged overboard.

Some specialized hull coatings serve to prevent organisms from attaching to a ship's hull also release substances that may be considered to be vessel discharges. All ocean-going commercial vessels utilize hull coatings designed to minimize resistance to movement through the water and the attachment of both soft and hard-shell organisms. These coatings are often referred to as "antifouling" coatings.

Antifouling coatings work by different methods. Some coatings make the hull surface slick, which causes fouling organisms to fall off once the vessel reaches a specific operating speed. Other compounds provide a controlled release of biocides to prevent the attachment of organisms such as barnacles and slime. Standards for the manufacture and use of these biocidal products are established through the CWA. In addition, the International Convention for the Control of Harmful Anti-fouling Systems on Ships (the AFS Treaty) prohibits the use of organotins as an active antifouling agent and sets forth a structure for international restrictions on other antifouling compounds deemed to be harmful to the marine environment. The AFS Treaty eliminated the use of tributyltin (TBT) on ships in 2008 due to its persistence in the marine environment and its effect on non-target species.

Hazardous Waste Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway service activities are expected to generate small quantities of hazardous wastes. These wastes include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries.

4.12.2 Environmental Consequences

4.12.2.1 Proposed Action

Hazardous Materials Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway activities would involve the use of small quantities of hazardous materials (e.g., fuel, oil, solvents, hydraulic fluid, antifreeze, lubricants, and/or paints) and generation of hazardous wastes. Any differences in the quantities of hazardous materials used over current baseline conditions are anticipated to be negligible and would not be significant. Appropriate procedures for the handling, storage, and transport of hazardous materials are expected to be implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, OSHA, and Nuclear Regulatory Commission regulations, and other applicable State and local regulations.

Accidental releases of hazardous materials would be reduced or eliminated through compliance with EPA and DOT procedures and through the development and implementation of a Spill Prevention, Control, and Countermeasure (SPCC) Plan. Both the port facility and the vessel would be responsible for preparing their own spill plans and ensuring their personnel are adequately trained in spill response procedures.

Fuels, such as diesel, needed to power vessels and port machinery would be stored in accordance with EPA regulations and site-specific best management practices (BMPs) for their handling, storage, and use, and would include regularly monitoring and inspecting tanks for leaks. A SPCC Plan would also be prepared by the port, as well as the vessel owner/operator, in the event of an accidental release of fuel.

Impacts from antifouling paints are not anticipated to be significant. The hull coating in most general use is biocidal antifouling paint, which leaches copper and a number of other biocides into the water in order to kill off fouling organisms that attach to the ship bottom. These paints gradually release the toxic substances into the water over a period of three to five years, after which time they become depleted and need to be replaced (EPA 1999). The slow release nature of the coating coupled with the transient nature of the vessels would not result in a significant impact to the environment.

Hazardous or toxic materials would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks.

Hazardous Waste Management

All hazardous wastes associated with the Program would be managed and disposed of in accordance with all applicable DOT, EPA, and OSHA regulations. Appropriate procedures for the handling, storage, transport, and disposal of hazardous wastes would be identified in site-specific Hazardous Waste Management Plans implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, and OSHA regulations, and other applicable State and local regulations. Compliance with applicable regulations, plans, policies, and procedures would minimize potential impacts to hazardous wastes and hazardous waste management and impacts would not be significant.

4.12.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Implementation of conceptual Marine Highway services as identified for the West Coast region would not occur. No significant impacts are expected to hazardous materials and waste management under the No Action Alternative.

5.0 GREAT LAKES

This chapter describes the existing environmental conditions in and around Marine Highway Corridors within the Great Lakes region for resources potentially affected by implementation of the Proposed Action as described in Chapter 2. In addition, this chapter identifies and evaluates the potential impacts of implementing the Proposed Action.

Three port pairs have been selected within the Great Lakes region: Oswego, NY to Toledo, OH; Duluth, MN to Sault Ste. Marie, Ontario; and Toledo, OH to Montreal, Quebec. The Port of Oswego is a small port on Lake Ontario with two terminals with a combined berthing length of 4,400 linear ft. The port is equipped to handle petroleum products, dry bulk, break bulk, and heavy lift cargo such as windmill components (Port of Oswego Authority 2012). The Port of Toledo is a medium size port on Lake Erie that includes 15 terminals and handles over 12 million tons of cargo from over 700 vessel calls each year. Cargo handling capacity at the Port of Toledo includes dry bulk, break bulk, general project cargo, and containers (Toledo Lucas County Port Authority 2012).

The Port of Duluth is located on Lake Superior at the mouth of the St. Louis River. It is the largest port on the Great Lakes, handling an average of 42 million short tons of cargo annually from nearly 1,000 vessels calls. Cargo handled predominantly consists of dry bulk, break bulk, and general cargo (Port of Duluth 2012). The Port of Sault Ste. Marie is a river port near the confluence of St. Mary's River with Lake Superior, with land currently used for barge and small vessel berthing available for marine terminal development (World Port Source 2012a).

The Port of Montreal is the world's biggest inland port and is the busiest port terminal on the Saint Lawrence River and Seaway, which links the Great Lakes with the Atlantic Ocean. The Port of Montreal is the leading container port in eastern Canada and receives one million containers annually, with most coming from or headed to Europe (Port of Montreal 2012b; Le Fleuve 2001). The cargo handled at the port is comprised of approximately 50% containers and 50% liquid and solid bulk (Port of Montreal 2012a). On average, the port handles more than 1.3 million TEUs each year (Port of Montreal 2012a).

5.1 Noise

5.1.1 Affected Environment

<u>Land Based Noise</u>

All the port pair communities are located in highly developed industrialized areas and are assumed to have noise levels similar to other industrial areas. The principal noise sources are from marine vessels, cranes, fork lifts, trucks/trains, and container handling equipment.

<u>Marine Noise along Shipping Routes</u>

In the aquatic environment, land uses as well as in-water activities contribute to ambient noise levels. Similar to land based noise in the corridor, noise measurements are not available along the Marine Highway Corridor within the Great Lakes region. Although the Great Lakes ports are in a different

region, ambient aquatic noise levels for all the proposed project port areas are assumed to be similar to those presented in Table 4.1-1.

Whether and how human-generated sounds affect aquatic species has become an issue of increasing public concern. Increased noise levels associated with shipping can interfere with communication, foraging, prey evasion and other important life history functions in aquatic species. It can also disrupt their behavior and may become compounded with other human-induced stressors with detrimental effects (Wright 2008).

5.1.2 Environmental Consequences

5.1.2.1 Proposed Action

Land Based Noise

No project-based baseline noise metrics have been collected in association with the identified conceptual Marine Highway services. Therefore, potential noise impacts evaluated herein are qualitative in nature and based on the activities normally associated with shipping ports.

Land based noise impacts attributable to the conceptual Marine Highway services identified for the Great Lakes region would result from increases in the amount of vessels using the selected port pair facilities and the increased use of cranes and other machinery used to load and unload cargo. Using the parameters and assumptions presented in Section 2.0 and Table 2.1-4, the anticipated weekly increases in vessel trips in each port is summarized in Table 5.1-1.

Table 5.1-1. Anticipated Weekly Increases in Vessel Trips in Port Areas

Port	Number of Vessel Trips
Oswego, NY	1 (ATB)
Toledo, OH	3 (ATB)
Duluth, MN	1 (ATB)
Sault Ste. Marie, Ontario	1 (ATB)
Montreal, Quebec	2 (ATB)

The increase in cargo load at the ports may result in increased noise at the ports currently impacted by port-associated noise. Any increases in ambient noise levels would be associated with typical operational noise, would occur during similar timeframes as existing noise. Because the increase in new vessel trips and operation of equipment would be minor compared with existing levels at the ports, the associated increase in noise would be minor. Therefore, land based noise impacts associated with the Proposed Action are not anticipated to be significant.

Marine Noise along Shipping Routes

The operation of the conceptual Marine Highway services would be expected to result in a small increase in vessel traffic along the nearshore area of the Great Lakes by an estimated one to two vessel trips per week (refer to Table 2.1.4). These vessels would be expected to be smaller and quieter than the larger container ships already in operation in the area, and therefore, the operation of these vessels would not be expected to result in noise increases above *de minimis* levels. The noise produced by these vessels is dependent on the size of the vessel and the rate of speed as well as specific design

characteristics (e.g., engine size, propeller placement) (NOAA 2004a). Underwater noise from commercial ships is generated during normal operation, most notably from propeller cavitation (when air spaces created by the motion of propellers collapse) (McKenna et al. 2012). Incorporating noise reduction measures into ship design and operation may mitigate the minor increase in noise from Marine Highway vessel trips.

Vessel traffic associated with the Great Lakes Marine Highway Corridor would occur at such a distance from the shoreline as to make the noise impacts negligible to humans and wildlife in shoreline communities and natural and recreational areas. As site-specific projects are further developed for the Program, project-based noise analyses may need to be conducted to quantify noise impacts to the marine environment.

5.1.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Therefore, there would be no impacts to noise under the No Action Alternative.

5.2 Air Quality

5.2.1 Affected Environment

Air quality within the Great Lakes region is highly variable, ranging from very good to deteriorated, with the more deteriorated air quality found in the larger port cities along the Great Lakes (e.g., Cleveland, Toledo, Detroit, and Chicago). Air quality improves to the north and west in the region, with areas such as Green Bay, Saginaw, Marquette, and Duluth either in attainment or having only minor maintenance issues. Table 5.2-1 summarizes the air quality in the regions surrounding ports in the Great Lakes region.

Ground-level, or tropospheric, O_3 forms when emissions of NOx and VOCs photo chemically react with sunlight. For this reason, NO_x and VOCs are considered O_3 precursors. O_3 exposure is linked to acute respiratory problems, aggravated asthma, reduced lung capacity, inflamed lung tissue, and impairment of the body's immune system. The 1990 CAA Amendments set out specific requirements for a group of northeast States that make up the Ozone Transport Region (OTR). States in the OTR are required to submit a SIP and install a certain level of controls for the pollutants that form O_3, even if they meet the NAAQS O_3 standards. Of the states in the Great Lakes region, Pennsylvania and New York are included in the OTR.

Table 5.2-1. Status of Compliance with NAAQS for Port Areas Included in the Great Lakes Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-90 Marine Corridor (includes M-75 Corridor and M-71/77 Marine Crossing)								
Albany, NY	•							
Oswego, NY								✓
Rochester, NY	•							
Buffalo, NY	•							
Erie, PA								✓

Table 5.2-1. Status of Compliance with NAAQS for Port Areas Included in the Great Lakes Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
Ashtabula, OH	▫						•	
Cleveland, OH	▫		▫	▫	◊	▫	•	
Toledo, OH	▫		▫					
Detroit, MI	▫			▫		▫	•	
Saginaw, MI								✓
Milwaukee, WI	•		▫				•	
Green Bay, WI			▫					
Chicago, IL	•				◊	▫	•	
Marquette, MI								✓
Duluth, MN				▫				

Source: 40 CFR 81.

Notes: •denotes nonattainment designation. For $PM_{2.5}$, nonattainment can be for annual standard, 24-hour standard, or both.
▫denotes maintenance area. Maintenance areas have been nonattainment at one time, achieved attainment, and now must follow approved plans to ensure continued attainment.
◊ denotes nonattainment for 2008 Pb standard.
✓denotes an area that is, and always has been, in attainment for all criteria pollutants.

All states in the Great Lakes region have SIPs and there may also be applicable TIPs, to achieve or maintain attainment levels for various criteria pollutants. Any project proposed under the Program would need to address state-specific requirements included under these implementation plans. In addition, many of the larger urban areas in the region, including Chicago, Albany, Rochester, Buffalo, Cleveland, and Toledo, have their own regulations for air quality management and their own regulatory agencies. Any proposed project under the Program would need to account for such local requirements in its NEPA analysis.

All of the states in the Great Lakes region, as well as many localities, have specific requirements for permitting of air emissions sources. Permitting requirements for construction and operation of stationary sources may need to be addressed in a project-based NEPA document. Additionally, construction activities, including building a road or preparing land to erect a tower, may require a permit, depending on the site location and its air quality, as the activity may increase PM_{10} through ground disturbance. In most cases, a permit may not be required for temporary, small-scale construction measures.

Mobile sources include vehicles that operate on roads and highways ("on-road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earth-moving equipment, lawn and garden power tools, marine vessels, railroad locomotives, and airplanes. All of the various forms of transportation used to haul freight and transport cargo are mobile sources that can contribute substantially to air pollution.

Most of the freight hauled in the Great Lakes region of the U.S. is transported by truck, with bulk such as iron ore transported aboard self-unloading bulk vessels, called Lakers, operating in the Great Lakes (see Table 5.2-2). The primary interstate routes in the Great Lakes region include the east to west I-90 and I-94 and the north to south I-35. I-80, a major east-west highway, is primarily south of the marine corridor but receives a significant component of traffic from the region surrounding the corridor.

The data used in this document for the volume of cargo hauled by truck were derived from the FAF3 program. FAF3 is a FHWA funded and managed data and analysis program that provides estimates of the total volumes of freight moved into, out of, and within the U.S., between individual states, major metropolitan areas, sub-state regions, and major international gateways.

For purposes of this study, the Great Lakes region has been included in one large market area, corresponding to the M-90 marine corridor. The M-75 marine corridor and M-71/77 marine crossing have been included in the M-90 corridor for these calculations. Table 5.2-2 presents the FAF3 data for truck hauling of freight in the Great Lakes region market area.

Table 5.2-2. Bulk Commodity Data for Freight Hauled by Truck in the Great Lakes Region, FAF3 2007 Data

Market Area	Hauled by Truck in Ton Miles	
	West Bound	East Bound
I-90	95,855,240	103,657,060

5.2.2 Environmental Consequences

5.2.2.1 Proposed Action

The Proposed Action would shift land-based, long haul truck freight movements to Marine Highway services. Additional information would be needed to fully assess the impacts of these changes to air quality. The assessment of air quality impacts for site-specific projects in criteria pollutant nonattainment areas would require additional emissions analysis under the CAA General Conformity regulations.

As indicated in Section 3.2.6, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping and hauling by heavy-duty truck. These calculations only include emissions associated with the actual movement of cargo from the specified origin to the specified destination and do not take into account truck idling or the operation of auxiliary engines used by marine vessels when at berth. Details on the resources used and the methodology for estimating emissions can be found with the calculations in Appendix B.

Tables 5.2-3 and 5.2-4 present the comparisons of moving cargo using ATBs versus trucks. It should be noted that the truck data differs for each of the vessel scenarios based on the volume and frequency of cargo movement. Specific information on the distances, load capacities, and trip frequencies can be found in Appendix B. All trucks were assumed to be heavy-duty diesel trucks in the 33,000 pounds or greater vehicle class. The data tables below demonstrate that freight movement by ATBs would result in similar emissions except CO, which would be reduced as compared to truck emissions for the three port pairs selected for analysis in this PEA in the Great Lakes region.

Table 5.2-3. Great Lakes Region Annual Emissions in Total Tons by Transport Type						
Great Lakes Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Oswego, NY to Toledo, OH	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**
ATB	7.67	119.80	17.89	0.02	5.75	5.29
Truck[1]	5.34	126.61	28.23	0.06	5.28	5.12
Duluth, MN to Sault Ste. Marie, ONT						
ATB	7.46	116.55	17.40	0.02	5.59	5.15
Truck[1]	4.98	118.17	26.35	0.06	4.93	4.78
Toledo, OH to Montreal, QUE						
ATB	22.94	358.51	53.52	0.05	17.20	15.83
Truck[1]	14.73	349.43	77.91	0.17	14.57	14.12

Note: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.

Table 5.2-4. Great Lakes Region Single Trip Emissions per TEU by Transport Type						
Great Lakes Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Oswego, NY to Toledo, OH	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**
ATB	0.00025	0.00431	0.00057	0.00000	0.00018	0.00017
Truck[1]	0.00017	0.00406	0.00090	0.00000	0.00017	0.00016
Duluth, MN to Sault Ste. Marie, ONT						
ATB	0.00024	0.00420	0.00056	0.00000	0.00018	0.00016
Truck[1]	0.00016	0.00379	0.00084	0.00000	0.00016	0.00015
Toledo, OH to Montreal, QUE						
ATB	0.00037	0.00646	0.00086	0.00000	0.00028	0.00025
Truck[1]	0.00024	0.00560	0.00125	0.00000	0.00023	0.00023

Note: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.

A factor that could further result in lowering emissions through the use of ATBs in the Great Lakes region is surface route congestion. As previously discussed, roadway congestion was not factored into the general set of calculations for this PEA; however, this congestion is a major contributor to air emissions in the Great Lakes region, particularly along I-90. The international border crossing between the U.S. and Canada also decreases road speeds for trucks hauling freight between Toledo or Detroit and Montreal, Quebec. Any air emissions models performed to assess air quality impacts of site-specific projects in the Great Lakes region would need to incorporate factors for traffic congestion.

5.2.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. There would be no operation of the conceptual Marine Highway services as identified for the Great Lakes region. Therefore, air quality in the Great Lakes region would not be impacted, either beneficially or negatively, from the implementation of the conceptual Marine Highway services. There would be no significant air quality impacts from the No Action Alternative.

5.3 Land Use (Including Section 4(f) Properties and Coastal Zone Management)

5.3.1 Affected Environment

Land Use (Including Section 4(f) Properties)

Nine of the 13 ports serviced in the Great Lakes region are located in urban areas. Four ports are located in suburban settings, including Ashtabula, Grand River, and Lorain, OH, and Erie, PA. No ports are located in rural settings. Ports within suburban settings are generally located near smaller towns as opposed to larger cities.

Six of the 13 ports within the Great Lakes region have NRHP-listed properties within or adjacent to the boundaries of the port (refer to Section 5.11.1). Six of these ports have parks within one half mile (refer to Section 5.6.1).

The representative port pairs identified in Table 2.1-4 are located in urban, developed areas with commercial and industrial land uses. The ports are surrounded by facilities with similar commercial and industrial land uses. Residential areas occur near the ports of Oswego, NY and Duluth, MN. Areas around the Port of Montreal are designated by Montreal's Master Plan as mixed use, transportation, and diversified employment areas (City of Montreal 2004).

The U.S. ports of the representative port pairs do not have NRHP-listed properties within the boundaries of the ports. The ports of Montreal and Sault Ste. Marie have approximately five and four properties, respectively, within or immediately adjacent (refer to Section 5.11.1). All the ports of the representative port pairs except for Sault Ste. Marie have parks within half a mile.

Coastal Zone Management

The representative port pairs identified for this region in Table 2.1-4 would follow the CZMPs identified for Minnesota, New York, and Ohio.

The CZMP for Minnesota was approved by NOAA in 1999 and is managed by the Department of Natural Resources, the Board of Water and Soil Resources, the Pollution Control Agency, and local water

conservation districts. It draws authority from the Shore Land Management Act (MN Regulations, Parts 6120.2500 - 6120.3900) and the North Shore Management Plan. The coastal zone extends approximately six miles inland from Lake Superior and follows township boundaries. Areas of particular interest are coastal outreach and education, land use planning and development, public access and recreation, enhancement, protection, management of natural and cultural coastal resources, and coastal economic activities and analysis (NOAA 2011d).

The CZMP for New York was approved by NOAA in 1982 and is managed by the Department of State, Division of Coastal Resources. It draws authority from the Waterfront Revitalization and Coastal Resources Act (New York Executive Law § 910-922), which allows the Department of State to establish a coastal program, develop coastal policies, define the coastal boundary, and establish consistency requirements. NY's coast extends along Lakes Erie and Ontario on the north and the Atlantic Ocean on the south. The coastal zone extends approximately 1,000 ft from the shoreline in non-urbanized areas; in urbanized areas, the coastal zone is usually less than 500 ft from the shoreline. The coastal zone may extend up to 10,000 ft inland to encompass significant coastal resources. Areas of interest are revitalization of waterfronts, public access, habitat restoration, water quality, strengthening local economies, reducing coastal hazards, and protecting historic resources (NOAA 2011e).

The CZMP for Ohio was approved by NOAA in 1997 and is administered by the Ohio Department of Natural Resources. The coastal zone extends anywhere between an eighth of a mile to 15 miles inland from Lake Erie, depending on the location of significant coastal resources. Areas of particular interest to the Department of Natural Resources are coastal erosion and flooding, water quality, ecologically sensitive areas, ports and shoreline development, recreation and cultural resources, fish and wildlife management, environmental quality, energy and mineral resources, and water quality (NOAA 2011f).

Coastal Barrier Resources

The CBRS contains 24 states with barrier islands, five of which are located in the Great Lakes region: Ohio, Michigan, New York, Minnesota, and Wisconsin. Ports to be serviced by the Proposed Action are located in New York, Ohio, and Minnesota (USFWS 2012a). There is no facility development or dredging associated with the Proposed Action. Therefore, the Proposed Action is not expected to alter protected coastal barrier islands.

5.3.2 Environmental Consequences

5.3.2.1 Proposed Action

Establishing the conceptual Marine Highway service between the representative port pairs selected for the Great Lakes region would increase the number of TEUs being shipped between each of the port pairs from 0 to 300 per week, resulting in an increase in ATB and marine vessel traffic between the ports. Because the Proposed Action would utilize existing ports, this increase is not anticipated to result in land use changes at the port or in the surrounding community. Impacts to land use would not be expected as a result of the conceptual Marine Highway services; however, site-specific projects may be further assessed in project-based NEPA documents.

No impacts to Section 4(f) resources are anticipated with the Marine Highway services at the selected port pairs under the Proposed Action, as no infrastructure improvements are expected. However,

should future projects under the Proposed Action identify the need to convert a Section 4(f) property to a non-Section 4(f) use, then a Section 4(f) study would be required. Because the Proposed Action utilizes existing ports and the shipping routes are already used to transport cargo, no CZMP inconsistencies are expected. Therefore, impacts to the coastal zone policies are not anticipated.

Impacts to coastal barrier resources are not anticipated because additional land development is not part of the Proposed Action.

5.3.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region representative port pairs would not be implemented. Therefore, there would be no impact to land use, Section 4(f) properties, or the coastal zone.

5.4 Infrastructure and Utilities

5.4.1 Affected Environment

Infrastructure

Summaries of the existing infrastructure components at the representative port pairs are listed below.

The Port of Oswego includes two terminals with a combined berthing length of 4,400 linear ft. The terminals have 10.5 acres of open storage available for all cargo, with an additional 15 acres available if needed. An outside crane contractor provides ship-to-shore cranes with lifting capacity of between 25 and 600 tons (Port of Oswego Authority 2012).

The Port of Toledo includes 15 terminals on 150 acres and has a general cargo center to handle containers. The port has approximately 15 acres of open storage and a straight-line wharf nearly one mile long (Toledo Lucas County Port Authority 2012).

The Port of Duluth handles an average of 42 million short tons of cargo annually, but it does not routinely handle large volumes of containers. The port is looking for opportunities to grow its containerized short sea shipping (Port of Duluth 2012).

The Port of Sault Ste. Marie has berthing areas on both sides of the locks, with land currently used for barge and small vessel berthing (World Port Source 2012a).

The Port of Montreal occupies approximately 1,570 acres including four container terminals, 15 dockside gantry cranes, 11 berths, rail service, and a berth depth ranging from 27 to 35 ft.

Utilities

Utility services such as potable water supply, wastewater collection, and electrical supply require a network of components. This network includes components such as pipelines, pumps, treatment units, and storage basins for potable water and wastewater systems and components such as transmission lines, substations, transformers, and distribution lines for electrical systems. Water and wastewater services are typically provided by the local municipality, whereas electrical service is typically provided by private companies.

Utility providers for the representative port pairs selected for the Great Lakes region are listed in Table 5.4-1.

Table 5.4-1. Utility Providers for the Representative Port Pairs in the Great Lakes Region

Port	Potable Water	Wastewater	Electrical Service
Oswego, NY	City of Oswego Public Works Dept.	City of Oswego Public Works Dept.	Ambit Energy
Toledo, OH	City of Toledo Dept. of Public Works	City of Toledo Dept. of Public Works	First Energy
Duluth, MN	City of Duluth Public Works & Utilities	City of Duluth Public Works & Utilities	Minnesota Power
Sault Ste. Marie, Ontario	Public Utilities Commission	City of Sault Ste. Marie Public Works	City of Sault Ste. Marie Public Utilities Comm.
Montreal, Quebec	Municipality of Montreal	Municipality of Montreal	Power Quebec

5.4.2 Environmental Consequences

5.4.2.1 Proposed Action

The implementation of the conceptual Marine Highway services for the Great Lakes region has the potential to increase the number and type of vessel calls and cargo handling requirements at the participating ports, which in turn could potentially impact the existing equipment, infrastructure, and utilities at these ports. The impact is dependent on the available capacity and the increase in demands.

The Ports of Oswego, Toledo, Duluth, and Montreal have ample capacity and appropriate existing infrastructure and equipment to handle any incremental cargo volumes generated by a new Marine Highway service. However, the condition and capacity of the infrastructure at the Port of Sault Ste. Marie is unclear at this time. Although cargo handling equipment may be required, and the port area would need to be secured, the proposed conceptual Marine Highway service includes only minimal additional marine vessel trips. Therefore, while there would be some impacts to Sault Ste. Marie, none of the impacts to the infrastructure associated with the Proposed Action are anticipated to be significant.

No new utility services would be required at the port pairs selected for the Great Lakes region. Additionally, the increases in water demand, wastewater flow, and electrical load associated with three additional vessels per week at the Port of Toledo, two additional vessels at Montreal, and one additional vessel at Oswego, Duluth, and Sault Ste. Marie would be nominal compared to utility requirements associated with the vessels currently received. Therefore, utility impacts associated with the Proposed Action are not anticipated to be significant.

As future site-specific projects are further developed, it would be necessary to determine which physical components of the terminal infrastructure and cargo handling equipment would be impacted and assessments would need to be performed to determine if there is sufficient capacity within all the components to meet the increased cargo handling at the participating ports.

5.4.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified for the

Great Lakes region would not be implemented. Therefore, no impacts to infrastructure and utilities would occur under the No Action Alternative.

5.5 Socioeconomics

5.5.1 Affected Environment

Employment and Income

At the Port of Duluth, there are approximately 11,500 jobs associated with cargo shipments in and out of the port. The U.S. Bureau of Labor and Statistics keeps statistics on the number of people employed regionally for specific industries. Table 5.5-1 estimates the number of people employed in the Transportation and Warehousing Industry for the past 10 years in the Great Lakes region by port pair. These numbers are included to provide a general indication of the transportation industry in the regions. Although it is assumed that many of the transportation jobs in the port regions would be either directly or indirectly associated with the port, all jobs are not necessarily attributed to port operations.

Table 5.5-1. Transportation and Warehousing Regional Employment – Great Lakes Region (in thousands)

Year	Oswego, NY and Toledo, OH	Duluth, MN and Sault Ste. Marie, Ontario[1]	Toledo, OH and Montreal, Quebec[2]
2002	21.7	10.5	95.0
2003	21.4	10.2	94.7
2004	22.0	10.2	95.1
2005	23.1	10.1	96.2
2006	23.6	9.9	96.8
2007	23.9	9.8	97.2
2008	23.8	9.9	97.0
2009	21.1	9.6	94.9
2010	20.7	9.4	94.6
2011	21.1	9.4	95.0

Source: U.S. Bureau of Labor Statistics 2012.
Note: [1] Annual data not available (only 2006 data available) for Sault Ste. Marie, Ontario. Data available for 2006 for Sault Ste. Marie assumed for all years in this table and combined with Duluth annual data to calculate combined total.
[2] Annual data not available (only 2006 data available) for Montreal. Data available for 2006 for Montreal was assumed for all years in this table and combined with Toledo annual data to calculate combined total.

5.5.2 Environmental Consequence

5.5.2.1 Proposed Action

Employment and Income

The methods and assumptions for estimating impacts of the Proposed Actions in this PEA are described in Section 4.5.2. The proposed conceptual Marine Highway service between the port pairs identified for the Great Lakes region is estimated to result in the creation of jobs and income associated with the proposed Marine Highway service and the loss of jobs and income associated with the reduction of long haul (one-way) trucking along these existing Marine Highway Corridors. The job gains and losses associated with the cargo volumes listed in Table 2.1-4 are estimated in Table 5.5-2.

Table 5.5-2. Economic Impacts of the Marine Highway Service - Great Lakes Region			
	Long Haul Trucking (Losses)	**Marine Highway Service (Gains)**	**Net Impacts**
Oswego, NY to Toledo, OH			
Jobs			
Direct	30	86	56
Induced	32	106	74
Indirect	17	48	31
TOTAL JOBS	**79**	**240**	**161**
Personal Income (1,000)			
Direct	$1,350	$4,676	$3,326
Re-spending/Local Consumption	$2,922	$10,123	$7,201
Indirect	$688	$1,973	$1,285
TOTAL (1,000)	**$4,960**	**$16,772**	**$11,812**
Federal, State, and Local Taxes (1,000)	$1,473	$4,981	$3,508
Duluth, MN to Sault Ste. Marie, Ontario			
Jobs			
Direct	64	98	34
Induced	68	119	51
Indirect	36	55	19
TOTAL JOBS	**168**	**272**	**104**
Personal Income (1,000)			
Direct	$2,880	$5,216	$2,336
Re-spending/Local Consumption	$6,235	$11,292	$5,057
Indirect	$1,467	$2,248	$781
TOTAL (1,000)	**$10,582**	**$18,756**	**$8,174**
Federal, State, and Local Taxes (1,000)	$3,143	$5,570	$2,427
Toledo, OH to Montreal, Quebec			
Jobs			
Direct	109	166	57
Induced	116	215	99
Indirect	61	93	32
TOTAL JOBS	**286**	**474**	**188**
Personal Income (1,000)			
Direct	$4,905	$9,589	$4,684
Re-spending/Local Consumption	$10,618	$20,758	$10,140
Indirect	$2,499	$3,808	$1,309
TOTAL (1,000)	**$18,022**	**$34,155**	**$16,133**
Federal, State, and Local Taxes (1,000)	$5,353	$10,144	$4,791

The operation of the conceptual Marine Highway service between the Ports of Duluth and Sault Ste. Marie is estimated to result in a loss of 64 direct long haul truck jobs and the creation of 98 port sector jobs. The majority of the port jobs would be held by members of the ILA as well as crew on the ATB.

The operation of the conceptual Marine Highway service between the Ports of Toledo and Montreal is estimated to result in a loss of 109 direct long haul truck jobs and the creation of 166 port sector jobs. The majority of the port sector jobs would be held by members of the ILA as well as crew on the ATB.

These findings are based on general formulas used for calculating employment and income. A more in-depth assessment may be required for future site-specific projects in the Great Lakes region to better

define the measureable logistics costs of the proposed services and to further assess the impacts to the logistics supply chains and strategies of the targeted users.

5.5.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region representative port pairs would not be implemented. Therefore, there would be no impact to employment and income.

5.6 Recreation

5.6.1 Affected Environment

Regional

The Great Lakes region provides a wealth of water-dependent recreational opportunities including boating, fishing, hunting, swimming, and beach-going. Fishing, hunting, and wildlife viewing generate almost $18 billion in annual revenues in the Great Lakes region (NOAA 2007). Public access to the Great Lakes and waterways is a vital component of local quality of life and an important draw for tourism.

The waterways potentially affected by projects in the Great Lakes region include Lake Superior, Lake Michigan, Lake Huron, Lake Erie, Lake Ontario, Erie Canal, and Detroit River. Ports would be served in New York, Ohio, Ontario, Quebec (refer to Section 2.1.4, *Proposed Action*, for additional detail).

The approved coastal programs of the Great Lakes port pair states contain provisions to protect and enhance public access to the shore (Department of Commerce 2012). Further, recreational activities, such as boating, fishing, and hunting, are protected and regulated by a number of additional State, regional and local agencies and jurisdictions.

Port Pairs

The Port of Oswego is located on Lake Ontario. The port includes a full-service recreational marina. In addition to the numerous Lake Ontario recreational opportunities such as boating, fishing and swimming, local recreational resources include the H. Lee White Marine Museum and the Fort Ontario State Historic Site. The Port of Toledo is located along the Maumee River Channel in Lake Erie. Lake Erie also supports extensive recreational boating, fishing, and tourism industries. Local recreational resources include the Col. James M. Schoonmaker Museum Ship and the proposed National Great Lakes Maritime Museum.

The Port of Duluth-Superior is located at the western end of Lake Superior. Local recreational opportunities include boating, fishing, swimming, sightseeing cruises, as well as the Lake Superior Maritime Museum, Great Lakes Aquarium, and S.S. William A. Irvin Ore Boat Museum. The Port of Sault Ste. Marie is located at the western end of Lake Superior.

The Ports of Toledo and Montreal were also identified as a port pair. Recreational resources in the vicinity of the Port of Toledo are described above. The Port of Montreal is located on the Saint Lawrence River. Jean Drapeau Park, spread amongst the islands of Sainte-Helene and Notre Dame, lies directly across from the port infrastructure on the Saint Lawrence River. The parks of Cite du Havre,

Parc du Basin de Bonsecours, Parc des Ecluses, and the Promenade du Vieux-Port, are all green areas along the old port and historic district in the vicinity of the Port of Montreal. Several activities and festivals such as the Festival du Bateau Classique de Montreal are held in this portion of the Saint Lawrence River. The District of the Old Port is considered an important cultural and recreational area of the city; the Place de Vestige on the Promenade often hosts concerts while tourist ferries depart from the Jacques-Cartier Pier (City of Montreal 2004). The waterside roadway comprises a major recreational route for pedestrians, bicyclists, and boaters along 168 miles of riverbanks on the Island of Montreal (City of Montreal 2004).

5.6.2 Environmental Consequences

5.6.2.1 Proposed Action

At the time this PEA was written, there was no regular container service along the Great Lakes Marine Highway Corridor. The conceptual Marine Highway services would be completely new services along this corridor and between these port pairs. However, given the frequency of the conceptual Marine Highway service between the port pairs and the smaller vessels that would transit along existing routes between existing ports, negligible impacts to recreation are anticipated.

5.6.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region representative port pairs would not be implemented. Therefore, there would be no impact to recreation.

5.7 Traffic and Transportation

5.7.1 Affected Environment

<u>Truck Traffic</u>

Oswego, NY to Toledo, OH

The landside interstate between the Ports of Oswego, NY and Toledo, OH is I-90, which parallels the U.S. coast of Lake Erie. There are approximately 460 miles between the two ports. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately 8.5 hours.

The Port of Oswego is located adjacent to community ball fields, in the vicinity of the residential area of Oswego. Access to the port is through a collector road, surrounded predominantly by local roads, with access to the intersection of two arterial roads (State Route 104 and U.S. Route 481) less than one half mile from the port entrance.

The Port of Toledo is located in an industrial area in East Toledo. There are a number of collector roads serving the port, with access to I-280 and I-75 within a few miles.

Duluth, MN to Sault Ste. Marie, Ontario

The landside corridor served between Duluth, MN and Sault Ste. Marie, Ontario is primarily Minnesota Highway M-28, as well as U.S. Highway 41 and U.S. Highway 2. This route runs east-west just south of Lake Superior for approximately 420 miles. At driving speeds of 55 – 65 miles per hour driving time is

estimated to be approximately eight hours. The combination of U.S. 2 and M-28 forms a major highway for Michigan and Canadian traffic. This corridor primarily consists of a two-lane, undivided highway, with the exception of the section including U.S. 41, which is a four-lane expressway.

The Port of Duluth is accessible from I-35 to the north and I-535 to the west, with access to the port directly from I-35.

The Port of Sault Ste. Marie is served by a collector road with direct access to I-75 within a mile.

Toledo, OH to Montreal, Quebec

The landside corridor served between the ports of Toledo, OH and Montreal, Quebec is a combination of I-75 and Highway 401. The highway distance from Toledo to Montreal is approximately 620 miles. At driving speeds of 55 to 65 miles per hour driving time is estimated to be approximately 10.5 hours. This corridor passes through the Detroit/Windsor gateway, which is the busiest international border crossing on the continent. This border crossing handles more than three million commercial trucks annually, and also handles approximately one million passenger vehicles each year. As such, this crossing is a source of significant bottlenecks.

The Port of Toledo The port is located in an industrial area in East Toledo and is served by a number of collector roads with access to I-280 and I-75 within a few miles.

The Port of Montreal is located in the borough of Ville-Marie, which includes all of downtown Montreal and supports much of Montreal's commercial activities. As such, there is a large network of roadways providing access to the port. The Port of Montreal is centrally located among Highways, 10, 15, 20, 25, and 40 with easy access to all.

<u>Vessel Traffic</u>

The Marine Highway Corridors associated with the Ports of Oswego and Toledo consist of the M-90 and M-71/77 corridors, which includes Lake Erie and Lake Ontario and the connecting channel located along the Niagara River. This route includes a waterway distance of approximately 400 miles. As of date this PEA is being prepared, there is a small freight service and a passenger service along this water crossing, but there is not a container service along this corridor.

The Marine Highway Corridor associated with the Ports of Duluth and Sault Ste. Marie includes the M-90 corridor, which crosses the length of Lake Superior. The waterway distance from Duluth to Sault Ste. Marie across Lake Superior is approximately 500 miles. As with service across Lake Erie and Lake Ontario, there is currently no regular container service operating along the Lake Superior corridor.

The Marine Highway Corridor associated with the Ports of Toledo and Montreal is an extension of the M-90 corridor. The M-90 corridor extends through Lake Erie and Lake Ontario and up the Saint Lawrence River. The waterway distance between the two ports is approximately 650 miles, which is comparable to the roadway distance between the two.

5.7.2 Environmental Consequences

5.7.2.1 Proposed Action

The Proposed Action has the potential to reduce traffic congestion along the busy corridors traveled by long haul trucks in the Great Lakes region. By transferring the transportation of cargo from trucks to marine vessels, there would be a decrease in the number of trucks on the nation's highways. Consequently, there would be an increase in the amount of vessel trips along the existing Marine Highway Corridor.

This section identifies the number of truck miles and hours of long haul transport that would be reduced as a result of the implementation of the Proposed Action, as well as the additional vessel traffic that would be introduced to the existing Marine Highway Corridors.

<u>Truck Traffic</u>

Oswego, NY to Toledo, OH

Based on the conceptual Marine Highway services outlined in Table 2.1-4, the implementation of this service would reduce truck trips along this corridor by 300 trips each week. This equates to a total reduction of 138,000 miles and 2,550 hours of truck traffic along this route each week. As the ports served by this route have relatively high volumes of traffic, this reduction of truck traffic would not be significant, but any reduction indicates that there would be positive impacts from reduced traffic congestion associated with long haul truck traffic with the implementation of the proposed Marine Highway service between the ports of Oswego, NY and Toledo, OH.

Duluth, MN to Sault Ste. Marie, Ontario

Based on the conceptual Marine Highway services outlined in Table 2.1-4, the implementation of this service would reduce truck trips along the Michigan Highway M-28 corridor by 300 trips each week. This equates to a total of 126,000 miles and 2,400 hours of truck traffic reduced along this route each week. As Duluth is a high volume port, decreases of truck traffic in and around Duluth may not be significant. However, with the relatively smaller size of the Port of Sault Ste. Marie, the reduced truck traffic in the vicinity of Sault Ste. Marie may be noticeable. Regardless of the degree of impacts to truck traffic in, around, and between the ports, the assessment indicates that there would be positive impacts from the reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between the ports of Duluth, MN and Sault Ste. Marie, Ontario.

Toledo, OH to Montreal, Quebec

Based on the conceptual Marine Highway services outlined in Table 2.1-4, the implementation of this service would reduce truck trips along the I-75 and connecting Highway 401 corridors by 600 trips each week. This equates to a total reduction of 372,000 miles and 6,300 hours of truck traffic along this route each week. As the ports served by this route have relatively high volumes of traffic, this reduction in truck traffic would not be significant, but any decrease indicates that there would be positive impacts from the reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between the ports of Toledo, OH and Montreal, Quebec.

Vessel Traffic

Oswego to Toledo, OH

Based on the conceptual Marine Highway services outlined in Table 2.1-4, vessel traffic would increase along this corridor by two vessel trips per week (one in each direction). For the ATB vessels, operating at 12 knots, the one-way operation would require 29 hours. Assuming just one round trip vessel operating per week, an estimated total of 58 hours of additional vessel traffic would be expected to occur along this corridor. As both ports currently support over a million tons of cargo handling each year, this minor increase in vessel trips would have minimal impact on Great Lakes waterways and therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

Duluth, MN to Sault Ste. Marie, Ontario

Based on the conceptual Marine Highway services outlined in Table 2.1-4, the number of vessel trips would increase along this corridor by two trips per week (one in each direction). For the ATB vessels, operating at 12 knots, the one-way operation would require 29 hours. Assuming just one round trip vessel operating per week, an estimated total of 58 hours of additional vessel traffic would be expected to occur along this corridor. Considering the size of the Port of Duluth, the minor increase in vessel trips would be negligible. However, because of relatively smaller size of the Port of Sault Ste. Marie, the increased vessel traffic at this port may be more noticeable. Nevertheless, the two additional vessel trips per week would not be expected to adversely affect vessel traffic. Therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

Toledo, OH to Montreal, Quebec

Based on the conceptual Marine Highway services outlined in Table 2.1-4, the number of vessel trips would increase along this corridor by four trips per week (two in each direction). For the ATB vessels, operating at 12 knots, the one-way operation would require 44 hours. Assuming just two round trip vessels operating per week, an estimated total of 176 hours of additional vessel traffic would be expected to occur along this corridor. As both ports currently support over a million tons of cargo handling each year, this increase in vessel traffic would have minimal impact on Great Lakes waterways and therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

5.7.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region representative port pairs would not be implemented. Truck traffic would continue as it is today, with landside routes that suffer congestion.

5.8 Biological Resources

5.8.1 Affected Environment

Vegetation and Wildlife

Because the operation of the conceptual Marine Highway services identified on the Great Lakes would occur in existing ports and along established Marine Highway Corridors, extensive stands of upland or SAV are not anticipated to be present in the area that could be affected by the Proposed Action. Upland areas within the ports are expected to be developed and devoid of vegetation while vessel berthing areas and navigation channels are expected to be too deep for the establishment of SAV.

The composition of upland vegetation communities along the banks of the Great Lakes varies by location and is largely dependent on temperature, soil type, and the availability of sunlight and water. Wildlife populations are generally determined by the habitat quality (e.g., size, composition, level of human disturbance) and food and water availability of the area. The broad ecological communities of North America have been categorized and mapped at three levels. Level I is the most general of the classification systems and presents a continental perspective; dividing North America in 15 ecoregions. Level II presents more of a national/regional perspective and divides the continent into 52 ecoregions, whereas Level III presents a regional perspective and divides the continent into approximately 200 ecoregions (CEC 1997). Eight ecoregions are found along the banks of the Great lakes under the Level III classification system. These include: Northern Lakes and Forests, North Central Hardwood Forests, Southeastern Wisconsin Till Plains, Central Corn Belt Plains, Southern Michigan/Northern Indiana Drift Plains, Huron/Erie Lake Plains, Lake Erie Lowland, and Eastern Great Lakes and Hudson Lowlands (CEC 2006). The vegetation and wildlife commonly associated with each of these ecoregions is described in the following paragraphs.

Northern Lakes and Forests: This ecoregion sits astride the U.S.-Canada border and includes southeast Manitoba, southwest Ontario, northeastern Minnesota, northern Wisconsin, and northern Michigan. Forest types are mostly coniferous and northern hardwood forests, with sugar maple, red maple, paper birch, yellow birch, aspen, white spruce, balsam fir, hemlock, eastern white pine, jack pine, and red pine. Cooler and wetter sites have black spruce, tamarack, and northern white cedar. The region is rich in wildlife, with moose, black bear, gray wolf, white-tailed deer (*Odocoileus virginianus*), lynx, snowshoe hare, ruffed grouse (*Bonasa umbellus*), pileated woodpecker, bald eagle, turkey vulture (*Cathartes aura*), and common loon (Wiken et al. 2011).

North Central Hardwood Forests: The North Central Hardwood Forests occur in central Minnesota, Wisconsin, and a small portion of Michigan. The ecoregion is transitional between the predominantly forested Northern Lakes and Forests to the north and the agricultural ecoregions to the south. Dominant forest types in this ecoregion are oak savanna, oak-hickory, maple-basswood and northern hardwoods consisting of maple (*Acer spp.*), beech (*Fagus spp.*), and birch (*Betula spp.*). Wildlife species found in this ecoregion include white-tailed deer, coyote, gray fox (*Urocyon cinereoargenteus)*, red fox, beaver, raccoon, fisher (*Martes pennant*), otter (*Lontra Canadensis*), mink (*Neovison vison*), gray squirrel (*Sciurus carolinensis*), wild turkey (*Meleagris gallopavo)*, sandhill crane (*Grus Canadensis*), ruffed grouse, and Canada goose (Wiken et al. 2011).

Southeastern Wisconsin Till Plains: This region lies adjacent to Lake Michigan in southeastern Wisconsin and northern Illinois and supports a mosaic of vegetation types, representing a transition between the hardwood forests and oak savannas to the west and the tall-grass prairie ecoregions to the south. Forested areas feature red and white oak, and areas of beech *(Fagus spp.)*, sugar maple (*Acer saccharum*), and basswood (*Tilia Americana*). Wildlife of this region includes: white-tailed deer, red fox, coyote, raccoon, red squirrel (*Tamiasciurus hudsonicus)*, gray squirrel, wild turkey, Canada goose and sandhill crane (Wiken et al. 2011).

***Central Corn Belt Plains*:** This region covers a large portion of northern Illinois and northwestern Indiana, with a small extension into southeastern Wisconsin. Nearly all the natural vegetation of this ecoregion has been replaced by agriculture. Extensive prairie communities intermixed with oak-hickory forests were native and contained big and little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), prairie dropseed (*Sporobolus heterolepis*), switchgrass (*Panicum virgatum*), and sideoats grama (*Bouteloua curtipendula*). Forested areas contained white oak (*Quercus alba L*), black oak (*Quercus kelloggii*), and shagbark hickory (*Carya ovate*). Wildlife found in this ecoregion includes white-tailed deer, coyote, bobcat, meadow vole (*Microtus pennsylvanicus*), Canada goose, mallard duck (*Anas platyrhynchos*), black-capped chickadee (*Poecile atricapillus*), upland sandpiper (*Bartramia longicauda*), Illinois mud turtle (*Kinosternon flavescens spooneri*), and Illinois chorus frog (*Pseudacris streckeri illinoensis*) (Wiken et al. 2011).

Southern Michigan/Northern Indiana Drift Plains: This region occurs in southern Michigan and northern Indiana. It is bordered by Lake Michigan on the west and the Huron/Erie Lake Plains region on the east. The dominant forest types found in this region include oak-hickory forests, northern swamp forests, and beech forests and contain white oak (*Quercus alba*), red oak (*Quercus rubra*), black oak, bitternut hickory (*Carya cordiformis*), shagbark hickory, sugar maple, and beech. Wildlife species found in this ecoregion include white-tailed deer, coyote, red fox, gray fox, beaver, river otter, mink, Canada warbler (*Wilsonia canadensis*), and upland sandpiper (Wiken et al. 2011).

Huron/Erie Lake Plains: This region is located on the flat lake plains adjacent to Lake Huron and Lake Erie in Michigan and Ohio, with a small extension into Indiana. Much of the natural vegetation in this region has been cleared for agriculture, although some areas remain with red maple (*Acer rubrum*), white ash (*Fraxinus Americana*), American basswood, aspen (*Populus tremuloides*), or with white oak, red oak, black oak, bitternut, and shagbark hickories. Wildlife species native to this region include white-tailed deer, raccoon, woodchuck (*Marmota monax*), downy woodpecker (*Picoides pubescens*), green-backed heron (*Butorides striata*), wood duck (*Aix sponsa*), snapping turtle (*Chelydra serpentine*) and northern water snake (*Nerodia sipedon*) (Wiken et al. 2011).

Lake Erie Lowland: This ecoregion contains Ontario from Windsor to Toronto, including the Niagara Peninsula. Older forests are characterized by sugar maple, beech, white and red oak, shagbark hickory, black walnut (*Juglans nigra*), and butternut *(Juglans cinerea)*. Moist sites are characterized by white elm (*Ulmus Americana, Linn*.), eastern cottonwood (*Populus deltoids*), balsam poplar (*Populus balsamifera*), red and black ash (*Fraxinus pennsylvanica* and *Fraxinus nigra*), and silver maple (*Acer saccharinum*). Wildlife species that characterize this ecoregion include white-tailed deer, grey and red squirrel, chipmunk (*Tamias striatus*), cardinal (*Cardinalis cardinalis*), wood thrush (*Hylocichla mustelina*), screech owl (*Megascops asio*), mourning dove (*Zenaida macroura*), green heron (*Butorides virescens*), pileated

and redbellied woodpecker (*Dryocopus pileatus* and *Melanerpes carolinus*), and wild turkey (Wiken et al. 2011).

Eastern Great Lakes and Hudson Lowlands: This ecoregion extends over the lowlands centered on the lower reaches of the Saint Lawrence and Hudson Rivers, stretching from Quebec City to Georgian Bay in the north, and the Notre Dame and Appalachian Mountains in New York and Vermont. Most of the native vegetation has been cleared for agriculture but once supported mixed coniferous-deciduous forests. The remaining forests contain sugar maple, yellow birch, eastern hemlock (*Tsuga Canadensis*), basswood, and eastern white pine (*Pinus strobus*). Dry sites are dominated by red oak (*Quercus rubra*) and pine (*Pinus spp*.), eastern white pine and cedar (*Cedrus spp.*), whereas, wetter sites support red maple, black ash, white spruce (*Picea glauca*), tamarack (*Larix laricina*), and eastern white cedar (*Thuja occidentalis*). Wildlife in the region includes white tailed deer, black bear, red fox, moose (*Alces alces*), coyote, gray wolf, snowshoe hare (*Lepus americanus*), red and gray squirrel, chipmunk, cardinal, wood thrush, screech owl (*Megascops asio*), osprey, mourning dove, green heron, pileated and redbellied woodpecker, Canada warbler (Wilsonia Canadensis), Canadian geese, mallard, wood duck, and American black duck (*Anas rubripes*) (Wiken et al. 2011).

Migratory Birds

The Great Lakes ecosystem provides important migration corridors and critical breeding, feeding, and resting areas for numerous species of migratory and resident birds - especially colonial shorebirds, waterfowl, and neotropical migrants (USFWS 2012b).

It is estimated that more than 100 species of birds are either totally or partially dependent on the Great Lakes basin wetlands (USCG 2008). Birds found in the Great Lakes include ducks, shorebirds, gulls and terns, herons and egrets, geese (*Branta spp.*) swans (*Cygnus spp.*), and raptors. Miscellaneous birds not contained in these major groups include coots (*Fulica Americana*), grebes, and moorhens (*Gallinula chloropus*) (USCG 2008). The sandy beach areas of the Great Lakes provide excellent shorebird habitat.

The states bordering the Great Lakes contain 521 IBAs recognized by the National Audubon Society. Not all of these IBAs are associated with the Great Lakes as many of the states in this region have large land areas, a substantial portion of which do not border the Great Lakes (i.e., New York and Pennsylvania). IBAs are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected. Identification of a site as an IBA indicates its unique importance for birds (Audubon 2012b).

A waterfowl winter congregation area is located in the Oswego River and Harbor (DOT 2012). In winter, large numbers of waterfowl are supported along the Lake Erie shoreline portions of OH. Included are significant wintering populations of American Black Duck, as well as large numbers of Canvasback and Redhead (Fischer and Forgette 2009).

The Port of Duluth area is an important feeding area for fish-eating birds (Metropolitan Interstate Council 2003). A variety of shore, marsh, and water birds also either reside in, or migrate through the

Duluth Superior Harbor vicinity. Migratory waterfowl use the harbor extensively both for breeding and as feeding and resting stops during migration (USACE 2002a).

Fish

EFH does not occur in the Great Lakes. However, the Great Lakes region constitutes the largest continuous mass of freshwater in the world and has supported one of the world's largest freshwater fisheries for over 100 years. There are approximately 180 species of fish indigenous to the Great Lakes. A variety of species inhabits nearshore areas (for example, smallmouth bass [*Micropterus dolomieu*], northern pike [*Esox lucius*], and channel catfish [*Ictalurus punctatus*]), whereas others reside primarily within the pelagic zone (for example, lake herring [*Coregonus artedii*], walleye [*Stizostedion vitreum*], and lake trout [*Salvelinus namaycush*]) (USCG 2008). Most of the species in the Great Lakes are native; however, species such as alewife (*Alosa pseudoharengus*), brown trout (*Salmo trutta*), carp (*Cyprinus carpio*), round goby (*Neogobius melanostomas*), ruffe (*Gymnocephalus cernuus*), and sea lamprey (*Petromyzon marinus*) have been introduced from other regions and are considered exotics (USCG 2008).

The Great Lakes fishery has changed dramatically over the past 100 years. Many native fish species have been lost because of overfishing, pollution, invasions by non-native species, and natural changes. The fishery has rebounded, with the exception of Lake Ontario, and some native fish are making a comeback because of government-imposed fishing quotas, reductions in pollution, efforts in controlling invasive species, and habitat restoration projects (USCG 2008).

Commercial fishing in the Great Lakes began in the 1800s. Lake herring (*Coregonus artedi*), rainbow smelt (*Osmerus mordax*), lake whitefish (*Coregonus clupeaformis*), and yellow perch (*Perca flavescens*) are of commercial importance in Lake Superior, while the lake whitefish is commercially important in Lake Huron. The Lake Ontario fishery has declined substantially due to the presence of contaminants and the main species harvested were the American eel (*Anguilla rostrata*), yellow perch, bullheads, sunfish, and rock bass (*Ambloplites rupestris*) (USCG 2008). Concentrations of organochlorine contaminants in Great Lakes sport fish are generally decreasing. However, in the U.S., PCBs drive consumption advisories of Great Lakes sport fish. In Ontario, most of the consumption advisories for Great Lakes sport fish are driven by PCBs, mercury, and dioxins. Toxaphene also contributes to consumption advisories of sport fish from Lake Superior and Lake Huron (USCG 2008). Today, most commercial fish are caught in Lake Erie (smelt, yellow perch, and walleye) and Lake Michigan (lake whitefish and alewife [*Alosa pseudoharengus*]) (USCG 2008).

Spawning and nursery habitats represent sensitive environments of limited distribution and are necessary to maintain fish populations. Because of the large number of fish species indigenous to the Great Lakes, representative species were selected as a means of characterizing the range of spawning and nursery habitats.

Table 5.8-1 briefly describes the preferred habitats of representative fish species in the Great Lakes, indicates whether the species had spawning or nursery habitat in the open waters of one or more of the Great Lakes, and if the species were of particular value to commercial or sport fisheries, or as an important component of the ecosystem (for example, an important forage food) in one or more of the Great Lakes.

Table 5.8-1. Species List Preferred Habitats

Species	Latin Name	Importance	Spawning/ Nursery Habitat	Lake Huron	Lake Ontario	Lake Michigan	Lake Erie	Lake Superior
Alewife	*Alosa pseudoharengus*	Forage	Bays, rivers, and shorelines with sand and gravel up to 30 ft	Present	Present	Present	Present	Present
Bloater	*Coregonus hoyi*	Forage; former commercial	Offshore, up to 500 ft	Present	Unknown	Present	Absent	Present
Emerald shiner	*Notropis atherinoides*	Forage	Young found by shoreline areas in lake proper	Few present	Few present	Present	Present	Few present
Lake whitefish	*Coregonus clupeaformis*	Sport, commercial	6 to 75 ft; sand, gravel, small stones, rocky reefs	Present	Present	Present	Present	Present
Lake herring	*C. artedi*	Forage; few remain	0 to 180 ft; pelagic spawners	Present	Present	Present	Present	Present
Lake trout	*Salvelinus namaycush*	Sport	Rocky reefs, up to 500 ft	Few present	Few present	Present	Present	Few present
Lake sturgeon	*Acipenser fulvescens*	Sport, commercial	Riverine	Unknown	Absent	Few present	Unknown	Few present
Rainbow smelt	*Osmerus mordax*	Forage	Spawn in rivers; young found by shoreline areas in lake proper	Present	Present	Present	Present	Present
Spottail shiner	*Notropis hudsonius*	Forage	Young found by shoreline areas in lake proper, less than 30 ft	Few present	Few present	Present	Present	Few present
Walleye	*Sander vitreus*	Sport, commercial	Shallow bays, up to 20 ft	Present	Present	Present	Present	Present
Yellow perch	*Perca flavescens*	Sport, commercial	Shallow bays, up to 20 ft	Present	Present	Present	Present	Present

Source: USCG 2008.

Marine Mammals

There have been no marine mammals identified in the Great Lakes region. Beluga whale (*Delphinapterus leucas*) sightings have occurred in the Saint Lawrence Seaway as far south as Montreal, but these instances are rare and outside of the beluga's normal habitat (NOAA 2004b).

Invasive Species

Since the 1800s, at least 136 nonindigenous aquatic organisms have become established in the Great Lakes (USCG 2008). Most of these organisms have been plants (61), followed by fish (24), algae (24), mollusks (9), and oligochaetes (7). More than one-third of the organisms have been introduced in the past 30 years, a surge coinciding with the opening of the Saint Lawrence Seaway. Two major entry mechanisms—unintentional releases (37%) and ships (32%)—were responsible for nearly all recent introductions of non-native species (USCG 2008). Because of the interconnectedness of the Great Lakes, a species' introduction in one lake is likely to lead to its expansion into all of the Great Lakes and the Mississippi River. Invasive species of concern in the Great Lakes are listed in Table 5.8-2.

Table 5.8-2. Invasive Species of Concern in the Great Lakes

Type of species	Common Name	Scientific Name
Plant	Common reed	*Phragmites australis*
Plant	Curlyleaf pondweed	*Potamogeton crispus*
Plant	Flowering rush	*Butomus umbellatus*
Plant	Eurasian and hybrid watermilfoil	*Myriophyllum spp.*
Plant	Narrowleaf and hybrid cattail	*Typha spp.*
Plant	Purple loosestrife	*Lythrum salicaria*
Plant	Watercress	*Rorippa nasturtium-aquaticum*
Mollusk	Banded mysterysnail	*Viviparus georgianus*
Mollusk	Chinese mysterysnail	*Cipangopaludina chinensis malleata*
Mollusk	New Zealand mud snail	*Potamopyrgus antipodarum*
Mollusk	Quagga mussel	*Dreissena bugensis*
Mollusk	Zebra mussel	*D. polymorpha*
Crusteacean	Fish-hook flea	*Cercopagis pengoi*
Crusteacean	Spiny water flea	*Bythotrephes longimanus*
Crusteacean	Rusty crayfish	*Oconectes rusticus*
Fish	Alewife	*Alosa pseudoharengus*
Fish	Common carp	*Cyprinus carpio*
Fish	Northern snakehead	*Channa argus*
Fish	Rainbow smelt	*Osmerus mordax*
Fish	Round goby	*Neogobius melanostomus*
Fish	Ruffe	*Gymnocephalus cernuus*
Fish	Sea lamprey	*Petromyzon marinus*
Fish	Threespine stickleback	*Gasterosteus aculeatus*
Fish	Yellow perch parasite	*Heterosporis spp.*

Source: Great Lakes Fish and Wildlife Commission 2012.

Threatened and Endangered Species

Two federally threatened or endangered species (a reptile and a mollusk) exist in the Great Lakes (Table 5.8-3), and 11 species of State-listed threatened or endangered fish exist in the Great Lakes (Table 5.8-3) (USCG 2008).

Most of the fish species spawn in tributaries or protected waters of the lakes. Several species of fish in the Great Lakes use deep offshore waters for spawning. These include lake trout, lake herring (Lakes Superior and Ontario only), several species of Cisco (some of which are now believed to be extinct), fourhorn sculpin, slimy sculpin *(Cotus cognatus)* (Lake Ontario only), and the emerald shiner *(Notropis atherinoides)* (Lake Erie only). The shortjaw Cisco and lake herring are the only threatened or endangered species that are known to spawn in deep offshore waters of the Great Lakes (USCG 2008).

Table 5.8-3. State-Listed Threatened or Endangered Fish Species Found in the Great Lakes

State	Common Name	Taxonomic Name	Lakes where Present	Status
NY	Lake chubsucker	*Erimyzon sucetta*	Erie	Threatened
	Lake sturgeon	*Acipenser fulvescens*	Ontario, Erie	Threatened
	Mooneye	*Hiodon tergisus*	Erie	Threatened
	Round whitefish	*Prosopium cylindraceum*	Ontario	Endangered
	Silver chub	*Macrhybopsis storeriana*	Erie	Endangered
MI	Lake herring	*Coregonus artedi*	Huron, Michigan, Erie, Superior	Threatened
	Lake sturgeon	*Acipenser fulvescens*	Huron, Michigan, Erie, Superior	Threatened
	Mooneye	*Hiodon tergisus*	Erie	Threatened
	Sauger	*Sander canadensis*	Huron, Michigan, Erie	Threatened
	Shortjaw Cisco	*Coregonus zenithicus*	Huron, Michigan, Superior	Threatened
IL	Lake herring	*Coregonus artedi*	Michigan	Threatened
	Lake sturgeon	*Acipenser fulvescens*	Michigan	Threatened
	Longnose sucker	*Catostomus catostomus*	Michigan	Threatened
IN	Lake sturgeon	*Acipenser fulvescens*	Michigan	Endangered
OH	Lake herring	*Coregonus artedi*	Erie	Endangered
	Lake sturgeon	*Acipenser fulvescens*	Erie	Endangered
	Longnose sucker	*Catostomus catostomus*	Erie	Endangered
	Spotted gar	*Lepisosteus oculatus*	Erie	Endangered
PA	Burbot	*Lota lota*	Erie	Threatened
	Lake sturgeon	*Acipenser fulvescens*	Erie	Endangered
	Longnose sucker	*Catostomus catostomus*	Erie	Endangered
MI	Not applicable (N/A)			
WI	N/A			

Source: USCG 2008.

Bald eagle, bog turtle *(Glyptemys muhlenbergii)*, piping plover (*Charadrius melodus*), and Indiana bat (*Myotis sodalis*) are all federally protected species that are known to occur in Oswego County. Because of the industrial nature of the port area, these species are not likely to occur (DOT 2012).

No federally protected species are known to occur in the waters near the Port of Toledo (Hull and Associates Inc. 2006).

Federally listed species that may be present in the Port of Duluth area include the bald eagle, threatened; piping plover, endangered; and gray wolf, endangered in Wisconsin and threatened in Minnesota. According to reports of the St. Louis River Estuary Colonial Bird Program (a program of the Minnesota and Wisconsin Departments of Natural Resources), piping plover have not been observed nesting in the harbor since 1985 (USACE 2002a). Bald eagle and gray wolf are not likely to occur in the highly developed port area.

Critical Habitat

Critical habitat for Piping Plover nesting and foraging was designated under the ESA on beaches in the Great Lakes region. USFWS has designated 35 critical habitat units for the Great Lakes population of this species (66 F.R. 22938 [May 7, 2001]). These units occur in: St. Louis County, Minnesota; Douglas, Ashland, Marinette, and Manitowoc Counties, Wisconsin; Lake County, Illinois; Porter County, Indiana; Erie and Lake Counties, Ohio; Erie County, Pennsylvania; Oswego and Jefferson Counties, New York; and Alger, Schoolcraft, Luce, Mackinac, Chippewa, Iosco, Presque Isle, Cheboygan, Emmet, Charlevoix, Leelanau, Benzie, Mason and Muskegon Counties, Michigan.

5.8.2 Environmental Consequences

5.8.2.1 Proposed Action

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to vegetation or wildlife within the Great Lakes region. Likewise, the presence of SAV within established shipping corridors is also unlikely; therefore, the use of these existing corridors by the conceptual Marine Highway services would not be expected to impact SAV.

As site-specific projects are further developed, additional analysis of vegetation communities at each port location and along the Marine Highway Corridors may need to be conducted under a project-based NEPA analysis to determine the presence and composition of vegetation in the project area, if necessary.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Great Lakes region would be expected to have minimal impacts to migratory birds on the Great Lakes and in the port pair cities. The existing shipping routes and port areas already support a high level of shipping activity and are heavily developed; therefore, no loss of

habitat is anticipated from the nominal increase in vessel trips. Additionally, any impacts would be minimized through compliance with existing Federal, State, and port specific regulations promulgated to protect biological resources.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any migratory bird species habitat in the area that may be affected by the future projects and to identify potential mitigation measures, if required, to ensure compliance with the MBTA.

Fish

The Great Lakes region does not contain EFH. Therefore, the operation of the conceptual Marine Highway services in this region would have no effect on EFH.

Because existing ports and Marine Highway Corridors would be utilized, no loss of aquatic habitat is anticipated as a result of the operation of the conceptual Marine Highway services. In addition, there would be no impact on commercially important fish species. The increased noise associated with increased vessel traffic would be minor and would not be expected to adversely impact fish. Additionally, fish are very motile and would avoid the area of noise if loud enough to cause annoyance. Indirect impacts to fish resulting from collisions and accidental spills would be minimized through adherence with the COLREGs. Furthermore, any accidental spills resulting from ship collisions would be responded to and contained as quickly as possible to reduce impacts to the surrounding environment. Therefore impacts to fish resulting from the operation of the conceptual Marine Highway services within the Great Lakes region would not be significant.

Marine Mammals

The conceptual Marine Highway services identified for the Great Lakes region port pairs would have no impacts to marine mammals as these species do not occur in the project area.

Invasive Species

The USCG and the EPA have Federal oversight of ballast water management through the Final Ballast Water Rule and the draft VGP, respectively. However, States retain authority to adopt or enforce more stringent control measures over aquatic nuisance species (Maryland Sea Grant 2010).

Impacts from invasive species would be minimized through compliance with the USCG Final Ballast Water Rule and the EPA draft VGP. The USCG Final Ballast Water Rule is described in Section 4.8.2.1, *Environmental Consequences*. Compliance with port-specific ballast water management plans and rules would further reduce potential impacts.

Threatened and Endangered Species

Operation of the conceptual Marine Highway services as identified within the Great Lakes region is anticipated to have minimal impacts on threatened and endangered species on the Great Lakes and in the port pair cities. The port pair areas already support a high level of shipping activity and no loss of habitat is anticipated from the minor increase in vessel trips with the conceptual Marine Highway services. The port areas are heavily developed to support water dependent uses and have several

programs and mitigation measures in place to reduce impacts to biological resources. Indirect impacts to potential habitat could be minimized with speed restrictions in sensitive areas.

Coordination with Federal and State environmental regulatory agencies under the ESA may be required under a project-based NEPA analysis to identify any ESA species in the area that may be affected by the future projects and to identify potential mitigation measures, if required.

Critical Habitat

Operation of the conceptual Marine Highway services is not expected to impact critical habitat for piping plover in the Great Lakes region. The existing shipping routes currently support a large amount of shipping activity and no loss or impacts to beach habitat would be expected from their increased use. The services would comply with existing maritime laws and procedures with regard to transit operations and cargo handling to ensure safe transport and minimize impacts to the aquatic environment or critical habitat.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any critical habitat for ESA species in the area that may be affected by site-specific projects and to identify potential mitigation measures, if required.

5.8.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region would not be implemented. The No Action Alternative would not result in impacts to vegetation and wildlife, migratory birds, EFH, marine mammals, invasive species, threatened and endangered species, or critical habitat.

5.9 Geological Resources

5.9.1 Affected Environment

Geology and soils are site-specific resources and their presence and composition would vary widely across the Marine Highway Corridor and at various port locations to the point where they cannot be described on a regional level. If necessary, site-specific conditions would be discussed in project-based NEPA documentation. The only geologic resource that can accurately be described on a regional level is the physiographic divisions. The USGS divides the North American continent into eight physiographic regions based on terrain texture, rock type, and geologic structure and history (USGS 2003). Two physiographic provinces, the Laurentian Upland (Superior Upland section) and Interior Plains (Central Lowlands – Eastern Lake section), comprise the Great Lakes Marine Highway Corridor.

The Superior Upland province covers northeastern Minnesota, northwestern Michigan, and approximately the northern half of Wisconsin and contains predominantly Precambrian rocks. Some of the oldest rocks known in North America occur in this province.

The Eastern Lakes section, which contains four of the five Great Lakes (Lake Superior is in the Superior Upland province), contains one of the largest drumlin fields in the world, located south of Lake Ontario, most prominently between Rochester and Syracuse in New York (Henry 2007). The Eastern Lake Section

consists of a series of northwest-sloping, lake-parallel, low-relief ridges. These ridges are made up of unconsolidated surficial materials, mainly sands and gravels that were deposited during the most recent de-glaciation of the area about 18,000 years ago. Steep-sided, narrow valleys cut through these ridges into the underlying shales and siltstones and extend into Lake Erie (Pennsylvania Department of Conservation and Natural Resources 2012).

5.9.2 Environmental Consequences

5.9.2.1 Proposed Action

The operation of the conceptual Marine Highway service identified within the Great Lakes region would utilize existing shipping routes and port facilities and would not include construction, dredging, or other activities that would affect geology and soils. Therefore, there would be no impacts to geology and soils under the Proposed Action.

5.9.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region would not be implemented. The No Action Alternative would not result in impacts to geology and soils.

5.10 Water Resources

5.10.1 Affected Environment

<u>Water Quality</u>

The Great Lakes region constitutes the largest continuous mass of freshwater in the world (USCG 2008). It holds approximately 95% of all the freshwater in North America and approximately 18% of all fresh water in the world (Great Lakes Region Water Program 2012). Water quality in the waters of the U.S. was recognized as a national priority by passage of the original CWA in the early 1970s. The Act, as amended in 1987 by the Water Quality Act, includes several sections that could relate to aspects of the Great Lakes. In addition to national water quality laws, the Great Lakes Water Quality Agreement, first signed in 1972 by the U.S. and Canada, and renewed in 1978, specifically establishes water quality goals with the goal to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin ecosystem. Article VI (1)(f) and Annex 5 of the Agreement requires the U.S. and Canada to develop measures for control of discharges of vessel wastes. The CWA and other regulations provide useful information in evaluating potential water quality impacts. Water quality chemical limits establish a concentration above which adverse effects to aquatic life or other uses of the surface waters could occur.

The water quality of the Great Lakes is affected by in-lake cycles, external inputs from watershed inflows, and atmospheric deposition, all of which can be influenced by human activities. Human activities provide much of the input through wastewater discharges, energy production, chemical spills, road salt usage, and other sources. Nutrient loadings into the Great Lakes have been reduced over the past 30 years; however, issues such as botulism, harmful algal blooms, viral hemorrhagic septicemia, and shoreline development remain. Harmful algal blooms are a concern in Great Lakes coastal areas

and are especially problematic in Lake Erie (EPA 2009). Any addition of contaminants to the water would be added to what already exists and therefore, an understanding of existing water quality is discussed below.

Lake Superior has seen a decline in the toxic organic contaminants in water by 50% from 1986 to 1997. Some contaminants, such as dieldrin, mercury, PCBs, and toxaphene, still exceed water quality standards for the Lake. Most of these contaminants enter the Lake through atmospheric deposition (USCG 2008).

Chemical contamination in Lake Huron is the main stressor in this lake. Water quality testing along the shoreline has found elevated levels of E. coli bacteria at many beaches and public areas. Furthermore, outbreaks of Type-E botulism bacterium have killed thousands of fish and water birds in Lake Huron. The sources of these bacteria are currently being investigated (USCG 2008).

Main water quality stressors within Lake Erie include, non-native species, nutrient inputs, chemical and biological contaminants, and land-use practices (USCG 2008). Zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena bugensis*) have decreased turbidity, reducing walleye habitat and increasing submerged aquatic plants (USCG 2008). PCB's and mercury continue to affect fish consumption (EPA 2009). Phosphorous, nitrogen and other toxic contaminants from both point and nonpoint sources continues to be a problem within Lake Erie leading to algal blooms and changes habitat dynamics.

Main stressors to the water quality of Lake Ontario are non-native invasive species, and contamination due to increasing urban sprawl and urbanization around the lake (USCG 2008).

Under the conceptual Marine Highway service for the Great Lakes region, three port pairs have been identified: Oswego, NY to Toledo, OH; Duluth, MN to Sault Ste. Marie, Ontario; and Toledo, OH to Montreal, Quebec. Existing water quality within each port varies.

The Port of Oswego is sited on the Oswego River in New York. The lower reach of the Oswego River at its confluence with Lake Ontario was once listed as an Area of Concern by the EPA, meaning that this was a severely degraded geographic area that had caused, or was likely to cause, impairment to the area's ability to support aquatic life (EPA 2012d). Impairments identified in the past involved fish consumption, fish habitat and populations, and eutrophication and algae (EPA 2012d). In 2006, this river system became the first Area of Concern in the U.S. to become formally delisted, as water quality had improved and there is no impairment data reported in the last reporting year (EPA 2012d).

The Port of Toledo is located at the mouth of the Maumee River where it joins Lake Erie. EPA water quality assessment for Maumee River in the vicinity of the Port of Toledo in 2010 reports that the overall status of the water body is impaired (EPA 2010c). The Maumee River in this area was not assessed for recreational use. However, it was listed impaired for aquatic life use, impaired for human health use, and good for public drinking water supply use (EPA 2010c).

The overall status for the St. Louis River, on which the Port of Duluth is located, is impaired (EPA 2010c). The reach of river at the Port of Duluth is specifically listed impaired for warm water aquatic consumption and aquatic recreation including fish, shellfish, and wildlife protection and propagation

(EPA 2010c). Causes for impairment for reporting year 2010 include DDT, dieldrin, dioxin, fecal coliform, mercury in fish tissue, mercury in the water column, PCB in fish tissue, and toxaphene (EPA 2010c).

The Port of Sault Ste. Marie is located on the St Mary's River, which drains Lake Superior. Water quality of the St. Mary's River in the port area has been an ongoing issue (EPA 2006b).

The Port of Montreal is located on the Saint Lawrence River and Seaway. The most frequently cited sources of impacts affecting water quality in the Saint Lawrence are atmospheric deposition, toxic/contaminated sediments and agricultural activities. Atmospheric deposition of both mercury and constituents of acid rain is the source of the most significant impairments to the waters of the seaway. Toxic/contaminated sediments are largely the result of historic legacy pollutant discharges and are responsible for the impairment to the entire length of the Saint Lawrence River. The occurrence of agricultural sources reflects the rural character of the basin, which includes significant farming regions. However, for the most part, agricultural activities result in less severe stresses and threats to water quality than more significant use impairment caused by atmospheric deposition and contaminated sediments (NY State Department of Environmental Conservation 2009).

Groundwater

The presence of groundwater is restricted to upland areas and would not exist beneath much of the M-90 corridor that is located in open water of the Great Lakes system; however, M-90 runs through several rivers connecting each lake and smaller tributaries discharge into the lakes, which are associated with upland areas. Aquifer types and associated Marine Highway Corridors are presented in Table 5.10-1.

Table 5.10-1. Aquifer Present

Aquifer Present	Aquifer Type	Associated Corridor Aquifer
Jacobsville Aquifer	Sandstone Aquifer	M-90
Cambrian-Ordovician Aquifer system	Sandstone Aquifer	M-90
Silurian-Devonian aquifers	Carbonate-rock Aquifers	M-90
Marshall Aquifer	Sandstone Aquifer	M-90
New York and New England Carbonate-rock Aquifers	Carbonate-rock Aquifers	M-90, M-75, M-71/77

Source: USGS 2012.

There are no aquifers that underlie the Port of Oswego, NY. The Silurian-Devonian aquifers underlie the Port of Toledo, OH (USGS 2012). The Cambrian-Ordovician Aquifer system underlies the Port of Duluth, MN and the Port of Sault Ste. Marie, Ontario (USGS 2012). Groundwater underlies the entire Montreal region, primarily in the fractured rocks of the Saint Lawrence Platform (Natural Resources Canada 2008).

Wetlands

Shoreline development along Lake Superior, especially of recreational homes, has increased over the years and is linked to loss of wetlands. The decrease in natural shoreline decreases the amount of natural wetlands, prairies, and forested areas along the shores. These natural buffers act as filters to reduce the amount of contaminated stormwater runoff from urban and agricultural areas (USCG 2008).

Over the last two centuries, more than 60% of Lake Michigan's coast and wetlands have been destroyed. The loss of natural shoreline has increased the amount of urban and agricultural stormwater runoff that

enters the lake, altered the watershed hydrology, increased the water and ambient air temperature, and reduced open space (USCG 2008). The amount of coastal wetlands along the Great Lakes in 1996 totaled more than 534,000 acres; however there is no comprehensive data to accurately report on loss of wetlands since this time (EPA 2009).

Invasive *Phragmites australis,* or common reed, infests many of the wetland and marshy areas within the Great Lakes region. This species is of special concern because it chokes out native species and destroys wetland vegetation (National Wildlife Foundation 2007).

Floodplains

Port communities may experience some degree of flooding because they are located at low elevations. The Great Lakes representative port pairs have 100- and 500-year floodplains associated with the ports according to FEMA floodplain mapping (FEMA Map Panels 3606560002D, 2704210040D, and 2704210040D) (FEMA 2012).

5.10.2 Environmental Consequences

5.10.2.1 Proposed Action

Water Quality

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Great Lakes region would be expected to have minimal impacts to water quality of the Great Lakes. Marine Highway Corridors are within U.S. territorial waters where Federal regulations prohibit vessels from dumping untreated sewage (NOAA 2008). Any impacts to water quality due to accidental release or vessel collision would be limited to the area of discharge and would be short-term in nature because of rapid dilution and dispersion.

There would not be an increase in vessel-to-vessel collisions or accidental oil spills because current Marine Highway Corridors are wide enough to allow vessels to avoid one another, as concluded by a USCG navigational safety analysis (USCG 2011).

Discharge of bilge and ballast water may include residual oil, lubricants, and fuel. There is also potential for pollutants from marine engines to be released into the water. However, compliance with CWA would eliminate and minimize any occurrences.

At this time there is no current Marine Highway service connecting the terminal facilities. Although, these are major ports with consistent ship traffic, there is potential for a nominal increase in ship traffic within these ports as a result of these new port pair connections. Additional vessel traffic in existing ports may increase the potential for additional concentrated discharges of pollutants within port areas. Adherence to rules and regulations of the various port management plans would further minimize the likelihood of adverse impacts to water quality stemming from accidental releases of pollutants. Impacts to surface waters within port areas would be minimized through adherence to the CWA and the regulations of Annex IV of MARPOL.

Groundwater

Based on the type of services to be implemented under the Proposed Action, a large consumption of groundwater would not be required, nor would they involve activities that would result in contamination of groundwater. Therefore, no impacts to groundwater are expected to occur.

Wetlands

Increased vessel traffic has the potential to increase erosion of sensitive wetland areas from increased wave action produced by ship wakes. However, because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have minimal impacts to wetlands of the Great Lakes. Potential impacts to wetlands could be minimized by the practice of reducing vessel speeds in areas containing sensitive wetlands.

For future site-specific projects, wetland identification and impact determination may be necessary. In these cases, consultations with USACE and appropriate State agencies would be conducted and the necessary permits obtained.

Floodplains

The ports along the Marine Highway Corridors have existing infrastructure and land use associated with port functions and already have flood control at these locations. It is not likely that there would be any increase in impacts to floodplains as a result of the Proposed Action. In addition, facility development is not part of the Proposed Action; therefore, no impacts to floodplains would occur.

For future site-specific projects, infrastructure improvements are not anticipated. However, if improvements are determined necessary for the ports to accommodate additional services, additional analysis may be necessary under a project-based NEPA document to analyze impacts to floodplains.

5.10.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region would not be implemented. Therefore, there would be no impacts to water resources.

5.11 Cultural Resources

5.11.1 Affected Environment

Archaeological Resources

The location of archaeological resources was not divulged on any online databases of SHPOs in the Great Lakes region. Likewise, no archaeological resources could be identified online for the port of Sault Ste. Marie. As of 2004, 191 archaeological sites in Montreal were listed in Quebec's inventory of archaeological resources. Many of these sites are within the Old Port of Montreal Historic and Natural District. Additionally, there are a few areas of "strong potential archaeological interest" within and adjacent to the port of Montreal. According to Montreal's Master Plan, the City implements measures to protect archaeological remains in areas of strong archaeological potential and listed archaeological

sites during public and private excavation work, including informing those responsible for excavation work of the possible presence of archaeological resources and the measures to take in the event of a discovery (City of Montreal 2004).

Native resources, as defined by NAGPRA, include human remains, funerary objects, sacred objects, or objects possessing cultural patrimony. TCPs, which are closely related to Native resources, are sites that derive their significance from the role they play in a community's historical beliefs, traditions, and customs (Parker and King 1998). They are objects or places that are significant because of their relationship with the culture, beliefs, and traditions of a community.

Native resources and TCPs are site-specific. Therefore consultation and coordination with SHPO, THPO, and/or the local community for identification of these resources should be initiated once specific sites are selected. Additionally, once specific sites of Marine Highway Projects are selected, federally recognized tribes in the vicinity of the proposed project or historically had ties to land in the Proposed Action should be contacted to identify Native resources and TCPs.

Architectural Resources

Five of the ports serviced within the Great Lakes region (Detroit, MI; and Sandusky, Cleveland, Ashtabula, Grand River, and Lorain, OH) have NRHP-listed architectural resources within the boundaries of the ports themselves. Seven ports have NRHP-listed properties within half a mile of port facilities. These are Chicago, IL; Detroit, MI; and Sandusky, Cleveland, Ashtabula, Grand River, and Lorain, OH (NPS 2012). An online database of inventoried architectural resources in Illinois was available, but no other online SHPO databases for states in the Great Lakes region were available or accessible. No Illinois ports have NRHP-eligible properties (Illinois Preservation Agency 2012).

The representative port pairs for the Great Lakes region (Table 2.1-4) include Oswego, NY; Toledo, OH; Duluth, MN; Sault Ste. Marie, Ontario; and Montreal, Quebec. No NRHP-listed properties were identified within the U.S. port locations. However, several NRHP properties are within one half mi of the port of Oswego, and three NRHP properties are approximately one mile across the waters of Lake Superior from the Port of Duluth. There are approximately four properties listed on the Canadian Register of Historic Properties within the port of Sault Ste. Marie, and approximately four more are adjacent (Parks Canada 2012). The Old Port of Montreal is a designated historic and natural district (City of Montreal 2004), and includes five properties individually listed on the Canadian Register of Historic Places. Approximately 20 Canadian Register-listed properties are adjacent to the port of Montreal (Parks Canada 2012). Additionally, the port of Montreal is within one of several industrial heritage areas that have been identified by the City of Montreal. According to the City's Master Plan, these industrial areas are subject to certain protection measures related to new construction, renovation, and landscaping (City of Montreal 2004).

5.11.2 Environmental Consequences

5.11.2.1 Proposed Action

Without a significant general cargo business in the Great Lakes, cargo service in the Great Lakes is typically more project-driven than schedule-driven as seen in the other regions. As such, effects as a result of the Program are more likely. However, dredging and landside infrastructure improvements are

not a planned aspect of the Proposed Action and are not included in this analysis. Therefore, the range of effects to NRHP-listed or eligible cultural resources by the Proposed Action within the Great Lakes region is similar to those described for the West Coast region in Section 4.11.2. As such, effects to NRHP-listed or eligible cultural resources would be evaluated in a project-based NEPA document for a Marine Highway Project proposed to be implemented under the Program.

No NRHP-listed properties were identified within the U.S. port locations of the representative port pairs for the Great Lakes region. However, several NRHP properties are within one half a mile of the Port of Oswego, and three NRHP properties are approximately one mile across the waters of Lake Superior from the Port of Duluth. The Canadian Register of Historic Places includes approximately four properties within the Port of Sault Ste. Marie and three that are within half a mile. Numerous Canadian Register properties are within and adjacent to the Port of Montreal, which is within an industrial heritage area. The Old Port of Montreal is a designated historic and natural district.

The Port of Sault Ste. Marie may need certain improvements to port and terminal infrastructure to accommodate the additional service proposed under the Program (refer to Section 5.4.2). These improvements currently do not include the properties listed on the Canadian Register. No construction, renovations, or demolition is proposed for the other representative port pairs in the Great Lakes region at this time. Therefore, there would be no direct effects to NRHP-listed or eligible properties.

Indirect effects to a NRHP-listed or eligible property could occur when visual, audible, or atmospheric elements that are out of character with the resource alter its setting or characteristics that qualify it for listing on the NRHP. The introduction of ATB traffic between the representative port pairs in this region, where barges have not previously been used, could result in an increase in noise levels from increased marine vessel traffic. However, as described in Section 5.1.2, noise impacts associated with the Proposed Action are not anticipated to be significant.

5.11.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Great Lakes region would not be implemented. The No Action Alternative would not result in impacts to cultural resources.

5.12 Hazardous Materials and Waste

Hazardous materials and wastes may be used and generated during the routine operation and maintenance of marine vessels in port areas. These substances may also be transported as cargo and, as such, may be present anywhere along the existing Marine Highway Corridors.

5.12.1 Affected Environment

<u>Hazardous Materials Management</u>

Large commercial vessels routinely discharge ballast water, gray and black water, bilge water, and deck runoff consistent with applicable international and national standards. Discharges of sewage (also known as black water) and gray water, which is the effluent generated from wash basins and showers on board ships, are regulated under MARPOL Annex IV. Discharges of black water are prohibited except

for specific conditions stipulated under the Annex. In addition to the international standards established under MARPOL Annex IV, the U.S. regulates vessel discharges of gray water, bilge water, and a variety of other vessel discharges through the EPA's VGP (EPA 2008a).

Accidental spills of oil and fuel can also cause significant damage to the environment and extensive standards have been put in place to prevent such accidents and to respond to such incidents when they do occur. Regulations for the prevention of oil pollution are set out in Annex I to MARPOL as well as the CWA.

Some specialized hull coatings that serve to prevent organisms from attaching to a ship's hull also release substances that may be considered to be vessel discharges. All ocean-going commercial vessels utilize hull coatings designed to minimize resistance to movement through the water and the attachment of both soft and hard-shell organisms. These coatings are often referred to as "antifouling" coatings.

Antifouling coatings work by different methods. Some coatings make the hull surface slick, which causes fouling organisms to fall off once the vessel reaches a specific operating speed. Other compounds provide a controlled release of biocides to prevent the attachment of organisms such as barnacles and slime. Standards for the manufacture and use of these biocidal products are established through the CWA. In addition, AFS Treaty prohibits the use of organotins as an active antifouling agent and sets forth a structure for international restrictions on other antifouling compounds deemed to be harmful to the marine environment. The AFS Treaty eliminated the use of TBT on ships in 2008 due its persistence in the marine environment and its effect on non-target species.

Hazardous Waste Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway service activities generates small quantities of hazardous wastes. These wastes include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries.

5.12.2 Environmental Consequences

5.12.2.1 Proposed Action

For future site-specific projects, NEPA analysis would be required to quantify volumes of hazardous materials and wastes used, generated, and transported by vessel services within the Great Lakes Marine Highway Corridor.

Hazardous Materials Management

Operation and maintenance of vessels, trains, trucks, cranes and forklifts used for Marine Highway activities would involve the use of small quantities of hazardous materials (e.g., fuel, oil, solvents, hydraulic fluid, antifreeze, lubricants, and/or paints) and generation of hazardous wastes. Any differences in the quantities of hazardous materials used over current baseline conditions are anticipated to be negligible and would not be significant. Appropriate procedures for the handling, storage, and transport of hazardous materials would be implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, OSHA, and Nuclear Regulatory Commission regulations, and other applicable State and local regulations.

Accidental releases of hazardous materials would be reduced or eliminated through compliance with EPA and DOT procedures and through the development and implementation of a SPCC Plan. Both the port facility and the vessel would be responsible for preparing their own spill plans and ensuring their personnel are adequately trained in spill response procedures.

Fuels, such as diesel, needed to power vessels and port machinery would be stored in accordance with EPA regulations and site-specific BMPs for their handling, storage and use, and would include regularly monitoring and inspecting tanks for leaks. A SPCC Plan would also be prepared by the port, as well as the vessel owner/operator, in the event of an accidental release of fuel.

Impacts from antifouling paints are not anticipated to be significant. The hull coating in most general use is biocidal antifouling paint, which leaches copper and a number of other biocides into the water in order to kill off fouling organisms that attach to the ship bottom. These paints gradually release the toxic substances into the water over a period of three to five years, after which time they become depleted and need to be replaced (EPA 1999). The slow release nature of the coating coupled with the transient nature of the vessels would not result in a significant impact to the environment.

Hazardous or toxic materials would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks.

Hazardous Waste Management

Operation and maintenance of vessels, trucks, cranes and forklifts used for Marine Highway activities would generate small quantities of hazardous wastes. Hazardous wastes generated during the operation and maintenance of the described marine high vessels and associated machinery are anticipated to include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries. These wastes would be managed and disposed of in accordance with applicable regulations and appropriate procedures for the handling, storage, transport and disposal of hazardous wastes would be identified in site-specific Hazardous Waste Management Plans implemented at each port location and during transport in accordance with RCRA and other applicable Federal, State, and local regulations. Compliance with applicable regulations, plans, policies and procedures would minimize potential impacts to hazardous wastes and hazardous waste management and impacts would not be significant.

5.12.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The implementation of conceptual Marine Highway services as identified for the Great Lakes region would not occur. No impacts associated with hazardous materials or waste management would occur under the No Action Alternative.

6.0 INLAND WATERWAYS/MISSISSIPPI

This chapter describes the existing environmental conditions in and around the Marine Highway Corridors within the Inland Waterways/Mississippi region for resources potentially affected by implementation of the Proposed Action as described in Chapter 2. In addition, this chapter identifies and evaluates the potential impacts of implementing the Proposed Action.

One port pair has been selected within the Inland Waterways/Mississippi region: Peoria, IL to New Orleans, LA. The Port of Peoria is a relatively small port on the Illinois River that handles a wide variety of dry bulk commodities, including salt, coal, rock, and grains, and is part of the Illinois-Mississippi River system (World Port Source 2012b). The Port of New Orleans is a large port on the Lower Mississippi River that handles break bulk, dry bulk, general cargo, and containerized cargo (Port of New Orleans 2012). The Port of New Orleans receives an average of 2,000 vessel calls each year.

6.1 Noise

6.1.1 Affected Environment

Land Based Noise

The selected ports of Peoria and New Orleans are located in highly developed industrialized areas and are assumed to have noise levels similar to other industrial areas. The principal noise sources are from ships, cranes, fork lifts, trucks/trains, and container handling equipment.

Marine Noise along Shipping Routes

In the aquatic environment, land uses as well as in-water activities, contribute to ambient noise levels. Table 4.1-1 in Section 4.1.1 presents ambient aquatic noise levels measured in similarly developed marine port areas. Similar ambient aquatic noise levels are assumed for the proposed project port areas.

6.1.2 Environmental Consequences

6.1.2.1 Proposed Action

Land Based Noise

No project-based baseline noise metrics have been collected in association with the identified conceptual Marine Highway services. Therefore, potential noise impacts evaluated herein are qualitative in nature and based on the activities normally associated with large shipping ports.

Land based noise impacts attributable to the conceptual Marine Highway services identified for the Inland Waterways/Mississippi region may result from increases in the amount of vessels using the port facilities and the increased use of cranes and other machinery used to load and unload cargo. Using the parameters and assumptions presented in Section 2.0 and Table 2.1-6, the anticipated weekly increases in vessel trips in each port is summarized in Table 6.1-1.

Table 6.1-1. Anticipated Weekly Increases in Vessel Trips in Port Areas	
Port	**Number of Vessel Trips**
Peoria, IL	2 (Inland Towboat/barges)
New Orleans, LA	2 (Inland Towboat/barges)

The increase in cargo load at the ports may result in increased noise at the ports currently impacted by port-associated noise. Any increases in ambient noise levels would be associated with typical operational noise would occur during similar timeframes as existing noises. Because the increase in new vessel trips and operation of equipment would be minor compared with existing levels at the ports, the associated increase in noise would be minor. Therefore, land based noise impacts associated with the Proposed Action are not anticipated to be significant.

Marine Noise along Shipping Routes

The operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would only be expected to result in a small increase in vessel traffic along these Marine Highway Corridors by an estimated two vessel trips per week (refer to Table 2.1-6). These vessels would be smaller and quieter than the larger container ships already in operation in the New Orleans area and therefore are not expected to result in noise increases above *de minimis* levels. The noise produced by these vessels is dependent on the size of the vessel and the rate of speed as well as specific design characteristics (e.g., engine size, propeller placement) (NOAA 2004a). Underwater noise from commercial ships is generated during normal operation, most notably from propeller cavitation (when air spaces created by the motion of propellers collapse) (McKenna et al. 2012). Incorporating noise reduction measures into ship design and operation, such as reducing engine size and vessel speed and placement of propellers lower in the water, may mitigate the impact of minor increases in noise from Marine Highway vessel trips.

Vessel traffic associated with conceptual Marine Highway services identified for the Inland Waterways/Mississippi region would occur at varying distances from the shoreline based on the width of the Mississippi River. Because the Tier 2 diesel engines are assumed to run quieter than current marine engines, noise impacts are not anticipated to be significant.

As site-specific projects are further developed for the Program, project-based noise analyses may need to be conducted to quantify noise impacts to the marine environment.

6.1.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Therefore, there would be no noise impacts under the No Action Alternative.

6.2 Air Quality

6.2.1 Affected Environment

Air quality within the Inland Waterways/Mississippi region is highly variable, ranging from very good to deteriorated, with the more deteriorated air quality found in the larger northern and eastern

metropolitan areas, including Chicago, Pittsburgh, and Cincinnati. St. Louis, a major transportation and shipping hub in the Midwest, also has deteriorated air quality. Air quality improves to the south in the Inland Waterways/Mississippi region, with even large cities such as New Orleans still in attainment for the criteria pollutants. Table 6.2-1 summarizes the air quality in the regions surrounding ports in the Inland Waterways/Mississippi region.

Table 6.2-1. Status of Compliance with NAAQS for Port Areas Included in the Inland Waterways/Mississippi Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-55 Marine Corridor								
Chicago, IL	•				◊	▫	•	
Joliet, IL	•						•	
Peoria, IL			▫					
Beardstown, IL								✓
St. Louis, MO	•			▫			•	
Memphis, TN	▫			▫	▫			
Vicksburg, MS								
Baton Rouge, LA	▫							
Avondale, LA								✓
New Orleans, LA								✓
M-40 Marine Connector								
Pine Bluff, AR								✓
Little Rock, AR								✓
Fort Smith, AR								✓
Muskogee, OK								✓
Catoosa, OK								✓
M-70 Marine Corridor								
Pittsburgh, PA	•			▫		▫	•	
Cincinnati, OH	▫						▫	
Indiana-Jeffersonville, IN	▫						•	
Evansville, IN	▫						▫	
St. Louis, MO	•			▫			•	
Kansas City, MO								✓

Source: 40 CFR 81.
Notes: • denotes nonattainment designation. For $PM_{2.5}$, nonattainment can be for annual standard, 24-hour standard, or both.
▫ denotes maintenance area. Maintenance areas have been nonattainment at one time, achieved attainment, and now must follow approved plans to ensure continued attainment.
◊ denotes nonattainment for 2008 Pb standard.
✓denotes an area that is, and always has been, in attainment for all criteria pollutants.

Ground-level, or tropospheric, O_3 forms when emissions of NOx and VOCs photo chemically react with sunlight. For this reason, NO_x and VOCs are considered O_3 precursors. O_3 exposure is linked to acute respiratory problems, aggravated asthma, reduced lung capacity, inflamed lung tissue, and impairment of the body's immune system. The 1990 CAA Amendments set out specific requirements for a group of northeast states that make up the OTR. States in the OTR are required to submit a SIP and install a certain level of controls for the pollutants that form O_3, even if they meet the NAAQS O_3 standards. Of the states in the Inland Waterways/Mississippi region, Pennsylvania is the only one included in the OTR.

States in the Inland Waterways/Mississippi region have SIPs and there may also be applicable TIPs, developed to achieve or maintain attainment levels for various criteria pollutants. Any project proposed under the Program would need to address state-specific requirements included under these implementation plans. The regional requirements for the OTR in Pennsylvania are included in the Pennsylvania SIP and would need to be addressed in a project-based NEPA document for any proposed project in that region. In addition, most of the larger urban areas in the region, including Chicago, St. Louis, Kansas City, Memphis, Pittsburgh, and Cincinnati, have their own regulations for air quality management and their own regulatory agencies. Any proposed project under the Program would need to account for such local requirements in a project-based NEPA document.

All of the states in the Inland Waterways/Mississippi region, as well as many localities, have specific requirements for permitting of air emissions sources. Permitting requirements for construction and operation of stationary sources may need to be addressed in a project-based NEPA document. Additionally, construction activities, including building a road or preparing land to erect a tower, may require a permit, depending on the site location and its air quality, as the activity may increase PM_{10} through ground disturbance. In most cases, a permit may not be required for temporary, small-scale construction measures.

Mobile sources include vehicles that operate on roads and highways ("on-road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earth-moving equipment, lawn and garden power tools, marine vessels, railroad locomotives, and airplanes. All of the various forms of transportation used to haul freight and transport cargo are mobile sources that can contribute substantially to air pollution.

The ports in the Inland Waterways/Mississippi region handle significant volumes of freight every year. In the Inland Waterways/Mississippi region, the ports of New Orleans and Pittsburgh handle the greatest volume of freight (USACE 2010a).

Although a significant portion of the freight in the Inland Waterways/Mississippi region is hauled by marine vessels and barges, most of the freight hauled in this region of the U.S. is transported by truck (see Table 6.2-2). Data on freight moved by truck in the region is provided in Table 6.2-2. The primary interstate routes in the Inland Waterways/Mississippi region include the north to south I-55, I-71, and, I-77 and the east to west I-70, I-40, and I-64.

The data used in this document for the volume of cargo hauled by truck were derived from the FAF3 program. FAF3 is a FHWA funded and managed data and analysis program that provides estimates of the total volumes of freight moved into, out of and within the U.S., between individual States, major metropolitan areas, sub-State regions, and major international gateways.

For purposes of this study, the Inland Waterways/Mississippi region was subdivided into three market areas: I-55, I-40, and I-70. Table 6.2-2 presents the FAF3 data for truck hauling of freight in the three Inland Waterways/Mississippi region market areas.

Table 6.2-2. Bulk Commodity Data for Freight Hauled by Truck in Inland Waterways/Mississippi Region (FAF3 2007 Data)		
Market Area	Hauled by Truck in Ton Miles	
	West/South Bound	East/North Bound
	Truck	Truck
I-55	11,869,080,000	11,473,600,000
I-40	1,135,350,000	2,800,510,000
I-70	8,920,400,000	8,559,310,000
Total	21,924,830,000	22,833,420,000

6.2.2 Environmental Consequences

6.2.2.1 Proposed Action

The Proposed Action would shift land-based, long haul truck freight movements to Marine Highway services. Additional information may be needed to fully assess the impacts of these changes to air quality. The assessment of air quality impacts for site-specific projects in criteria pollutant nonattainment areas would require additional emissions analysis under the CAA General Conformity regulations. As indicated in Section 3.2.6, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping and hauling by heavy-duty truck. These calculations only include emissions associated with the actual movement of cargo from the specified origin to the specified destination and do not take into account truck idling or the operation of auxiliary engines used by marine vessels when at berth. Details on the resources used and the methodology for estimating emissions can be found with the calculations in Appendix B.

Tables 6.2-3 and 6.2-4 present the comparisons of moving cargo using inland towboats/barges versus trucks. It should be noted that the truck data differs for each of the vessel scenarios based on the volume and frequency of cargo movement. Specific information on the distances, load capacities, and trip frequencies can be found in Appendix B. All trucks were assumed to be heavy-duty diesel trucks in the 33,000 pounds or greater vehicle class. The data tables below demonstrate that freight movement by towboat/barge transport generates higher emissions of NO_x and CO, and slightly higher emissions of PM, as compared with trucks.

One factor that may reduce emissions using towboat/barge combinations in the Inland Waterways/Mississippi region is surface route congestion. As previously discussed, congestion was not factored in to the general set of calculations for this PEA; however, congestion is a major contributor to air emissions in the Inland Waterways/Mississippi region, particularly in the Chicago area. Any site-specific projects for this region would need to account for traffic congestion when modeling air emissions.

Table 6.2-3. Inland Waterways/Mississippi Region Annual Emissions in Total Tons by Transport Type

Corridor Peoria, IL to New Orleans, LA	VOCs Tons/Year	NO_x Tons/Year	CO Tons/Year	SO_2 Tons/Year	PM_{10} Tons/Year	$PM_{2.5}$ Tons/Year
Inland Towboat/barge	5.12	283.14	76.38	0.05	12.22	11.24
Truck[1]	6.70	158.87	35.42	0.08	6.63	6.42

Note: [1] Comparison of moving cargo using trucks versus towboats, based on volume and frequency of cargo movement.

Table 6.2-4. Inland Waterways/Mississippi Region Single Trip Emissions per TEU by Transport

Corridor Peoria, IL to New Orleans, LA	VOCs Tons/TEU	NO_x Tons/TEU	CO Tons/TEU	SO_2 Tons/TEU	PM_{10} Tons/TEU	$PM_{2.5}$ Tons/TEU
Inland Towboat/barge	0.00025	0.01529	0.00367	0.00000	0.00059	0.00054
Truck[1]	0.00032	0.00764	0.00170	0.00000	0.00032	0.00031

Note: [1] Comparison of moving cargo using trucks versus towboats, based on volume and frequency of cargo movement.

The applicability of CAA General Conformity requirements would need to be addressed for individual port locations subject to changes as a result of implementation of sea cargo movements. Site-specific projects would require additional calculations to determine the actual environmental consequences in a given area.

6.2.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. There would be no operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region. Therefore, air quality in the Inland Waterways/Mississippi region would not be impacted, either beneficially or negatively, from the implementation of the conceptual Marine Highway services. There would be no air quality impacts under the No Action Alternative.

6.3 Land Use (Including Section 4(f) Properties and Coastal Zone Management)

6.3.1 Affected Environment

Land Use (Including Section 4(f) Properties)

More than half of the 20 ports serviced in the Inland Waterways/Mississippi region are located in urban areas. Seven of the ports are located in suburban or rural settings. The ports located in suburban settings are Jeffersonville, IN; Pine Bluff and Fort Smith, AR; Beardstown, IL; and Vicksburg, MS. Ports located in rural settings include Muskogee and Catoosa, OK. Ports within suburban or rural settings are generally located near smaller towns as opposed to larger cities. For the representative port pairs for the Inland Waterways/Mississippi region, both the ports of New Orleans and Peoria are located in urban, developed areas surrounded by commercial and industrial land uses.

Nine of the 20 ports within the Inland Waterways/Mississippi region have NRHP-listed properties within or adjacent to the boundaries of the port (refer to Section 6.11.1). Two of these ports have parks within half a mile. Section 4(f) properties identified within the representative port pair for this region include NRHP-listed resources in the port of New Orleans. No Section 4(f) properties were identified in the Port of Peoria. However, the use of a Section 4(f) property, and thus the applicability of Section 4(f), can only be determined after specific sites for Marine Highway Projects are selected.

Coastal Zone Management

Two states within the Inland Waterways/Mississippi region include coastal zones. Illinois has coastal areas along the Great Lakes and Louisiana has coastal areas along the Gulf of Mexico. For specific information about the CZMP of Illinois, refer to Section 5.3.1.

The CZMP for Louisiana was accepted by NOAA in 1980 and is administered by the Department of Natural Resources, Coastal Management Division (Louisiana Department of Natural Resources 2012). The CZMP draws its authority from the State and Local Coastal Management Act of 1978 (Act 361, La. R.S. 49:214.21 *et seq*.). The coastal zone extends 16 to 32 miles inland from the Gulf Coast, depending upon the coastal resources in the area. Louisiana has 40% of the nation's wetlands. Areas of particular concern are wetland mitigation, Federal consistency, and the Coastal Nonpoint Pollutant Control Program. Additionally, the Coastal Use Permit Program, a part of the Coastal Program, regulates

activities that result in loss of wetlands (NOAA 2011g). The representative port pairs selected for this region would follow the CZMPs identified above for Illinois and Louisiana.

Coastal Barrier Resources

Only one state within the conceptual Marine Highway services of the Inland Waterways/Mississippi region, Louisiana, has land within the CBRS (USFWS 2012a).

6.3.2 Environmental Consequences

6.3.2.1 Proposed Action

Land Use (Including Section 4(f) Properties)

Establishing the conceptual Marine Highway service between the representative port pair selected for the Inland Waterways/Mississippi region would increase the number of TEUs being shipped between both of the ports from 0 to 100 per week, resulting in an increase in ATB and vessel trips between the ports. Because the Proposed Action currently intends to utilize existing ports, the nominal increase in vessel trips is not anticipated to result in land use changes at the port or in the surrounding community. Therefore, the conceptual Marine Highway services would not be expected to impact land use. Site-specific projects would be assessed with regard to land use in project-based NEPA documents.

Because the Proposed Action assumes the use of existing ports that already have port infrastructure, impacts to Section 4(f) resources would not be expected. However, should future projects under the Proposed Action identify the need to convert a Section 4(f) resource to a non-Section 4(f) use, then a Section 4(f) study would be required.

Coastal Zone Management

Because the Proposed Action would utilize existing ports and the existing Marine Highway Corridors are already used to transport cargo, the Proposed Action is anticipated to be consistent with the CZMPs of Illinois and Louisiana. Therefore, impacts to the coastal zone are not anticipated.

Impacts to coastal barrier resources are not anticipated because the Proposed Action does not intend to develop any additional land.

6.3.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region representative port pairs would not be implemented. Therefore, there would be no impact to land use, Section 4(f) properties, or the coastal zone.

6.4 Infrastructure and Utilities

6.4.1 Affected Environment

Infrastructure

The Port of Peoria has nine terminals and total berthing area of over 3,000 ft (World Port Source 2012b). The Port of New Orleans includes over 500 acres of cargo-handling area. In addition, the Port of New Orleans includes the world's longest wharf, extending over 2 miles, and can accommodate as many as 15 vessels at the same time (Port of New Orleans 2012).

Utilities

Utility services such as potable water supply, wastewater collection, and electrical supply require a network of components. This network includes components such as pipelines, pumps, treatment units, and storage basins for potable water and wastewater systems and components such as transmission lines, substations, transformers, and distribution lines for electrical systems. Water and wastewater services are typically provided by the local municipality, whereas electrical service is typically provided by private companies. Utility providers for the representative port pair selected for the Inland Waterways/Mississippi region are listed in Table 6.4-1.

Table 6.4-1. Utility Providers for the Representative Port Pairs in the Inland Waterways/Mississippi Region

Port	Potable Water	Wastewater	Electrical Service
Peoria, IL	City of Peoria, Department of Public Works		Ameren
New Orleans, LA	Sewerage and Water Board of New Orleans		Entergy

6.4.2 Environmental Consequences

6.4.2.1 Proposed Action

The implementation of the conceptual Marine Highway services for the Inland Waterways/Mississippi region has the potential to increase the number and type of vessel calls and cargo handling requirements at the participating ports, which in turn could increase demand for the existing equipment, infrastructure, and utilities at these ports. The impact is dependent on the available capacity and the increase in demands.

The Port of New Orleans has ample capacity and appropriate existing facilities and equipment to handle any incremental cargo volumes generated by the conceptual Marine Highway service. The Port of Peoria has more limited capacity. Because of the nominal increase in vessel trips estimated for the conceptual Marine Highway service, while there may be some impacts to Port of Peoria infrastructure, the impacts would be expected to be minimal. Therefore, impacts to infrastructure associated with the Proposed Action at the Ports of Peoria and New Orleans would not be expected to be significant.

The increases in water demand, wastewater flow, and electrical load associated with two additional vessels per week would be nominal compared to utility requirements associated with the vessels currently received. Therefore, utility impacts associated with the Proposed Action are not anticipated to be significant.

As future site-specific projects are developed, it would be necessary to determine which physical components of the port terminal infrastructure and cargo handling equipment would be impacted and perform the necessary assessments to determine if there is sufficient capacity within all the components to meet the increased cargo handling at the participating ports.

6.4.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would not be implemented. Therefore, no impacts to infrastructure and utilities would occur under the No Action Alternative.

6.5 Socioeconomics

6.5.1 Affected Environment

Employment and Income

The Port of New Orleans, LA is one of America's leading general cargo ports. Currently, it supports approximately 160,000 jobs in the region. The U.S. Bureau of Labor and Statistics keeps statistics on the number of people employed regionally for specific industries. Table 6.5-1 estimates the number of people employed in the Transportation and Warehousing Industry for the past 10 years in the Inland Waterways/Mississippi region by port pair. These numbers are included to provide a general indication of the transportation industry in the regions. Although it is assumed that many of the transportation jobs in the port regions would be either directly or indirectly associated with the port, all jobs are not necessarily attributed to port operations.

Table 6.5-1. Transportation and Warehousing Regional Employment–Inland Waterways/Mississippi Region (in thousands)

Year	Peoria, IL and New Orleans, LA
2002	36.7
2003	35.2
2004	35.8
2005	34.2
2006	32.4
2007	32.7
2008	33.1
2009	31.6
2010	32.5
2011	35.0

Source: U.S. Bureau of Labor Statistics 2012.

6.5.2 Environmental Consequences

6.5.2.1 Proposed Action

The methods and assumptions for estimating impacts of the Proposed Actions in this PEA are described in Section 4.5.2. It is estimated that substitution of the conceptual Marine Highway service for long-haul truck service between the Ports of Peoria, IL and New Orleans, LA would result in the creation of jobs and income associated with the proposed Marine Highway service and the loss of jobs and income associated with the decrease of long haul (one-way) trucking along this existing Marine Highway Corridor. The job gains and losses associated with the cargo volumes listed in Table 2.1-6 and the estimates are listed in Table 6.5-2.

Table 6.5-2. Economic Impacts of the Marine Highway Service - Inland Waterways/Mississippi Region			
	Long Haul Trucking (Losses)	**Marine Highway Service (Gains)**	**Net Impacts**
Peoria, IL to New Orleans, LA			
Jobs			
Direct	43	220	177
Induced	46	251	205
Indirect	24	123	99
TOTAL JOBS	**113**	**594**	**481**
Personal Income (1,000)			
Direct	$1,935	$10,834	$8,899
Re-spending/Local Consumption	$4,189	$23,454	$19,265
Indirect	$986	$5,036	$4,050
TOTAL (1,000)	**$7,110**	**$39,324**	**$32,214**

The operation of the conceptual Marine Highway service between the Ports of Peoria, IL and New Orleans, LA is estimated to result in a loss of 43 direct trucking jobs in the long haul sector, and the creation of 177 direct port industry jobs. The majority of the port sector jobs would be with members of the ILA and U.S. merchant mariners onboard the tug/barge combination providing the service between Peoria and New Orleans.

For the port pair identified for the Inland Waterways/Mississippi region, the impacts of transitioning from the long-haul truck service to the Marine Highway service indicate that while there are lost jobs and income, it is estimated that there would be increases in both the overall number of jobs created and personal income. Therefore, there would be no significant employment and income impacts associated with the Proposed Action for the Inland Waterways/Mississippi region.

These findings are based on general formulas used for calculating employment and income. A more in-depth feasibility assessment may be required for future site-specific projects in the Inland Waterways/Mississippi region to better define the measureable logistics costs of the proposed services and to further assess the impacts to the logistics supply chains and strategies of the targeted users.

6.5.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region representative port pairs would not be implemented. Therefore, there would be no impact to employment and income.

6.6 Recreation

6.6.1 Affected Environment

Regional

The Inland Waterways/Mississippi region provides a wealth of water-dependent recreational opportunities including boating, fishing, hunting, swimming, and beach-going. Public access to waterways is a vital component of local quality of life and an important draw for tourism.

The waterways potentially affected by projects in the Inland Waterways/Mississippi region include the Mississippi, Missouri, Ohio, Arkansas, Verdigris, White, and Illinois Rivers. Ports would be served in Pennsylvania, Ohio, Indiana, Illinois, Missouri, Arkansas, Oklahoma, Tennessee, Mississippi, and Louisiana (refer to Section 2.1, *Proposed Action*, for additional detail).

Recreational activities, such as boating, fishing, and hunting, are protected and regulated by a number of additional State, regional and local agencies and jurisdictions.

Port Pairs

The Port of Peoria is part of the Mississippi-Illinois River System. This river system supports numerous recreational resources and opportunities including boating, fishing, hunting, camping, swimming, and wildlife viewing. The Port of New Orleans is located on the Lower Mississippi River, near many of the numerous New Orleans recreational resources. Local recreational resources include the Riverwalk Marketplace, French Quarter, and river cruises.

6.6.2 Environmental Consequences

6.6.2.1 Proposed Action

Regional

Given that the frequency of the conceptual Marine Highway service between the selected Inland Waterways/Mississippi region port pairs and that the vessels intend to utilize existing shipping routes between existing ports, the Proposed Action is not expected to impact recreational opportunities within the Inland Waterways/Mississippi region.

Port Pairs

Container on barge service connecting New Orleans and Baton Rouge and Memphis was operated for a number of years, but discontinued around 2009. At the time this PEA was written, there was no existing service between the Ports of Peoria, IL and New Orleans, LA. The conceptual Marine Highway services, as depicted in Table 2.1-6, would be completely new services along this corridor and between these port pairs. However, given the frequency of vessel trips proposed for the conceptual Marine Highway service between the port pairs and that the vessels would transit along existing shipping routes between existing ports, negligible impacts to recreation are anticipated.

6.6.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland

Waterways/Mississippi region representative port pair would not be implemented. Therefore, there would be no change or impact to recreation under the No Action Alternative.

6.7 Traffic and Transportation

6.7.1 Affected Environment

Truck Traffic

The landside corridor between the Ports of Peoria, IL and New Orleans, LA is primarily I-55. I-55 is a major north-south corridor along the Mississippi River. The highway distance from Peoria to New Orleans is approximately 850 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately 13 hours. The DOT indicates that this corridor is plagued with major freight truck bottlenecks, including metropolitan areas such as Chicago, St. Louis, Baton Rouge, and New Orleans, causing millions of hours in truck delay each year.

The Port of Peoria is served by several collector roads with direct access to I-74 and access to I-474 within 2 miles. The Port of New Orleans is served by a number of collector roads with direct access to I-90.

Vessel Traffic

The Marine Highway Corridor associated with the Ports of Peoria and New Orleans is the Mississippi River consisting of the M-55 and M-70 corridors. The waterway distance from Peoria to New Orleans is approximately 950 miles. While there has been a container-on-barge service that operated between New Orleans and Memphis in the past, the service was discontinued around 2009. Currently, there are no container-on-barge systems operating along any portion of the Mississippi River system between Peoria and New Orleans.

6.7.2 Environmental Consequences

6.7.2.1 Proposed Action

The Proposed Action has the potential to reduce traffic congestion along the busy roadways traveled by long haul trucks in the Inland Waterways/Mississippi region. By transferring the transportation of cargo from trucks to marine vessels, there would be a decrease in the number of trucks on the nation's highways. Consequently, there would be an increase in the amount of vessel trips along the existing Inland Waterways/Mississippi Marine Highway Corridor.

This section identifies the number of truck miles and hours of long haul transport that are being reduced as a result of the implementation of the Proposed Action, as well as the additional vessel traffic that would be introduced to the existing Marine Highway Corridors.

Truck Traffic

Based on the conceptual Marine Highway services outlined in Table 2.1-6, the implementation of this program would reduce truck trips along the I-55 corridor by 200 trips each week. This equates to a total of 170,000 miles and 2,600 hours of truck traffic reduction along this route each week. Due to the relative size of the two ports, the decrease of truck traffic in and around New Orleans would be much less noticeable than the reduction of truck traffic closer to Peoria. Regardless of the degree of impacts to truck traffic in, around, and between the ports, the assessment indicates that there would be positive

impacts from the reduction in traffic congestion associated with long haul truck traffic associated with the implementation of the proposed Marine Highway service between the ports of Peoria, IL and New Orleans, LA.

Vessel Traffic

Based on the conceptual Marine Highway services outlined in Table 2.1-6, vessel traffic would increase along this corridor by four vessel trips per week (two in each direction). For the towboat/barge vessels, operating at 8 knots, the one-way operation would require 134 hours. Assuming just two round trip vessels operating on a weekly rotation, a total of 536 hours of additional vessel traffic would be seen along this corridor. Because of the large number of vessels currently travelling in and around New Orleans, this increase in vessel traffic along this portion of the route would be expected to be negligible. Similarly, although containerized cargo is not typically handled in Peoria, there are numerous vessels transporting other types of cargo to and from Peoria. Therefore, the increase in vessel trips would be expected to have minimal impact in this portion of the Peoria to New Orleans corridor. Therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

6.7.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region representative port pairs would not be implemented. Truck traffic would continue as it is today, with landside routes that suffer congestion.

6.8 Biological Resources

6.8.1 Affected Environment

Vegetation and Wildlife

Because the establishment and operation of the Marine Highway along the Mississippi River would occur in existing ports and along established shipping corridors, extensive stands of upland or SAV are not anticipated to be present in the area that could be affected by the Proposed Action. Upland areas within the ports are expected to be developed and devoid of vegetation while ship berthing areas and navigation channels are expected to be too deep for the establishment of SAV. Site-specific analysis of vegetation communities at each port location and along the shipping corridors may be needed during the preparation of project-based NEPA documentation to determine the presence and composition of vegetation in the project area, if necessary.

The composition of upland vegetation communities along the banks of the Mississippi River varies by location and is largely dependent on temperature, soil type, and the availability of sunlight and water. Wildlife populations are generally determined by the habitat quality (e.g., size, composition, level of human disturbance) and food and water availability of the area. The broad ecological communities of North America have been categorized and mapped at three levels. Level I is the most general of the classification systems and presents a continental perspective; dividing North America in 15 ecoregions. Level II presents more of a national/regional perspective and divides the continent into 52 ecoregions, whereas Level III presents a regional perspective and divides the continent into approximately 200 ecoregions (CEC 1997). Nine ecoregions are found along the banks of the Mississippi River under the

Level III classification system (CEC 2006). The vegetation and wildlife commonly associated with each of these ecoregions is described in the following paragraphs.

***Driftless Area*:** This region spans both sides of the upper Mississippi River valley in southeast Minnesota, southwest Wisconsin, northeast Iowa, and northwest Illinois. The region is a mosaic of prairie containing bluestem (*Andropogon gerardii*), Indiangrass, and sideoats grama *(Bouteloua curtipendula*), and forests of bur oak (*Quercus macrocarpa*) and white oak. In moist areas, there are forests of sugar maple, basswood, and red oak, and riparian forests with elm (*Ulmus sp.)*, river birch (*Betula nigra*), silver maple, and ash. Wildlife species found in this region include white-tailed deer*,* coyote, gray fox, red fox, beaver, raccoon, fisher (*Martes pennant*), otter, mink, gray squirrel, red-shouldered hawk (*Buteo lineatus*), turkey vulture, ruffed grouse, and wild turkey (Wiken et al. 2011).

North Central Hardwood Forests: The North Central Hardwood Forests occur in central Minnesota, Wisconsin, and a small portion of Michigan. The ecoregion is transitional between the predominantly forested northern lakes and forests ecoregions to the north and the agricultural ecoregions to the south. The dominant forest types in this ecoregion include oak savanna (*Quercus spp.*), oak-hickory forests (*Quercus sp.* and *Carya sp.*), maple-basswood forests, northern hardwoods of maple (*Acer sp.)*, beech (*Fagus sp.)*, and birch (*Betula sp.)*. Wildlife species found in this ecoregion include white-tailed deer, coyote, gray fox, red fox, beaver, raccoon, otter, mink, gray squirrel, wild turkey, sandhill crane, turkey vulture, ruffed grouse, and Canada goose (Wiken et al. 2011).

Central Corn Belt Plains: This ecoregion covers a large portion of northern Illinois and northwestern Indiana, with a small extension into southeastern Wisconsin. Nearly all of the natural vegetation in this region has been replaced by agriculture, but once hosted extensive prairie communities intermixed with oak-hickory forests. Wildlife found in this region includes white-tailed deer, coyote, bobcat, meadow vole, Canada goose, mallard duck, black-capped chickadee, upland sandpiper, Illinois mud turtle (*Kinosternon flavescens spooneri*), and Illinois chorus frog (*Pseudacris streckeri illinoensis*) (Wiken et al. 2011).

Western Corn Belt Plains: The Western Corn Belt Plains stretches across southern Minnesota, most of central and western Iowa, eastern South Dakota, eastern Nebraska, northwest Missouri, and northeast Kansas. The region has largely been converted to agricultural land but once supported tallgrass prairie covered with little bluestem*,* big bluestem, Indiangrass, and switchgrass, with small areas of bur oak, and oak-hickory woodlands. Regional wildlife includes white-tailed deer, beaver, raccoon, red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), bobwhite quail (*Colinus virginianus*), western meadowlark (*Sturnella neglecta*), Canada goose, ring-neck pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), mallard, teal (*Anas crecca*), and Great Plains toad (*Bufo cognatus*) (Wiken et al. 2011).

Central Irregular Plains: This ecoregion spans southern Iowa, northern and western Missouri, eastern Kansas, and northeastern Oklahoma. Historically this ecoregion supported a grassland/forest mosaic but has largely been converted to agricultural land. Grasslands were all grass prairies with little bluestem, big bluestem, Indiangrass, and switchgrass. Forests were oak-hickory woodlands with red oak, white oak (*Quercus alba*), bur oak, chinkapin oak (*Quercus muehlenbergii*), post oak (*Quercus stellate*), shagbark hickory, and bitternut hickory. Wildlife species found in this region include white-tailed deer, badger (*Meles meles*), raccoon, striped skunk, muskrat (*Ondatra zibethicus*), cottontail

rabbit (*Sylvilagus Floridanus*), mink, Canada geese, bobwhite quail, western meadowlark, and ring-neck pheasant (Wiken et al. 2011).

Ozark Highlands: This region covers a large portion of southern Missouri and northern Arkansas, and small portions of northeastern Oklahoma and southeastern Kansas. Oak-hickory and oak-hickory-pine forest stands are typically found in this region. Wildlife species found in this region include white-tailed deer, coyote, bobcat, beaver, gray bat (*Myotis grisescens*), wild turkey, eastern bluebird (*Sialia sialis*), bobwhite quail, warblers (*Parulidae sp.*), and collared lizard (*Crotaphytus collaris*) (Wiken et al. 2011).

Interior River Valleys and Hills: This ecoregion is located in the central part of the Mississippi River basin where large rivers such as the Ohio and Missouri meet the Mississippi River. It spans southeast Iowa, southwestern and southern Illinois, eastern Missouri, southeastern Indiana, and western Kentucky. Bottomland deciduous forests and swamp forests were once extensive on poorly-drained, nearly level, lowland sites but most have been replaced by cropland and pastureland. Along the Mississippi River silver maple, American elm, and green ash (*Fraxinus pennsylvanica*), with pin oak (*Quercus palustris*), pecan (*Carya illinoinensis*), bur oak, sycamore (*Platanus occidental*), honey locust (*Gleditsia triacanthos*), hickories (*Carya sp.*), and black walnut can be found. Bottomland forests contain pin oak, bur oak, Shumard oak (*Quercus shumardii*), cherrybark oak (*Quercus pagoda*), overcup oak (*Quercus lyrata*), swamp white oak (*Quercus bicolor*), swamp chestnut oak (*Quercus michauxii*), and sweetgum (*Liquidambar styraciflua*). Wildlife found in this ecoregion includes white-tailed deer, badger, weasel (*Mustela nivalis*), raccoon, bobwhite quail, Carolina chickadee (*Poecile carolinensis*), redback salamander (*Plethodon cinereus*), copperbelly water snake (*Nerodia erythrogaster neglecta*), timber rattlesnake (*Crotalus horridus*), eastern box turtle (*Terrapene carolina carolina*), and snapping turtle (*Chelydra serpentine*) (Wiken et al. 2011).

Mississippi River Valley Loess Plains: This region stretches from the Ohio River in western Kentucky south to Louisiana, running just to the east of the Mississippi River. In the more gently rolling plains portion of this ecoregion located to the east, upland forests are dominated by oaks (*Quercus sp.*), hickories *(Carya sp.)*, and both loblolly (*Pinus taeda*) and shortleaf pine (*Pinus echinata*). The western portion of this ecoregion contains more rugged terrain and oak-hickory forests, as well as southern wet forests that contain beech (*Fagus sp.*), maples (*Acer sp.*), sweetgum, basswood, tulip poplar (*Liriodendron tulipifera*), southern magnolia (*Magnolia grandiflora*), and American holly (*Ilex opaca*). Wildlife species found in this region include white-tailed deer, red fox, raccoon, weasel, gray squirrel, wood thrush, Carolina wren (*Thryothorus ludovicianus*), bobwhite quail, mourning dove, and wild turkey (Wiken et al. 2011).

Mississippi River Alluvial Plain: This riverine ecoregion extends from southern Illinois, at the confluence of the Ohio River with the Mississippi River, south to the Gulf of Mexico. The region is one of the most altered ecoregions in the U.S. and historically contained bottomland deciduous forests that largely were cleared for cultivation. The remaining floodplain forest communities are affected by hydroperiod. River swamp forests contain bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatic*). Hardwood swamp forests contain water hickory (*Carya aquatic*), red maple, green ash, and river birch. In higher, seasonally flooded areas, sweetgum, sycamore, laurel oak (*Quercus laurifolia*), Nuttall oak (*Quercus nuttallii*), and willow oak (*Quercus phellos*) occur. Deforestation and wetland degradation has had an adverse impact in wildlife population in this ecoregion. However, species such as white-tailed deer,

black bear, bobcat, gray fox, raccoon, swamp rabbit (*Sylvilagus aquaticus*), migratory waterfowl, wild turkey, cormorants, egrets (*Ardea sp.*), herons (*Ardeidae sp.*), mourning dove, wood thrush, yellow-throated vireo (*Vireo flavifrons*), and American alligator (*Alligator mississippiensis*) are still found (Wiken et al. 2011).

Migratory Birds

The Mississippi River region is of critical importance to birds and is contained within the Mississippi Flyway (USCG 2009). Nearly half of North America's bird species, and about 40% of its waterfowl, spend at least part of their lives in the Mississippi Flyway (Audubon 2012c). Up to 50% of the world's canvasback ducks and 20% of the eastern U.S. population of Tundra swans stop on the upper Mississippi River during fall migration. Ring-necked duck, hooded merganser, lesser snow geese, Canada geese, wood duck, mallard, blue-winged teal, canvasback, and lesser scaup also rely heavily on the Mississippi Flyway for migration. The Mississippi Flyway extends from the Patagonia region in South America northward to the Gulf Coast and to Canada's tundra and boreal forest. This migratory corridor follows the Mississippi River through central North America (Figure 6-1).

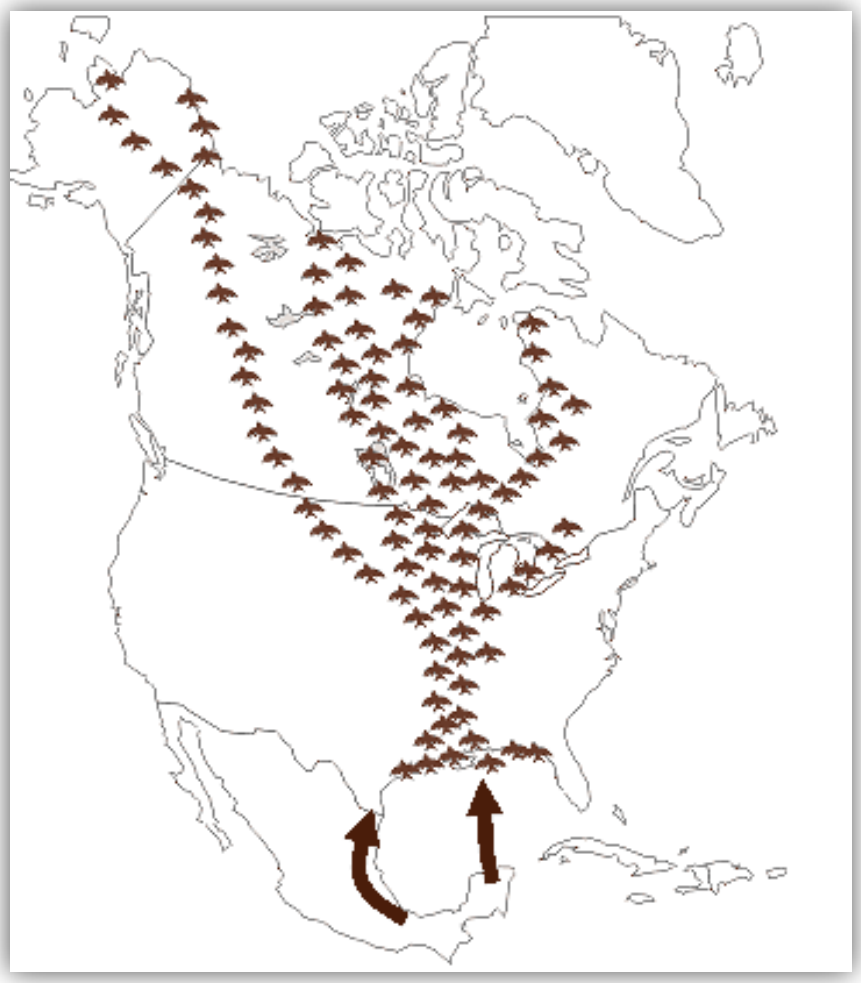

Figure 6-1 Mississippi Flyway (with Principal Routes)

Source: Texas Parks and Wildlife Department 2012a.

The states bordering the Mississippi River contain 411 IBAs, as recognized by the National Audubon Society; however, many are not associated with the river and are located inland. IBAs are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected. Identification of a site as an IBA indicates its unique importance for birds (Audubon 2012b). A project-based NEPA analysis may be needed to identify any IBAs that may have potential to be affected by the proposed Marine Highway.

The Illinois River Valley is part of the Upper Mississippi River Flyway, a critical migration corridor for waterfowl and other migratory birds. Waterfowl such as ducks and geese are most abundant in the spring and fall, but they can be found on the lakes year round. The Illinois River Valley is also considered to be an important breeding ground for the wood duck (USACE 2002a).

The North American Flyway passes directly over south Louisiana, and more than five million migratory waterfowl spend the winter in Louisiana's marshes (State of Louisiana 2012). In addition, the coastal landscape provides stopover habitat for millions of Neotropical migratory birds on their journeys across the Gulf of Mexico (Coastal Protection and Restoration Authority [CPRA] 2012).

Fish

The Mississippi River, south of Empire, LA contains EFH under the MSA and contains managed species as described in the Gulf Coast region (refer to Section 7.8.1) (USCG 2009).

EFH is not known to be present in the Port of Peoria. EFH in the Port of New Orleans includes estuarine emergent wetlands, estuarine water column, and estuarine mud substrate (bottom). SAV occurs in some isolated areas but is not a major component of the EFH in the port area. Three federally-managed estuarine/marine species are commonly to abundantly found in the waters near the port area; brown shrimp, white shrimp, and red drum. Brown shrimp occur as post-larvae, juveniles, and subadults. The postlarvae show up in large numbers beginning in late March/early April. The juveniles and subadults are abundant and heavily fished in May, June, and July. White shrimp also occur as post-larvae, juveniles, and subadults. Post larvae begin to show up in June and July. The peak of white shrimp abundance and harvest is August through November. Red drum of various age classes from small juveniles up to subadults also occur (USACE 2009b).

Marine Mammals

Marine mammals do not normally occur within the Mississippi River; however, several species may be present in the vicinity of the mouth of the river and the Mississippi River Delta, especially during warmer months. These species are discussed in detail in the Gulf Coast region (refer to Section 7.8.1).

Marine mammals are not known to occur in the Port of Peoria. Marine mammals that might occur in the vicinity of the port area include the finback (*Balaenoptera physalus*, endangered); sei (*Balaenoptera borealis*, endangered), blue (*Balaenoptera musculus*, endangered), and sperm whales (*Physeter macrocephalus*, endangered) (USACE 2009b).

Invasive Species

Invasive and exotic species are a concern in the Mississippi River. The Mississippi River Basin contains more than 135 foreign species; although not all are invasive, many pose environmental and ecological problems (Mississippi Interstate Cooperative Resource Association 2003). Table 6.8-1 lists those invasive species of most concern in the region.

Table 6.8-1. Invasive Species of Concern in the Inland Waterways/Mississippi Region

Type of species	Common Name	Scientific Name
Plant	Alligator weed	*Alternanthera philoxeroides*
Plant	Asian spiderwort	*Murdannia keisak*
Plant	Australian water clover	*Marsilea mutica*
Plant	Brittle naiad	*Najas minor*
Plant	Chinese tallow tree	*Triadica sebifera*
Plant	Common Reed	*Phragmites australis*
Plant	Curly leaf pondweed	*Potamogeton crispus*
Plant	Eurasian watermilfoil	*Myriophyllum spicatum*
Plant	Floating primrose-willow	*Ludwigia peploides*
Plant	Flowering rush	*Botumus umbellatus*
Plant	Hydrilla	*Hydrilla verticillata*
Plant	Japanese knotweed	*Polygonum cuspidatum*
Plant	Parrot feather	*Myriophyllum aquaticum*
Plant	Purple loosestrife	*Lythrum salicaria*
Plant	Salvinia spp.	*Salvinia spp.*
Plant	Uruguayan primrose-willow	*Ludwigia uruguayensis*
Plant	Water hyacinth	*Eichhornia crassipes*
Plant	Western salt cedar	*Tamarix spp.*
Crustacean	Fish hook waterflea	*Cercopogis pengoi*
Crustacean	Red swamp crayfish	*Procambarus antipodarum*
Crustacean	Rusty crayfish	*Orconectes rusticus*
Crustacean	Spiny waterflea	*Bythotrephes longimanus*
Mollusk	Asian clam	*Corbicula fluminea*
Mollusk	New Zealand mud snail	*Potamopyrgus antipodarum*
Mollusk	Quagga mussel	*Dreissena bugensis*
Mollusk	Southern mapleleaf mussel	*Quadrula apiculata*
Mollusk	Zebra mussel	*Dreissena polymorpha*
Fish	Alewife	*Alosa pseudoharengus*
Fish	Bighead carp	*Hypophthalmichthys nobilis*
Fish	Black carp	*Mylopharyngodon piceus*
Fish	Blueback herring	*Alosa aestivalis*
Fish	Common carp	*Cyprinus carpio*
Fish	Grass carp	*Ctenopharyngodon idella*
Fish	Nile tilapia	*Oreochromis niloticus*
Fish	Rainbow smelt	*Osmerus mordax*
Fish	Red shiner	*Cyprinella lutrensis*
Fish	Round goby	*Neogobius melanostomus*
Fish	Rudd	*Scardinius erythropthalmus*
Fish	Ruffe	*Gymnocephalus cernuus*
Fish	Sea lamprey	*Petromyzon marinus*
Fish	Silver carp	*Hypophthalmichthys molitrix*
Fish	White perch	*Morone Americana*

Table 6.8-1. Invasive Species of Concern in the Inland Waterways/Mississippi Region		
Mammal	Nutria	*Myocastor Coypus*

Source: Mississippi Interstate Cooperative Resource Association 2003.

Threatened and Endangered Species

The Inland Waterways/Mississippi region conceptual Marine Highway services have the potential to affect populations and habitats of federally protected species as a result of its location along migratory pathways of bird and aquatic species. Federally threatened or endangered aquatic species that may occur in the waters of the Mississippi River are listed in Table 6.8-2.

Table 6.8-2. Federally Protected Aquatic Species Occurring in the Inland Waterways/Mississippi Region

Common Name	Scientific Name	Threatened or Endangered
Invertebrates		
Alabama heelsplitter	*Potamilus inflatus*	Threatened
Birdwing pearlymussel	*Conradilla caelata*	Endangered
Cracking pearlymussel	*Hemistena lata*	Endangered
Cumberland bean	*Villosa trabalis*	Endangered
Cumberland elktoe	*Alasmidonta atropurpurea*	Endangered
Cumberlandian combshell	*Epioblasma brevidens*	Endangered
Dromedary pearlymussel	*Dromus dromas*	Endangered
Fat pocketbook	*Potamilus capax*	Endangered
Flat pigtoe	*Pleurobema marshalli*	Endangered
Green blossom	*Epioblasma torulosa gubernaculum*	Endangered
Higgins eye pearlymussel	*Lampsilis higginsii*	Endangered
Iowa Pleistocene snail	*Discus macclintocki*	Endangered
Orangefoot pimpleback	*Plethobasus cooperianus*	Endangered
Oyster mussel	*Epioblasma capsaeformis*	Endangered
Pink mucket (pearlymussel)	*Lampsilis abrupta*	Endangered
Purple cat's paw	*Epioblasma obliquata obliquata*	Endangered
Ring pink	*Obovaria retusa*	Endangered
Rough rabbitsfoot	*Quadrula cylindrica strigillata*	Endangered
Royal marstonia	*Pyrgulopsis ogmorhaphe*	Endangered
Scaleshell mussel	*Leptodea leptodon*	Endangered
Sheepnose	*Plethobasus cyphyus*	Endangered
Snuffbox mussel	*Epioblasma triquetra*	Endangered
Southern acornshell	*E. othcaloogensis*	Endangered
Spectaclecase	*Cumberlandia monodonta*	Endangered
Stirrupshell	*Quadrula stapes*	Endangered
Tan riffleshell	*Epioblasma florentina walkeri*	Endangered
Turgid blossom	*Epioblasma turgidula*	Endangered
Upland combshell	*E. metastriata*	Endangered
White wartyback	*Plethobasus cicatricosus*	Endangered
Winged mapleleaf	*Quadrula fragosa*	Endangered
Yellow blossom	*Epioblasma florentina florentina*	Endangered
Fish		
Bayou darter	*Etheostoma rubrum*	Threatened
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened
Pallid sturgeon	*Scaphirhynchus albus*	Endangered
Pygmy madtom	*Noturus stanauli*	Endangered

Table 6.8-2. Federally Protected Aquatic Species Occurring in the Inland Waterways/Mississippi Region

Common Name	Scientific Name	Threatened or Endangered
Relict darter	*Etheostoma chienense*	Endangered
Smoky madtom	*Noturus baileyi*	Endangered
Reptiles		
American alligator	*Alligator mississippiensis*	Threatened
Green sea turtle	*Chelonia mydas*	Threatened/Endangered (FL)
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened
Ringed map turtle	*Graptemys oculifera*	Threatened
Mammals		
West Indian Manatee	*Trichechus manatus*	Endangered

Source: USFWS 2012c.

Federally protected species that may occur in the vicinity of the Port of New Orleans, LA include brown pelican (*Pelecanus occidentalis*, endangered), pallid sturgeon (*Scaphirhynchus albus*, endangered), West Indian manatee (*Trichechus manatus*, endangered), and Gulf sturgeon (*Acipenser oxyrhynchus desotoi*, threatened). The green (threatened); hawksbill (*Eretmochelys imbricate*, endangered); Kemp's ridley (*Lepidochelys kempii*, endangered), leatherback (endangered), and loggerhead (threatened) sea turtles and the finback (endangered); sei (endangered), blue (endangered), and sperm (endangered) whales might occur in the vicinity of the port area (USACE 2009b).

Critical Habitat

No ESA designated critical habitat was identified along the Mississippi, although several important habitat areas and refuges occur along its length.

6.8.2 Environmental Consequences

6.8.2.1 Proposed Action

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to vegetation or wildlife within the Inland Waterways/Mississippi region. Likewise, the presence of SAV within established shipping corridors is also unlikely; therefore, the use of these existing corridors by the conceptual Marine Highway services would not be expected to impact SAV.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would be expected to have minimal impacts to migratory birds on the Mississippi River and in the port pair cities. The existing shipping routes and port areas already support a high level of shipping activity and are heavily developed; therefore, no loss of habitat is anticipated from the nominal increase in vessel trips. Additionally, any

impacts would be minimized through compliance with existing Federal, State, and port specific regulations promulgated to protect biological resources.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any migratory bird species habitat in the project area that may be affected by future projects and to identify potential mitigation measures, if necessary, to ensure compliance with the MBTA.

Fish

The port pair selected for the Inland Waterways/Mississippi region contains EFH in New Orleans, LA, whereas the port area in Peoria, IL does not. The Proposed Action would have no effect on EFH or fish species managed under the MSA in the port areas or along Marine Highway Corridors where they occur, nor would there be any effect on commercially important fish species in the region. Because existing ports and Marine Highway Corridors would be utilized, no loss of aquatic habitat is anticipated as a result of the Proposed Action. The increased noise associated with the nominal increase in vessel trips would be minimal and would not be expected to adversely impact EFH or fish species. Additionally, fish are very motile and would avoid the area of noise if loud enough to cause annoyance.

Indirect impacts that may potentially result from collisions and accidental spills have the potential to affect EFH. Human errors in design, fabrication and operation are the cause of most, if not all serious accidents. Ship collisions would be minimized through adherence with the COLREGs. These regulations state the means that an oceangoing vessel must undertake to avoid a ship collision, such as keeping watch and maintaining reasonable speeds. In order to prevent a ship collision, COLGREGs requires that vessels have a watch during all hours of the day. Under COLREGs, ships are also required to carry certain navigation lights to help pilots and crew members carry out watches. Depending on the length of the vessel, the masthead light, sidelights, towing light, and all around lights must be visible from distances of between one and six miles. Vessels are also required to adhere to specific regulations regarding right-of-way and traffic separation schemes. Adherence to COLREGs would minimize the potential for ship collisions and subsequent indirect impacts to EFH and important fish species. Furthermore, any accidental spills resulting from ship collisions would be responded to and contained as quickly as possible to reduce impacts to the surrounding environment. Therefore impacts to EFH resulting from the operation of the conceptual Marine Highway services within the Inland Waterways/Mississippi region would not be significant.

Marine Mammals

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region are anticipated to have minimal impacts to marine mammals and would not be expected to result in takes or harassment as defined by the MMPA. Impacts to marine mammals would also be minimized through coordination with the various Federal and State agencies, as needed, and compliance with existing regulations promulgated to protect biological resources and prevent the release of pollutants to the environment.

For future site-specific projects developed as part of the Program, consultation may be required with NMFS and USFWS. In addition, analysis of noise impacts on marine mammals as well as an analysis of

ship strike potential may be required to determine impacts to marine mammal species and to identify minimization and mitigation measures, if necessary.

Invasive Species

The Proposed Action would not be expected to result in invasive species impacts. The nominal increase in vessel traffic with operation of the conceptual Marine Highway services, as identified for the West Coast region, in conjunction with compliance with the USCG Final Ballast Water Rule and the EPA draft VGP would result in minimal potential for the introduction of invasive species.

The USCG and the EPA have Federal oversight of ballast water management through the Final Ballast Water Rule and the draft VGP, respectively. However, states may adopt or enforce more stringent control measures over aquatic nuisance species (Maryland Sea Grant 2010).

Impacts from invasive species would be minimized through compliance with the USCG Final Ballast Water Rule and the EPA draft VGP. The USCG Final Ballast Water Rule was issued in 2012 and is described in Section 4.8.2.1 *Invasive Species*. Compliance with port-specific ballast water management plans and rules would further reduce potential impacts.

Threatened and Endangered Species

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi Marine Highway region would be expected to have no effect on, or may affect but would not be likely to adversely affect, threatened and endangered species.

Coordination with Federal and State environmental regulatory agencies may be required for future site-specific projects under a project-based NEPA analysis to identify any protected species that may be affected by a project and to identify potential mitigation measures, if necessary.

Critical Habitat

No ESA designated critical habitat exists along the Mississippi River. Therefore, there would be no impacts to critical habitat if the conceptual Marine Highway services were implemented under the Proposed Action.

6.8.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region would not be implemented. The No Action Alternative would not result in impacts to vegetation and wildlife, migratory birds, EFH, marine mammals, invasive species, threatened and endangered species, or critical habitat.

6.9 Geological Resources

6.9.1 Affected Environment

Geology and soils are site-specific resources and their presence and composition would vary widely across the Marine Highway Corridor and at various port locations to the point where they cannot be

described at a regional level. If necessary, site-specific conditions would be discussed in project-based NEPA documentation. The only geologic resource that can accurately be described at a regional level is the physiographic divisions. The USGS divides the North American continent into eight physiographic divisions based on terrain texture, rock type, and geologic structure and history. Two physiographic divisions, the Atlantic Plain (Coastal Plain province, Mississippi Alluvial Plain section) and the Interior Plains (Central Lowland province, Till Plain and Wisconsin Driftless sections) comprise the Inland Waterways/Mississippi Marine Highway Corridor.

The Mississippi Alluvial Plain section of the Atlantic Plain province encompasses 550 miles of the Mississippi River alluvial floodplain extending southward from southern Illinois to the Mississippi River delta at the mouth of the river at the Gulf of Mexico. The floodplain ranges between 50 to 100 miles wide and has a very gentle southward slope that averages less than one ft per mile over its entire length. This section is bordered along much of its length, especially in the north, by prominent bluffs that in some places rise 250 ft above the river but generally decrease in height to the south.

The Mississippi Alluvial Plain contains the New Madrid seismic zone, which is the most active seismic zone east of the Rocky Mountains. The surface expression of the seismic zone is more than 120 miles long and extends from southeastern Illinois southwest to near Marked Tree, AR. Much of the seismic zone straddles the Mississippi River along the Tennessee-Arkansas border. Very small earthquakes occur almost weekly in the zone, and more than 3,000 earthquakes have been recorded since 1974, although all have had magnitudes less than 5.0.

The Central Lowlands province covers 585,000 sq mi and is the largest province in the conterminous U.S. It extends from central New York, east of Lake Ontario, westward to western North Dakota and stretches southward as far as central Texas. The province also extends far into Canada. Two of the main distinguishing characteristics of the Central Lowlands are relatively low elevation and low relief throughout most of the province. The province ranges between 300 and 2,000 ft in elevation with relief that barely exceeds 600 ft. The basement rocks in this province are primarily sandstone, shale, limestone and conglomerate covered with a relatively thin layer of sedimentary strata.

The Till Plains are covered with older glacial deposits and does not contain topographic hummocks. The Driftless section has not been significantly glaciated although some portions are covered with deeply weathered till, indicating glaciation. This region is slightly more rugged than the surrounding area (Henry 2007).

6.9.2 Environmental Consequences

6.9.2.1 Proposed Action

The operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would utilize existing Marine Highway Corridors and port facilities and no upgrades involving construction, dredging, or other activities that would affect geology and soils are anticipated. Therefore, there would be no impacts to geology and soils under the Proposed Action.

6.9.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland

Waterways/Mississippi region would not be implemented. Therefore, the No Action Alternative would not result in impacts to geology and soils.

6.10 Water Resources

6.10.1 Affected Environment

Water Quality

The Mississippi River is divided into two sub-basins: the Upper Mississippi River in the north, and the Lower Mississippi River in the south. The Upper Mississippi River originates in northern Minnesota and flows generally south 1,250 miles to the confluence of the Ohio River. From this point, the Lower Mississippi River flows south approximately 1,000 miles, draining into the Gulf of Mexico.

Historically substantial heavy industry has occurred and remains, along the Mississippi River. Examples of some activities include lead mining and smelting and a plethora of industrial contaminants have been detected within the waters including pesticides, trace metals, bacteria, and chlorinated hydrocarbons (CPRA 2003). CWA regulations for the past 25 years have led to massive improvement in water quality within this region. There are currently relatively healthy fish populations (CPRA 2003). Louisiana Department of Environmental Quality and USGS studies of Mississippi River water quality have analyzed fish tissue for over 100 toxic chemicals and have found that approximately 95% were not detected (CPRA 2003). Pesticides and industrial by-products are generally no longer detected within the water column due to strict CWA regulations; however, they are commonly found precipitated within the bed sediments. Atrazine and Hexachlorobenzene are the only pesticides found in low concentrations within the Mississippi; however, concentrations fall below EPA guidelines for drinking water (CPRA 2003).

Surface waters of the Inland Waterways/Mississippi region include freshwater from the Mississippi, Illinois, Missouri, Ohio, Arkansas, Verdigris, and White Rivers. In addition, the lower portion of the Mississippi River contains brackish water due to tidal influence in the presence of the estuarine environment. The M-55 corridor spans from Chicago down the Illinois River to the Mississippi River and continues down 2,348 miles of freshwater on the Mississippi River from St. Louis to New Orleans where the Mississippi discharges into the Gulf of Mexico's coastal waters. Surface waters on M-70 include waters of the Missouri River from Kansas City to St. Louis, a small portion of the Mississippi River, and the Ohio River connecting from the Mississippi River to Pittsburgh. M-40 includes the McClellan-Kerr Arkansas River System, which includes the Arkansas, Verdigris, and White Rivers. These surface waters span 445 miles from Tulsa, OK to its confluence with the Mississippi River.

One port pair has been selected within the Inland Waterways/Mississippi region: Peoria, IL to New Orleans, LA. Existing water quality within each port varies by city.

The overall status for the water quality of Port of Peoria, IL was not assessed by EPA for aesthetic quality or for secondary contact recreation. It was assessed and listed as good for aquatic life protection and propagation and was listed as impaired for fish consumption and primary contact recreation (EPA 2008c).

According to 2008 reporting for the status of water quality within the New Orleans reach of the Mississippi River, the overall status was good (EPA 2008c). This reach of the Mississippi River is good for

drinking water supply, fish and wildlife propagation, primary contact recreation, and secondary contact recreation (EPA 2008c).

Groundwater

Groundwater beneath the Inland Waterways/Mississippi region varies as the Mississippi River travels through its watershed. Along coastal Louisiana, due to dredging for canals and navigation, saltwater intrusion has become a growing problem within groundwater (CPRA 2003). Saltwater intrusion into freshwater aquifers is a common problem within coastal and inland areas if groundwater is withdrawn faster than it can be recharged. Aquifer types and associated Marine Highway Corridors are presented in Table 6.10-1.

Table 6.10-1. Aquifers

Aquifer Present	Aquifer Type	Associated Corridor Aquifer
Silurian-Devonian Aquifers	Carbonate Rock Aquifer	M-55
Mississippi River Aquifers	Sandstone and Carbonate Rock Aquifers	M-55, M-70
Ozark Plateaus Aquifer system	Carbonate Rock Aquifers	M-55
Mississippi River Valley Alluvial Aquifers	Unconsolidated Sand and Gravel Aquifers	M-55, M-40
Southeastern Coastal Plain aquifer system	Semiconsolidated Sand Aquifers	M-55
Coastal Lowlands Aquifer System	Semi-consolidated Sand Aquifers	M-55

Source: USGS 2012.

Aquifers underlie the local port pair selected for the region. The Silurian-Devonian aquifers underlie the Port of Peoria, IL (USGS 2012). The Coastal Lowlands Aquifer system underlies the Port of New Orleans, LA (USGS 2012).

Wetlands

Wetland loss along the Louisiana coastline where the Mississippi River discharges into the Gulf of Mexico has become a growing problem, with losses of approximately 24 sq mi each year (CPRA 2003). Main reasons for wetland loss include levees that block sediment replenishment in coastal marsh habitat, increases of saltwater intrusion, subsidence, and hurricanes (CPRA 2003).

Floodplains

Port communities may experience some degree of flooding because they are located at low elevations. The Inland Waterways/Mississippi representative port pair has 100- and 500-year floodplains associated with the ports, according to FEMA floodplain mapping (FEMA Map Panels 1705360020B, and 2252030160E) (FEMA 2012).

6.10.2 Environmental Consequences

6.10.2.1 Proposed Action

Water Quality

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would be expected to have minimal

impacts to water quality of the Mississippi River. Marine Highway Corridors are within U.S. territorial waters where Federal regulations prohibit vessels from dumping untreated sewage (NOAA 2008). Any impacts to water quality due to accidental release or vessel collision would be limited to the area of discharge and would be short-term in nature because of rapid dilution and dispersion.

There would not be an increase in vessel-to-vessel collisions or accidental oil spills because current Marine Highway Corridors are wide enough to allow vessels to avoid one another, as concluded by a USCG navigational safety analysis (USCG 2011).

Discharge of bilge and ballast water may include residual oil, lubricants, and fuel. There is also potential for pollutants from marine engines to be released into the water. However, compliance with CWA would eliminate and minimize any occurrences.

At this time there is no current Marine Highway service connecting terminal facilities at the Ports of Peoria, IL and New Orleans, LA. Although, these are major ports with consistent ship traffic, by connecting ports previously not connected there is potential for a nominal increase in ship traffic within these ports. Additional vessel traffic in existing ports may increase the potential for additional concentrated discharges of pollutants within port areas. Adherence to rules and regulations of the various port management plans would further minimize the likelihood of adverse impacts to water quality stemming from accidental releases of pollutants. Impacts to surface waters within port areas would be minimized through adherence to the CWA and the regulations of Annex IV of MARPOL.

Groundwater

Based on the type of services to be implemented under the Proposed Action, a large consumption of groundwater would not be required, nor would they involve activities that would result in contamination of groundwater. Therefore, no impacts to groundwater are expected to occur.

Wetlands

Increased vessel traffic has the potential to increase erosion of sensitive wetland areas from increased wave action produced by ship wakes. However, because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have minimal impacts to wetlands. Potential impacts to wetlands could be minimized by the practice of reducing vessel speeds in areas containing sensitive wetlands.

For future site-specific projects, wetland identification and impact determination may be necessary. In these cases, consultations with USACE and appropriate State agencies would be conducted and the necessary permits obtained.

Floodplains

The ports along the Marine Highway Corridors have existing infrastructure and land use associated with port functions and already have flood control at these locations. It is not likely that there would be any increase in impacts to floodplains as a result of the Proposed Action. In addition, facility development is not part of the Proposed Action; therefore, no impacts to floodplains would occur.

For future site-specific projects, infrastructure improvements are not anticipated. However, if improvements are determined necessary for the ports to accommodate additional services, additional analysis may be necessary under a project-based NEPA document to analyze impacts to floodplains.

6.10.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region would not be implemented. Therefore, there would be no impacts to water resources under the No Action Alternative.

6.11 Cultural Resources

6.11.1 Affected Environment

Archaeological Resources

The location of archaeological resources was not divulged on any online databases of SHPOs in the Inland Waterways/Mississippi region.

Architectural Resources

Four of the ports serviced within the Inland Waterways/Mississippi region (Evansville, IL; St. Louis and Kansas City, MO; and New Orleans, LA) have NRHP-listed architectural resources within the boundaries of the ports themselves. Eight ports have NRHP-listed properties within half a mile of port facilities. These are Chicago and Evansville, IL; St. Louis and Kansas City, MO; Pittsburgh, PA; Cincinnati OH; Fort Smith, AR; and Avondale, LA (NPS 2012). Three of the ports in Illinois, Mississippi, and Louisiana have inventoried properties with undetermined NRHP eligibility status (Joliet, IL; Vicksburg, MS; and Baton Rouge, LA) (Illinois Preservation Agency 2012; Louisiana Department of Culture, Recreation, and Tourism 2012; Mississippi Department of Archives and History 2012). Online SHPO databases for the other states in the Inland Waterways/Mississippi region were not available or accessible.

NRHP properties have been identified within only one of the ports in the representative port pairs for the Inland Waterways/Mississippi region. NRHP-listed architectural resources are within the boundaries of the Port of New Orleans. No NRHP properties were identified in or near the Port of Peoria.

6.11.2 Environmental Consequences

6.11.2.1 Proposed Action

There is currently no regular maritime containerized trade between the ports of Peoria, IL and New Orleans, LA. As such, effects as a result of the Program are more likely. However, dredging and landside infrastructure improvements are not a planned aspect of the Proposed Action and are not included in this analysis. Therefore, the range of effects to NRHP-listed or eligible cultural resources by the Proposed Action within the Inland Waterways/Mississippi region is similar to those described for the West Coast region in Section 4.11.2. Effects to NRHP-listed or eligible cultural resources would be evaluated in a project-based NEPA document for a Marine Highway Project proposed under the Program.

No known archaeological sites were identified at or near the representative port pair locations. No construction, demolition, or other activities that would require ground disturbance are currently

proposed at the port pair locations in the Inland Waterways/Mississippi region. Therefore, there would be no impacts to archaeological resources resulting from the proposed conceptual Marine Highway service at the representative port pair in the Inland Waterways/Mississippi region.

No construction, renovations, or demolition is proposed for the representative port pair in the Inland Waterways/Mississippi region at this time. Therefore, there would be no direct effects to NRHP-listed or eligible cultural resources.

Indirect effects to a NRHP-listed or eligible property could occur when visual, audible, or atmospheric elements that are out of character with the resource alter its setting or characteristics that qualify it for listing on the NRHP. The introduction of ATB traffic between the representative port pairs in this region could result in an increase in noise levels from increased marine vessel traffic. However, as described in Section 6.1.2, noise impacts associated with the Proposed Action are not anticipated to be significant.

6.11.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Inland Waterways/Mississippi region would not be implemented. The No Action Alternative would not result in impacts to cultural resources.

6.12 Hazardous Materials and Waste

6.12.1 Affected Environment

Hazardous materials and wastes may be used and generated during the routine operation and maintenance of marine vessels in port areas. These substances may also be transported as cargo and, as such, may be present anywhere along Marine Highway Corridors.

<u>Hazardous Materials Management</u>

Large commercial vessels routinely discharge ballast water, gray and black water, bilge water, and deck runoff consistent with applicable international and national standards. Discharges of sewage (also known as black water) and gray water, which is the effluent generated from wash basins and showers on board ships, are regulated under MARPOL Annex IV. Discharges of black water are prohibited except for specific conditions stipulated under the Annex. In addition to the international standards established under MARPOL Annex IV, the U.S. regulates vessel discharges of gray water, bilge water, and a variety of other vessel discharges through the EPA's VGP (EPA 2008a).

Accidental spills of oil and fuel can also cause significant damage to the environment and extensive standards have been put in place to prevent such accidents and to respond to such incidents when they do occur. Regulations for the prevention of oil pollution are set out in Annex I to MARPOL as well as the CWA.

Some specialized hull coatings that serve to prevent organisms from attaching to a ship's hull also release substances that may be considered to be vessel discharges. All ocean-going commercial vessels utilize hull coatings designed to minimize resistance to movement through the water and the attachment of both soft and hard-shell organisms. These coatings are often referred to as "antifouling" coatings.

Antifouling coatings work by different methods. Some coatings make the hull surface slick, which causes fouling organisms to fall off once the vessel reaches a specific operating speed. Other compounds provide a controlled release of biocides to prevent the attachment of organisms such as barnacles and slime. Standards for the manufacture and use of these biocidal products are established through the CWA. In addition, the International Convention for the Control of Harmful Anti-fouling Systems on Ships (often referred to as the AFS Treaty) prohibits the use of organotins as an active antifouling agent and sets forth a structure for international restrictions on other antifouling compounds deemed to be harmful to the marine environment. The AFS Treaty eliminated the use of TBT on ships in 2008 due its persistence in the marine environment and its effect on non-target species.

Hazardous Waste Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway service activities generates small quantities of hazardous wastes. These wastes include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries.

6.12.2 Environmental Consequences

6.12.2.1 Proposed Action

Hazardous Materials Management

Operation and maintenance of vessels, trains, trucks, cranes and forklifts used for Marine Highway activities would involve the use of small quantities of hazardous materials (e.g., fuel, oil, solvents, hydraulic fluid, antifreeze, lubricants, and/or paints) and generation of hazardous wastes. Any differences in the quantities of hazardous materials used over current baseline conditions are anticipated to be negligible and would not be significant. Appropriate procedures for the handling, storage, and transport of hazardous materials would be implemented at each port location and during transport, in accordance with RCRA, all applicable DOT, EPA, OSHA, and Nuclear Regulatory Commission regulations, and other applicable State and local regulations.

Accidental releases of hazardous materials would be reduced or eliminated through compliance with EPA and DOT procedures and through the development and implementation of a SPCC Plan. Both the port facility and the vessel would be responsible for preparing their own spill plans and ensuring their personnel are adequately trained in spill response procedures.

Fuels, such as diesel, needed to power vessels and port machinery would be stored in accordance with EPA regulations and site-specific BMPs for their handling, storage and use, and would include regularly monitoring and inspecting tanks for leaks. A SPCC Plan would also be prepared by the port, as well as the vessel owner/operator, in the event of an accidental release of fuel.

Impacts from antifouling paints are not anticipated to be significant. The hull coating in most general use is biocidal antifouling paint, which leaches copper and a number of other biocides into the water in order to kill off fouling organisms that attach to the ship bottom. These paints gradually release the toxic substances into the water over a period of three to five years, after which time they become depleted and need to be replaced (EPA 1999). The slow release nature of the coating coupled with the transient nature of the vessels would not result in a significant impact to the environment.

Hazardous or toxic materials would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks.

Hazardous Waste Management

All hazardous wastes associated with the Program would be managed and disposed of in accordance with all applicable DOT, EPA, and OSHA regulations. Appropriate procedures for the handling, storage, transport and disposal of hazardous wastes would be identified in site-specific Hazardous Waste Management Plans implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, and OSHA regulations, and other applicable State and local regulations. Compliance with applicable regulations, plans, policies and procedures would minimize potential impacts to hazardous wastes and hazardous waste management and impacts would not be significant.

6.12.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The implementation of conceptual Marine Highway services as identified for the Inland Waterways/Mississippi region would not occur. No impacts associated with hazardous materials or waste management would occur under the No Action Alternative.

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7.0 GULF COAST

This chapter describes the existing environmental conditions in and around the Marine Highway Corridors within the Gulf Coast region for resources potentially affected by implementation of the Proposed Action as described in Chapter 2. In addition, this chapter identifies and evaluates the potential impacts of implementing the Proposed Action.

Two port pairs have been selected within the Gulf Coast region: Brownsville, TX to Port Manatee, FL and Fulton, MS (Port of Itawamba) to Mobile, AL. The Port of Brownsville has direct access to the Gulf of Mexico via a 17 mile canal. It has the capability to handle multiple cargo types including dry bulk, liquid bulk, and general cargo. Port Manatee is a seaport in Tampa Bay that can accommodate Panamax vessels. The port handles containers, dry bulk, break bulk, general purpose cargo, RORO, and heavy-lift cargo.

The Port of Itawamba in Fulton, MS is a river port on the Tenn-Tom Waterway. It has the capability to handle multiple cargo types including containers, break bulk, dry bulk, general cargo, and RORO. The Port of Mobile is a large deepwater port located on Mobile Bay at the mouth of the Gulf of Mexico. It is a multicargo port, with the capability to handle containers, dry bulk, break bulk, lumber, and general project cargo.

A container-on-barge service was operated into and out of the Port of Itawamba from 2008 to January 2011. At this time, there is no existing regular maritime containerized trade between Port Manatee, FL and Brownsville, TX nor is there service along the Tenn-Tom Waterway between the ports of Itawamba, MS and Mobile, AL. The following analyses incorporate this information into its assumptions whenever applicable.

7.1 Noise

7.1.1 Affected Environment

<u>Land Based Noise</u>

The Port of Mobile is located in highly developed industrialized area and is assumed to have noise levels similar to other industrial areas. The principal noise sources are ships, cranes, fork lifts, trucks/trains, and container handling equipment (Khoo and Nguyen 2011). Port Manatee, FL and the ports of Brownsville, TX, and Fulton, MS are smaller and less industrialized ports. Nonetheless, Port Manatee is one of Florida's larger ports and it is the closest U.S. deepwater port to the Panama Canal, handling approximately 9 million tons of cargo each year. Port Manatee's railroad operates 24 hours a day (Manatee County Port Authority 2012). Because of the high level of activity at this port, it is assumed to generate noise levels similar to those assumed for the Port of Mobile, with the principal noise sources being from marine vessels, cranes, fork lifts, trucks/trains, and container handling equipment.

The Port of Brownsville provides the services to facilitate the international movement of goods between Mexico and the U.S. The Port of Brownsville is a major center of industrial development and hosts over 230 companies (Port of Brownsville 2012). Because of the high level of activity at this port, it is also assumed to generate noise levels similar to those assumed for the Port of Mobile, with the principal

noise sources being from marine vessels, cranes, fork lifts, trucks/trains, and container handling equipment.

The Port of Itawamba in Fulton, MS is smaller and less industrialized than the other ports; however, the port contains a rail spur, 60-ton bridge crane, wireless inventory warehousing system, and an additional hard-surface storage area. Port operations at this location would generate noise, but to a lesser degree than the other identified ports. The more rural nature of the surrounding area would render it more sensitive to noise impacts.

Marine Noise along Shipping Routes

Marine noise in the Gulf of Mexico is the result of both natural and human activities. Natural sources or marine noise include: wind and waves, precipitation (rain and storm events), geologic processes (earthquakes and volcanoes), and marine fauna (echolocation and vocalization). Human induced marine noise is generated primarily by transportation (surface vessels and aircraft), dredging, construction, geological exploration and extraction, seismic surveys and sonar (military and research) (National Science Foundation 2011).

Similar to land based noise in the corridor, noise measurements are not available along specific Marine Highway Corridors within the Gulf Coast region. Table 4.1-1 in Section 4.4-1 presents ambient aquatic noise levels measured in similarly developed marine port areas. Similar ambient aquatic noise levels are assumed for the proposed project port areas.

7.1.2 Environmental Consequences

7.1.2.1 Proposed Action

Land Based Noise

No project-based baseline noise metrics have been collected in association with the identified conceptual Marine Highway services. Therefore, potential noise impacts evaluated herein are qualitative in nature and based on the activities normally associated with large shipping ports.

Land based noise impacts attributable to the Proposed Action would result from increases in the amount of vessels using the port facilities and the increased use of cranes and other machinery used to load and unload cargo. Using the parameters and assumptions presented in Section 2.0 and Table 2.1-8, the anticipated weekly increases in vessel trips in each port is summarized in Table 7.1-1.

Table 7.1-1. Anticipated Weekly Increases in Vessel Trips in Port Areas

Port	Number of Vessel Trips
Brownsville, TX	1 (ATB)
Port Manatee, FL	1 (ATB)
Fulton, MS	2 (Inland Towboat/barges)
Mobile, AL	2 (Inland Towboat/barges)

The increase in cargo load at the ports may result in increased noise at the ports currently impacted by port-associated noise. Any increases in ambient noise levels would be associated with typical operational noise would occur during similar timeframes as existing noise. Because the increase in new

vessel trips and operation of equipment would be minor compared with existing levels at the ports, the associated increase in noise would be minor. Therefore, land based noise impacts associated with the Proposed Action are not anticipated to be significant.

Marine Noise along Shipping Routes

The operation of the conceptual Marine Highway services within the Gulf Coast region would be expected to result in a small increase in vessel traffic along the nearshore area of the Gulf of Mexico by an estimated one to two vessel trips per week (refer to Table 7.1-1). Further, these vessels would be expected to be smaller and quieter than the vessels already in operation along the coast, and therefore the operation of these vessels would not be expected to result in noise increases above *de minimis* levels. The noise produced by these vessels is dependent on the size of the vessel and the rate of speed as well as specific design characteristics (e.g., engine size, propeller placement) (NOAA 2004a). Underwater noise from commercial ships is generated during normal operation, most notably from propeller cavitation (when air spaces created by the motion of propellers collapse) (McKenna et al. 2012). Incorporating noise reduction measures into ship design and operation, such as reducing engine size and vessel speed and placement of propellers lower in the water, may mitigate the impact of minor increases in noise from Marine Highway vessel trips.

Vessel traffic associated with Marine Highway Corridors on the Gulf Coast would occur at such a distance from the shoreline as to make the noise impacts negligible to humans and wildlife in shoreline communities and natural and recreational areas.

As site-specific projects are further developed for the Program, project-based noise analyses may need to be conducted to quantify noise impacts to the marine environment.

7.1.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Therefore, there would be no noise impacts under the No Action Alternative.

7.2 Air Quality

7.2.1 Affected Environment

Air quality within the Gulf Coast region is highly variable, ranging from very good to deteriorated, with the more deteriorated air quality found in the area around Houston and Galveston. The regions around Baton Rouge, LA and Birmingham, AL also have deteriorated air quality. Table 7.2-1 summarizes the air quality in the regions surrounding ports in the Gulf Coast region.

Emissions influencing air quality in the Gulf of Mexico region originate from a variety of man-made, biological, and geological sources. These sources originate from both landside and offshore areas. The coastal areas of the Gulf of Mexico include large urban areas (Houston and Galveston, TX); several mid-size urban areas (New Orleans, LA); as well as a number of smaller cities (Tallahassee, FL). Oil and gas development activities are located in coastal State waters of Texas, Louisiana, Mississippi, and Alabama. Commercial shipping, recreational boating, fishing, military, and other activities occur offshore throughout the region.

Table 7.2-1. Status of Compliance with NAAQS for Port Areas Included in the Gulf Coast Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-10 Marine Corridor								
Tampa/Port Manatee, FL					◊			✓
Pensacola, FL								✓
Pascagoula, MS								✓
Mobile, AL								✓
New Orleans, LA								✓
St. Bernard Terminal, LA								✓
Morgan City, LA								✓
Lake Charles, LA								✓
Freeport, TX	•							
Galveston, TX	•							
Houston, TX	•							
Brownsville, TX								✓
M-49 Marine Corridor								
Morgan City, LA								✓
Krotz Springs, LA								✓
Shreveport, LA								✓
New Orleans, LA								✓
Greater Baton Rouge, LA	▫							
M-65 Marine Corridor								
Mobile, AL								✓
Lowndes County, MS								✓
Itawamba County, MS								✓
Yellow Creek State Inland								✓
Birmingham, AL	▫						•	

Source: 40 CFR 81.

Notes: •denotes nonattainment designation. For $PM_{2.5}$, nonattainment can be for annual standard, 24-hour standard, or both.
▫denotes maintenance area. Maintenance areas have been nonattainment at one time, achieved attainment, and now must follow approved plans to ensure continued attainment.
◊ denotes nonattainment for 2008 Pb standard.
✓denotes an area that is, and always has been, in attainment for all criteria pollutants.

Emissions generated in coastal onshore areas are primarily the result of population-based sources. Mobile, area, and nonroad emission sources contribute NO_x, VOCs, SO_2, CO, and $PM_{2.5}$ to the atmosphere. Transportation-related sources are the dominant contributor of onshore emissions in the major metropolitan areas, at the coastal ports, and along the Interstate highway system (I-10, I-12, I-45, I-55, and I-59) along the Gulf Coast. Other important land based emission sources along the Gulf Coast include industrial point sources (e.g., petrochemical and gas production) and power generation. These and other industries situated across the coastal region contribute O_3 and particulate matter precursors that influence the air quality of both the onshore and offshore areas of the Gulf of Mexico.

Emission sources generated in the offshore areas of the Gulf of Mexico are generated by commercial marine vessels, shipping, recreational boating, military, and fishing operations. Minor amounts of VOC emissions are also generated from biological and geological sources (e.g., bacterial processes, mud volcanoes, and crude oil seeps) (Douglas et al. 2009).

The states in the Gulf Coast region have SIPs and there may also be applicable TIPs, developed to achieve or maintain attainment levels for various criteria pollutants. Any project proposed under the Program would need to address state-specific requirements included under these implementation plans. In addition, Houston has its own regulations for air quality management and its own regulatory agency. Any proposed project under the Program would need to account for such local requirements in project-based NEPA documentation.

All states in the Gulf Coast region, as well as many localities, have specific requirements for permitting of air emissions sources. Permitting requirements for construction and operation stationary of sources may need to be addressed in a project-based NEPA document. Additionally, construction activities, including building a road or preparing land to erect a tower, may require a permit. This would depend on the site location and its air quality, as the activity may increase PM_{10} through ground disturbance. In most cases, a permit may not be required for temporary, small-scale construction measures.

Mobile sources include vehicles that operate on roads and highways ("on-road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earth-moving equipment, lawn and garden power tools, marine vessels, railroad locomotives, and airplanes. All of the various forms of transportation used to haul freight and transport cargo are mobile sources that can contribute substantially to air pollution.

Some of the ports in Region 4 are the busiest in the U.S., based on the throughput of cargo. Houston ranks eighth in the nation in throughput with over 1.3 million TEUs. In Region 4, the port of Jacksonville ranks second (and 13th nationally) with 0.7 million TEUs (USACE 2010a).

Although a significant portion of the freight in the Gulf Coast region is hauled by marine vessels and barges, the bulk of the freight hauled in the Gulf Coast region of the U.S. is transported by truck. The primary Interstate routes in Region 4 include the east to west I-10 and the north to south I-75, I-65, and I-49. Highway 77 is the primary highway along the Gulf Coast in Texas, running from Houston to Brownsville. Information from FHWA databases show that approximately 108 million tons were hauled by trucks in this region in 2007. Freight carried by ship or barge accounted for approximately 81 million tons.

The data used in this document for the volumes and the monetary values of the cargos hauled by truck were derived from the FAF3 program. FAF3 is a FHWA funded and managed data and analysis program that provides estimates of the total volumes of freight moved into, out of, and within the U.S., between individual states, major metropolitan areas, sub-State regions, and major international gateways.

For purposes of this study, the Gulf Coast region was subdivided into three market areas: I-10/I-75, I-49/Highway 90, and I-65. These three market areas correspond to the three Marine Highway Corridors in Region 4 and have been used to determine and present general data on the volume and value of the

commodities hauled through the Gulf Coast region by truck. Table 7.2-2 presents the FAF3 data for truck hauling of freight in the three Gulf Coast region market areas.

Table 7.2-2. Bulk Commodity Data for Freight Hauled by Truck in the Gulf Coast Region, FAF3 2007 Data

Market Area	Hauled by Truck in Ton Miles	
	West/South Bound	East/North Bound
	Truck	Truck
I-10/I-75	9,568,000,000	7,754,500,000
I-49/Hwy 90	1,329,980,000	1,073,560,000
I-65	709,120,000	948,220,000
Total	**11,607,100,000**	**9,776,280,000**

7.2.2 Environmental Consequences

7.2.2.1 Proposed Action

The Proposed Action would shift land-based, long haul truck freight movements to Marine Highway services. Additional information would be needed to fully assess the impacts of these changes to air quality. The assessment of air quality impacts for site-specific projects in criteria pollutant nonattainment areas would require additional emissions analysis under the CAA General Conformity regulations. As indicated in Section 3.2.6, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping and hauling by heavy-duty truck. These calculations only include emissions associated with the actual movement of cargo from the specified origin to the specified destination and do not take into account truck idling or the operation of auxiliary engines used by marine vessels when at berth. Details on the resources used and the methodology for estimating emissions can be found with the calculations in Appendix B.

Tables 7.2-3 and 7.2-4 present the comparisons of moving cargo using ATBs and towboats versus trucks. Specific information on the distances, load capacities, and trip frequencies can be found in Appendix B. All trucks were assumed to be heavy-duty diesel trucks in the 33,000 pounds or greater vehicle class. The data tables below demonstrate that freight movement by ATBs would result in a decrease in NO_x and CO emissions as compared to truck transport for the Brownsville, TX to Port Manatee, FL port pair with the remaining pollutant emissions being similar for both transport types. The area along the Texas coast from Freeport to Houston is in nonattainment for O_3. As NO_x are O_3 precursors, the decrease in VOC and NO_x emissions through use of ATBs for shipping could aid in reducing regional pollution. Freight movement by ATBs or truck would generate similar emission quantities for the Fulton, MS to Mobile, AL port pair.

The primary factor with a potential to mitigate air emissions generated by ATBs and towboat/barge combinations in the Gulf Coast region is surface route congestion. As previously discussed, congestion was not factored in to the general set of calculations for this PEA; however, congestion is a major contributor to air emissions in the Gulf Coast region, particularly in the Houston and New Orleans areas. Any site-specific projects proposed for this region would need to account for traffic congestion when modeling air emissions.

7.2.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. There would be no operation of the conceptual Marine Highway services as identified for the Gulf Coast region. Therefore, air quality in the Gulf Coast region would not be impacted, either beneficially or negatively, from the implementation of the conceptual Marine Highway services. There would be no air quality impacts under the No Action Alternative.

Table 7.2-3. Gulf Coast Region Annual Emissions in Total Tons by Transport Type						
Gulf Coast Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Brownsville, TX to Port Manatee, FL via Mobile, AL	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**
ATB	22.48	351.29	52.45	0.05	16.86	15.51
Truck[1]	16.43	389.66	86.88	0.19	16.25	15.75
Fulton, MS to Mobile, AL						
Towboat/Barge	0.97	53.56	14.45	0.01	2.31	2.13
Truck[2]	2.25	53.46	11.92	0.03	2.23	2.16

Notes: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.
[2] Comparison of moving cargo using trucks versus towboats, based on volume and frequency of cargo movement.

Table 7.2-4. Gulf Coast Region Single Trip Emissions per TEU by Transport Type						
Gulf Coast Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Brownsville, TX to Port Manatee, FL via Mobile, AL	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**
ATB	0.00072	0.01265	0.00168	0.00000	0.00054	0.00050
Truck[1]	0.00053	0.01249	0.00278	0.00001	0.00052	0.00050
Fulton, MS to Mobile, AL						
Towboat/Barge	0.00005	0.00289	0.00069	0.00000	0.00011	0.00010
Truck[2]	0.00011	0.00257	0.00057	0.00000	0.00011	0.00010

Notes: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.
[2] Comparison of moving cargo using trucks versus towboats, based on volume and frequency of cargo movement.

7.3 Land Use (Including Section 4(f) Properties and Coastal Zone Management)

7.3.1 Affected Environment

Land Use (Including Section 4(f) Properties)

Eleven of the 19 ports serviced by the Proposed Action in the Gulf Coast region are located in urban areas and the other eight are in either rural or suburban settings. Six ports are located in suburban settings. These ports include Pascagoula and Yellow Creek State Inland, MS; Freeport, Krotz Springs, and Lake Charles, LA; Brownsville, TX; and Paducah, KY. Ports located in rural settings include Port Manatee, FL and the Port of Itawamba, in Fulton, MS. Ports within suburban or rural settings are generally located along rivers as opposed to oceans and near smaller towns as opposed to larger cities.

For the representative port pairs selected for the Gulf Coast region, the Port of Mobile is located in an urban, developed area surrounded by commercial and industrial land uses. The Port of Brownsville is within a suburban setting, surrounded by industrial uses as well as open land. Port Manatee, FL is in a rural, relatively undeveloped area, including an agricultural field, with light industrial in the vicinity. The Port of Itawamba in Fulton, MS is in a rural and relatively undeveloped area.

Seven of the nineteen ports within the Gulf Coast region have NRHP-listed properties within or adjacent to the boundaries of the port (refer to Section 7.11.1). Four of these ports have parks within half a mile. However, the use of a Section 4(f) property, and thus the applicability of Section 4(f), can only be determined after specific sites for Marine Highway Projects are selected.

Several Section 4(f) properties are located within or near two of the ports of the representative port pairs for this region. They include a park and national seashore near the port of Brownsville and a park and NRHP-listed property near the Port of Mobile. No Section 4(f) properties were identified near Port Manatee, FL or the Port of Itawamba.

Coastal Zone Management

Section 6.3.1 includes an in-depth discussion of coastal zone management within the State of Louisiana.

The CZMP for Alabama was accepted by NOAA in 1979 and is administered by two State agencies. The Alabama Department of Conservation and Natural Resources is responsible for fiscal management, public education and outreach, and planning (Alabama Department of Environmental Management 2012). The Alabama Department of Environmental Management is responsible for regulatory functions such as permitting and enforcement. The CZMP draws its authority from the Alabama Coastal Act of 1976 (Act 534). The coastal zone of Alabama extends inland to the 10-ft contour in Mobile and Baldwin Counties. Areas of particular concern within the CZMP are growth-planning, hazard mitigation, and public access. Because the counties along the coast of Alabama have experienced a high rate of growth, the CZMP includes watershed planning, water-quality monitoring, technical training, and Initiatives (e.g., the Alabama-Mississippi Clean Marina Program) (NOAA 2011h).

The CZMP for Florida was accepted by NOAA in 1981 and is administered by the Florida Department of Environmental Protection. Florida is unique in two ways: the entire state is considered a part of the coastal zone and it has coral reefs to consider as a part of its CZMP. Because the coastal zone is the

entire state, it is divided into two tiers. Only counties or cities that border a body of water are eligible for coast zone management funds. Areas of particular concern to the Department of Environmental Protection are public access, stewardship, protection of remarkable coastal places, and revitalization of waterfronts. In terms of the coral reefs, areas of concern are fishing, diving, public awareness, pollution, and impacts from the maritime and coastal construction industries. Florida is a member of the U.S. Coral Reef Task Force (NOAA 2011i).

The CZMP for Mississippi was accepted by NOAA in 1980 and is administered by the Mississippi Department of Marine Resources, Office of Coastal Ecology. The Committee on Marine Resources also governs the CZMP. The CZMP draws its authority from the Coastal Wetlands Protection Act (Mississippi Department of Marine Resources 2012). The Coastal Wetlands Protection Act established the protection of wetlands in their natural state unless the development of wetlands serves a higher public interest. The coastal zone of Mississippi encompasses the three Gulf Coast counties, barrier islands, and coastal waters adjacent to the three counties. Of particular concern to the Office of Coastal Ecology and the Committee on Marine Resources are wetlands preservation, coastal ecosystems, and nonpoint pollution prevention. The Wetlands Permitting Program coordinates the development of wetlands areas through the permitting agencies: Mississippi Department of Marine Resources, Mississippi Department of Environmental Quality, and USACE (NOAA 2011j).

The CZMP for Texas was accepted by NOAA in 1996 and is administered by the Texas General Land Office. It draws its authority from the Coastal Coordination Act (Texas General Land Office 2012). The coastal zone extends up to three marine leagues into the Gulf of Mexico and generally follows the road nearest the coastline on the inland boundary. It also extends up to one mile inland of wetlands near coastal rivers. Areas of particular concern to the General Land Office are increased and improved public access, protection and restoration of wetlands, water quality, coastal hazard response, public education and outreach, and improved information and data availability. Additionally, the General Land Office helps local governments administer permits for use of coastal areas (NOAA 2011k).

EO 13554, *Establishing the Gulf Coast Ecosystem Restoration Task Force* (75 FR 62313), recognized the Gulf Coast as a national treasure and addressed the longstanding ecological decline of that region. Issued after the blowout and explosion of the offshore drilling unit Deepwater Horizon that occurred on April 20, 2010, it established a Gulf Coast Ecosystem Restoration Task Force to coordinate intergovernmental efforts, planning, and the exchange of information in order to better implement Gulf Coast ecosystem restoration and facilitate appropriate accountability and support throughout the restoration process.

Coastal Barrier Resources

Five states located in the Gulf Coast region, Alabama, Texas, Louisiana, Mississippi, and Florida, have coastal barrier resources (USFWS 2012a). Of ports included in the conceptual Marine Highway services in the Gulf Coast region, three, Alabama, Texas, and Florida, have coastal barrier resources.

7.3.2 Environmental Consequences

7.3.2.1 Proposed Action

Establishing the conceptual Marine Highway service between the representative port pairs selected for the Gulf Coast region (Table 2.1-8) would increase the number of TEUs being shipped between the port pair of Brownsville, TX and Port Manatee, FL from 0 to 300 per week, resulting in an increase in ATB and ship traffic between the ports. In addition, the number of TEUs being shipped between the port pair of Fulton, MS and Mobile, AL would increase from 0 to 100, two times per week with the establishment of that conceptual Marine Highway service. Because the Proposed Action would utilize existing ports, these improvements would not be expected to result in land use changes at the port or in the surrounding community. Impacts to land use would not be expected as a result of the conceptual Marine Highway services; however, site-specific projects may be further assessed in project-based NEPA documents.

No impacts to Section 4(f) resources are anticipated with the Marine Highway services at the selected port pairs under the Proposed Action, as no infrastructure improvements are expected. However, should future projects under the Proposed Action identify the need to convert a Section 4(f) property to a non-Section 4(f) use, then a Section 4(f) study would be required.

Because the Proposed Action would utilize existing ports and the Marine Highway Corridors are already used to transport cargo, the Proposed Action is anticipated to be consistent with the CZMPs of Alabama, Florida, Mississippi, and Texas. Therefore, impacts to coastal zone are not anticipated. Impacts to coastal barrier resources are not anticipated because additional land development is not part of the Proposed Action.

7.3.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region representative port pairs would not be implemented. Therefore, there would be no impact to land use, Section 4(f) properties, or the coastal zone.

7.4 Infrastructure and Utilities

7.4.1 Affected Environment

<u>Infrastructure</u>

The Port of Brownsville is at the inland end of a 17 mile canal that links the port to the Gulf of Mexico at the Brazos Santiago Pass. It has the capability to handle multiple cargo types including dry bulk, liquid bulk, and general cargo. Cargo handling facilities include 17 docks encompassing 5,000 ft. There are currently 230 companies doing business at the Port of Brownsville, and they have excess capacity to handle additional cargo and new industries (Port of Brownsville 2012).

Port Manatee has two mobile harbor cranes and several other multi-purpose cranes for handling cargo such as containers, dry bulk, break bulk, general purpose cargo, RORO, and heavy-lift cargo. There are 1.5 miles of berthing space for ocean-going vessels, with plans underway to extend one of its berths by 584 ft and expand the corresponding landside for container yard construction. The port currently

handles approximately nine million tons of cargo each year and is anticipating growth associated with the Panama Canal widening (Port Manatee 2012).

The Port of Itawamba in Fulton, MS has the capability to handle multiple cargo types including containers, break bulk, dry bulk, general cargo, and RORO and is looking to expand its container-on-barge services. Currently, the largest vessel to date docking at the facility is 280 ft (Port of Itawamba 2012).

The Port of Mobile encompasses 4,000 acres and includes 41 berths. In 2011, the port received 1,443 vessel calls to include over 25 million tons of cargo, including 170,000 TEUs (Alabama State Port Authority 2012).

Utilities

Utility services such as potable water supply, wastewater collection, and electrical supply require a network of components. This network includes components such as pipelines, pumps, treatment units, and storage basins for potable water and wastewater systems and components such as transmission lines, substations, transformers, and distribution lines for electrical systems. Water and wastewater services are typically provided by the local municipality, whereas electrical service is typically provided by private companies. Utility providers for the representative port pairs selected for the Gulf Coast region are listed in Table 7.4-1.

Table 7.4-1. Utility Providers for the Representative Port Pairs in the Gulf Coast Region

Port	Potable Water	Wastewater	Electrical Service
Brownsville, TX	Brownsville Public Utilities Board	Brownsville Public Utilities Board	Brownsville Public Utilities Board
Port Manatee, FL	Manatee County Utilities Dept.	Manatee County Utilities Dept.	FL Power and Light
Fulton, MS	NE Itawamba Water	NE Itawamba Water	Tombigbee Electric Power Association
Mobile, AL	Mobile Area Water and Sewer System	Mobile Area Water and Sewer System	AL Power Company

7.4.2 Environmental Consequences

7.4.2.1 Proposed Action

The implementation of the conceptual Marine Highway services for the Gulf Coast region has the potential to increase the number and type of vessel calls and cargo handling requirements at the participating ports, which in turn could potentially impact the existing equipment, infrastructure, and utilities at these ports. The impact is dependent on the available capacity and the increase in demands.

The Ports of Brownsville, Manatee, and Mobile have ample capacity and appropriate existing facilities and equipment to handle any incremental cargo volumes generated by the proposed Marine Highway service. However, the Port of Itawamba has more limited capacity. Because of the nominal increase in vessel trips estimated for the conceptual Marine Highway service, while there may be some impacts to Port of Itawamba infrastructure, the impacts would be expected to be minimal. Therefore, impacts to port infrastructure associated with the Proposed Action at Brownsville, Manatee, Mobile, and Itawamba would not be expected to be significant.

The increases in water demand, wastewater flow, and electrical load associated with two additional vessels per week at the Ports of Mobile and Itawamba and one vessel per week between Brownsville and Port Manatee would be nominal compared to utility requirements associated with the vessels currently received. Therefore, utility impacts associated with the Proposed Action are not anticipated to be significant.

As future site-specific projects are developed, it may be necessary to determine which physical components of the port terminal infrastructure and cargo handling equipment would be impacted and perform the necessary assessments to determine if there is sufficient capacity within all the components to meet the increased cargo handling at the participating ports.

7.4.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified for the Gulf Coast region would not be implemented. Therefore, no impacts to infrastructure and utilities would occur under the No Action Alternative.

7.5 Socioeconomics

7.5.1 Affected Environment

Employment and Income

In the Gulf Coast, ports such as Mobile, AL and Brownsville, TX create approximately 93,000 jobs and 38,000 jobs, respectively for their regions. Smaller ports such as Port Manatee, FL can attribute approximately 12,000 jobs state-wide to the port, which includes 2,400 direct jobs.

The U.S. Bureau of Labor and Statistics keeps statistics on the number of people employed regionally for specific industries. Table 7.5-1 estimates the number of people employed in the Transportation and Warehousing Industry for the past 10 years in the Gulf Coast region by port pair. These numbers are included to provide a general indication of the transportation industry in the regions. Although it is assumed that many of the transportation jobs in the port regions would be either directly or indirectly associated with the port, all jobs are not necessarily attributed to port operations.

Table 7.5-1. Transportation and Warehousing Regional Employment – Gulf Coast Region (in thousands)

Year	Brownsville, TX and Port Manatee, FL	Fulton, MS and Mobile, AL
2002	7.2	18.7
2003	7.1	18.5
2004	7.7	19.0
2005	7.8	19.3
2006	8.3	20.0
2007	8.3	21.0
2008	7.9	21.3
2009	7.5	19.8
2010	7.9	19.1
2011	8.2	19.1

Source: U.S. Bureau of Labor Statistics 2012.

7.5.2 Environmental Consequences

7.5.2.1 Proposed Action

Employment and Income

The methods and assumptions for estimating impacts of the Proposed Actions in this PEA were described in Section 4.5.2. The proposed substitution of the conceptual Marine Highway service for long haul truck service between the Ports of Brownsville, TX and Port Manatee, FL and between the Ports of Itawamba in Fulton, MS and Mobile, AL is estimated to result in the creation of jobs and income associated with the new Marine Highway service and the loss of jobs and income associated with the reduction of long haul (one-way) trucking along these routes. The gains and losses associated with the cargo volumes listed in Table 2.1-8 are estimated in Table 7.5-2.

Table 7.5-2. Economic Impacts of the Marine Highway Service - Gulf Coast Region

	Long Haul Trucking (Losses)	Marine Highway Service (Gains)	Net Impacts
Brownsville, TX to Manatee, FL			
Jobs			
Direct	94	134	40
Induced	100	177	77
Indirect	53	75	22
TOTAL JOBS	**247**	**386**	**139**
Personal Income (1,000)			
Direct	$4,230	$7,956	$3,726
Re-spending/Local Consumption	$9,157	$17,223	$8,066
Indirect	$2,155	$3,073	$918
TOTAL (1,000)	**$15,542**	**$28,252**	**$12,710**
Federal, State, and Local Taxes (1,000)	$4,616	$8,391	$3,775
Fulton, MS to Mobile, AL			
Jobs			
Direct	18	124	106
Induced	19	141	122
Indirect	10	70	60
TOTAL JOBS	**47**	**335**	**288**
Personal Income (1,000)			
Direct	$810	$6,038	$5,228
Re-spending/Local Consumption	$1,753	$13,070	$11,317
Indirect	$413	$2,851	$2,438
TOTAL (1,000)	**$2,976**	**$21,959**	**$18,983**
Federal, State, and Local Taxes (1,000)	$884	$6,522	$5,638

The operation of the conceptual Marine Highway service between the Ports of Brownsville and Manatee is estimated to result in a loss of 94 direct trucking jobs in the long haul sector, and the creation of 134 direct port industry jobs. The majority of the port sector jobs would be with members of the ILA and U.S. merchant mariners onboard the ATB service between Brownsville, Mobile, and Port Manatee.

The operation of the conceptual Marine Highway service between Ports of Itawamba and Mobile is estimated to result in the loss of 18 direct long haul trucking jobs. These 18 direct long haul truck jobs would be replaced by 124 port sector jobs. The Marine Highway service between Fulton and Mobile is estimated to result in a net gain of 106 direct jobs, 121 induced jobs, and 60 indirect jobs, for a total net gain of 288 direct, induced and indirect jobs.

For both port pairs identified for the Gulf Coast region, the impacts of transitioning from the long haul truck service to the Marine Highway service indicate that while there are lost jobs and income, it is estimated that there would be increases in both the overall number of jobs created and personal income. Therefore, there would be no significant employment and income impacts associated with the Proposed Action for the Gulf Coast region.

These findings are based on general formulas used for calculating employment and income. A more in-depth assessment may be required for future site-specific projects in the Gulf Coast region to better define the measureable logistics costs of the proposed Marine Highway services and to further assess the impacts to the logistics supply chains and strategies of the targeted users.

7.5.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region representative port pairs would not be implemented. Therefore, there would be no impact to employment and income under the No Action Alternative.

7.6 Recreation

7.6.1 Affected Environment

Regional

The Gulf Coast region provides a wealth of coastal- and water-dependent recreational opportunities including boating, fishing, hunting, swimming, diving, wildlife viewing, and beach-going. Public access to coastal and inland bodies of water is a vital component of local quality of life and an important draw for tourism.

Recreational activities on the Gulf of Mexico were adversely affected by the April 2010 oil spill disaster. Most areas have recovered, but some areas, particularly beaches, were still experiencing oil pollution into 2012 (NRDC 2012).

The waterways potentially affected by projects in the Gulf Coast region include coastal waters of the Gulf of Mexico, the Gulf Intracoastal Waterway, J. Bennett Johnston Waterway, and the Atchafalaya, Mobile, Tombigbee, and Black Warrior Rivers. Ports would be served in Texas, Louisiana, Mississippi, Alabama, and Florida (refer to Section 2.1, Proposed Action, for additional detail).

Recreational activities, such as boating, fishing, and hunting, are protected and regulated by a number state, regional, and local agencies and jurisdictions.

Port Pairs

The Port of Brownsville, TX, is located at the end of a 17-mile ship channel from the Gulf of Mexico. The coastal and inland waterways support numerous recreational resources including Las Palomas Wildlife Management Area, Boca Chica State Park, Padre Island National Seashore, and the beaches and attractions of South Padre Island. Port Manatee, FL, is located at the entrance to Tampa Bay. Numerous recreational resources and opportunities exist in the Tampa Bay and coastal Gulf of Mexico area, including boating, fishing, swimming, diving, and beach going.

The Port of Itawamba is located in Fulton, MS, on the Tenn-Tom Waterway. The Tenn-Tom Waterway supports many recreational activities, including boating, fishing, swimming, camping, hunting, and wildlife viewing. The Port of Mobile is located on the Mobile River in Mobile Bay near local attractions such as the USS *Alabama* Battleship Memorial Park. Mobile Bay supports numerous recreational resources (Port of Mobile 2012).

7.6.2 Environmental Consequences

7.6.2.1 Proposed Action

Regional

Given that the frequency of the conceptual Marine Highway service between the selected Gulf Coast region port pairs and the vessels intend to utilize existing shipping routes between existing ports, the Proposed Action is not expected to impact recreation opportunities within the Gulf Coast region. However, potential impacts to recreation from future site-specific actions proposed for implementation under the Program may need to be addressed in project-based NEPA documents.

Port Pairs

Freight services operated within the Gulf Coast region beginning in 2008, but due to the lack of cargo from Port Manatee, FL, there is no longer a regular maritime containerized trade between the Port of Brownsville, TX and Port Manatee, FL. The conceptual Marine Highway service as depicted in Table 2.1-8 would be a completely new service along this corridor and between this port pair. However, given the frequency of the conceptual Marine Highway service between the port pair and the vessels that would transit along existing routes between existing ports, negligible environmental impacts are anticipated.

At the time this PEA was written, there is no existing service along the Tenn-Tom Waterway between the Ports of Itawamba, MS and Mobile, AL. The conceptual Marine Highway services as depicted in Table 2.1-8 would be completely new services along this corridor and between these port pairs. However, given the frequency of vessel trips proposed for the conceptual Marine Highway service between the port pairs and that the vessels would transit along existing shipping routes between existing ports, negligible impacts to recreation are anticipated.

7.6.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region representative port pairs would not be implemented. Therefore, there would be no change or impact to recreation under the Proposed Action.

7.7 Traffic and Transportation

7.7.1 Affected Environment

Truck Traffic

Brownsville, TX to Port Manatee, FL

The landside corridor between the Port of Brownsville, TX and Port Manatee, FL is a combination of the north-south corridors along U.S. 77 in Texas and I-75 in Florida and east-west corridors along I-10 and I-12, near the Gulf Coast. The highway distance from Brownsville to Port Manatee is approximately 1,475 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately 23 hours. This corridor accommodates considerable east-west freight and the DOT has identified several major freight truck bottlenecks in and around the urban areas of Houston, TX, New Orleans, LA, and Tampa, FL. These bottlenecks are expected to grow significantly over the next 10 to 15 years.

The Port of Brownsville is served by several collector roads that provide access to Highway U.S. 77 within four miles of the port. Port Manatee is accessed from an arterial road that connects to I-75 and I-275 within three miles of the port.

Fulton, MS to Mobile, AL

The landside corridor between the ports of Fulton, MS and Mobile, AL is a north-south corridor that primarily consists of U.S. Highway 45. The highway distance from Fulton to Mobile is approximately 300 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately 5.5 hours. U.S. 45 is a four-lane road that originates in Mobile, AL and runs north to Lake Superior. The DOT anticipates increases in freight and hazardous material movements north from the Mobile area, which would likely exacerbate the truck congestion currently experienced along this route.

The Port of Itawamba is accessed from a collector road that connects to I-22 and Highway 78. The Port of Mobile is located adjacent to I-10 and I-165 and has direct access to both.

Vessel Traffic

Brownsville, TX to Port Manatee, FL

The Marine Highway Corridor associated with the Port of Brownsville and Port Manatee includes a network of coastal, intracoastal, and inland waterways along the Gulf Coast consisting of the M-10 and M-49 corridors. This route encompasses approximately 1,000 miles. While this route has supported a freight service in the past, currently there is not a regular maritime containerized cargo service operating along this route.

Fulton, MS to Mobile, AL

The Marine Highway Corridor associated with the Ports of Itawamba (Fulton, MS) and Mobile is a combination of the Tenn-Tom Waterway and the Tombigbee River comprising the M-65 corridor. The waterway distance from Fulton, MS to Mobile, AL along this route is approximately 250 miles. Currently, there is no container-on-barge service operating along this route.

7.7.2 Environmental Consequences

7.7.2.1 Proposed Action

The Proposed Action has the potential to reduce traffic congestion along the busy corridors traveled by long haul trucks in the Gulf Coast region. By transferring the transportation of cargo from trucks to marine vessels, there would be an increase in the amount of vessel trips along the existing Marine Highway Corridor on the Gulf Coast.

This section identifies the number of truck miles and hours of long haul transport that are being reduced as a result of the implementation of the Proposed Action, as well as the additional vessel traffic that would be introduced to the existing Marine Highway Corridors.

<u>Truck Traffic</u>

Brownsville, TX to Port Manatee, FL

Based on the conceptual Marine Highway services outlined in Table 2.1-8, there would be a reduction of 300 truck trips along this corridor each week.

This equates to a total reduction of 442,500 miles and 6,900 hours of truck traffic along this route each week. As the ports served by this route have relatively high volumes of traffic, this reduction of truck traffic will not be significant, but any reduction indicates that there would be positive impacts from the reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between the Port of Brownsville, TX and Port Manatee, FL.

Fulton, MS to Mobile, AL

Based on the conceptual Marine Highway services outlined in Table 2.1-8, the implementation of this program would reduce truck trips along the Highway 45 corridor by 200 trips each week. This equates to a total reduction of 60,000 miles and 1,100 hours of truck traffic along this route each week. Due to the relative size of the two ports, the reduction of truck traffic in and around Mobile would be much less noticeable than reduced truck traffic closer to Fulton. Regardless of the degree of impacts to truck traffic in, around, and between the ports, the assessment indicates that there would be positive impacts from the reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between Fulton, MS and Mobile, AL.

<u>Vessel Traffic</u>

Brownsville, TX to Port Manatee, FL

Based on the conceptual Marine Highway services outlined in Table 2.1-8, vessel traffic would increase along this corridor by two vessel trips per week (one in each direction). For the ATB vessels, operating at 12 knots, the one-way operation would require 86 hours. Assuming just one round trip vessels operating on a weekly rotation, a total of 172 hours of additional vessel traffic would be seen along this corridor. As both ports currently support over a million tons of cargo handling each year, this increase in vessel traffic would have minimal impact on the Marine Highway Corridor on the Gulf Coast and therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

Fulton, MS to Mobile, AL

Based on the conceptual Marine Highway services outlined in Table 2.1-8, vessel traffic would increase along this corridor by four vessel trips per week (two in each direction). For the towboat/barge vessels, operating at 8 knots, the one-way operation would require 25 hours. Assuming just two round trip vessels operating on a weekly rotation, a total of 100 hours of additional vessel traffic would be seen along this corridor. Because of the large number of vessels currently calling at the Port of Mobile, this nominal increase in vessel traffic in and around Mobile would be negligible. However, due to the relative size of the Port of Itawamba, the increased vessel traffic in and around this port would be more noticeable. It is anticipated that this increase would be beneficial because it is consistent with Port of Itawamba goals for growth. Although there would likely be some impact to vessel traffic on portions of the Marine Highway Corridor on the Gulf Coast, the vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

7.7.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region representative port pairs would not be implemented. Truck traffic would continue as it is today, with landside routes that suffer congestion.

7.8 Biological Resources

7.8.1 Affected Environment

Vegetation and Wildlife

Because the establishment and operation of the Marine Highway along the Gulf Coast would occur in existing ports and along established shipping corridors, extensive stands of upland vegetation or SAV are not anticipated to be present in the area that could be affected by the Proposed Action. Upland areas within the ports are expected to be developed and devoid of vegetation while ship berthing areas and navigation channels are expected to be too deep for the establishment of SAV. Because of the broad geographic scale of the Proposed Action, biological resources cannot be described in detail at this time. Site-specific analysis of vegetation and wildlife communities at each port location and along the shipping corridors may be needed during the preparation of project-based NEPA documentation to determine the presence and composition of vegetation and wildlife communities in the project area, if necessary. A general discussion of vegetation and wildlife on a regional scale is presented herein.

The composition of upland vegetation communities along the U.S. Gulf Coast varies by location and is largely dependent on temperature, soil type, and the availability of sunlight and water. Wildlife populations are generally determined by the habitat quality (e.g., size, composition, level of human disturbance) and food and water availability of the area. The broad ecological communities of North America have been categorized and mapped at three levels. Level I is the most general of the classification systems and presents a continental perspective; dividing North America in 15 ecoregions. Level II represents more of a national/regional perspective and divides the continent into 52 ecoregions, whereas Level III presents a regional perspective and divides the continent into approximately 200 ecoregions (CEC 1997). Four ecoregions comprise the U.S. Gulf Coast under the Level III classification

system (CEC 2006). The vegetation and wildlife commonly associated with each of these ecoregions is described in the following paragraphs.

Southern Florida Coastal Plain: This ecoregion is located at the southern tip of Florida, from Lake Okeechobee in the north to Key West in the south. Vegetation in this ecoregion is dominated by the Everglades and consists of extensive sawgrass (*Cladium jamaicense*) marshes with some tree-islands of slash pine (*Pinus elliottii*), gumbo limbo (*Bursera simaruba*), live oak (*Quercus virginiana*), strangler fig (*Ficus aurea*), and royal palm (*Roystonea regia*). To the west in the Big Cypress area, cypress (*Callistris sp.*) are found in wet areas, and gumbo limbo, pigeon plum (*Coccoloba diversifolia*), live oak, and laurel oak are found in drier areas. On the eastern coastal strip are areas of slash pine, sand pine (*Pinus clausa*), scrub oak (*Quercus berberidifolia*), and saw palmetto (*Sereno repens*). Mangrove (*Rhizophora*) swamps are common on the southern coast and the islands of the Florida Keys. Wildlife associated with this ecoregion includes: alligator (*Alligator sp.*), American crocodile (*Crocodylus acutus*), Florida panther (*Concolor coryi*), Key deer (*Odocoileus virginianus clavium*), white-tailed deer, manatee (*Trichechus manatus*), brown pelican, woodstork (*Mycteria Americana*), ibis (*Threskiornis sp.*), and herons (Wiken et al. 2011).

Southern Coastal Plain: This ecoregion extends from South Carolina and Georgia through much of central Florida, and along the Gulf Coast lowlands of the Florida Panhandle, Alabama, Mississippi, and eastern Louisiana. Once covered mainly by longleaf pine flatwoods and savannas, it now supports slash pine, pond pine (*Pinus serotina*), pond cypress (*Taxodium ascendens*), beech (*Nothofagus genus*), sweetgum, southern magnolia, white oak, and laurel oak forest. Southern floodplain forests contain bald cypress, pond cypress, water tupelo, bottomland oaks, sweetgum, green ash, and water hickory. Wildlife indigenous to this ecoregion black bear, white-tailed deer, bobcat, marsh rabbit (*Sylvilagus palustris*), fox squirrel (*Sciurus niger*), manatee (*Trichechus sp.*), egret *(Ardea sp.)*, blue heron (*Ardea herodias*), redcockaded woodpecker (*Picoides borealis*), indigo bunting (*Passerina cyanea*), Florida scrub jay (*Aphelocoma coerulescens*), box turtle (*Terrapene sp.*), gopher tortoise (*Gopherus polyphemus*), southern dusky salamander (*Desmognathus auricalatus*), scrub lizard (*Sceloporous woodi*), cottonmouth (*Agkistrodon piscivorus*), and alligator (Wiken et al. 2011).

Mississippi Alluvial Plain: This riverine ecoregion extends from southern Illinois, at the confluence of the Ohio River with the Mississippi River, south to the Gulf of Mexico. This ecoregion is one of the most altered in the U.S. Bottomland deciduous forest historically covered the region, however much of it was cleared for cultivation. The vegetation communities found in the floodplain forests of this ecoregion are determined by hydrology. River swamp forests contain bald cypress, and water tupelo, whereas hardwood swamp forests include more water hickory, red maple, green ash, and river birch. In higher, seasonally flooded areas, there are sweetgum, sycamore, laurel oak, Nuttall oak, and willow oak. Wildlife species native to this ecoregion include white-tailed deer, black bear, bobcat, gray fox, raccoon, swamp rabbit, migratory waterfowl, wild turkey, cormorants, egrets, herons, mourning dove, wood thrush, yellow-throated vireo, alligator, and "big river" species such as alligator gar (*Atractosteus spatula*), and pallid sturgeon (Wiken et al. 2011).

Western Gulf Coastal Plain: This ecoregion includes southwestern Louisiana, coastal Texas, and northeastern Tamaulipas. The boundaries of this ecoregion are the Mississippi River Delta to the north

and the Gulf of Mexico coastal plains to the south. Most of the vegetation on this ecoregion is now cropland but originally had tallgrass prairies in the north, with big bluestem, yellow Indiangrass, and brownseed paspalum (*Paspalum plicatulum*) mixed with other herbaceous species. Central areas also had tall dropseed (*Sporobolus heterolepis*), silver bluestem (*Bothriochloa saccharoides*), common curley mesquite (*Hilaria belangeri*), and plains bristlegrass (*Setaria vulpiseta*). The southern sand plains of Texas had southern oak (*Quercus Virginia*), honey mesquite (*Prosopis glandulosa*), Texas persimmon (*Diospyros texana*), Colima (*Zanthoxylum fagara*), granjeno (*Celtis pallida*), seacoast bluestem (*Schizachyrium scoparium*), little bluestem, and sand dropseed (*Sporobolus cryptandrus*). Coastal marshes present cordgrass (*Spartina patens*), saltgrass (*Distichlis spicata*), needlerush (*Juncus roemerianus*), and saltmarsh bulrush (*Schoenoplectus maritimus*). Barrier islands present seacoast bluestem (*Andropogon scoparius*), gulfdune paspalum (*Paspalum monostachyum*), and sea oats (*Uniola paniculata*). Wildlife native to this ecoregion includes white-tailed deer, ocelots (*Leopardus pardalis*), jaguarondi (*Puma yagouaroundi*), coyote, ringtail cat (*Bassariscus astutus*), armadillo (*Priodontes maximus*), javelin (*Antilocapra Americana*), swamp rabbit, American alligator, ferruginous pygmy-owl (*Glaucidium brasilianum*), green jay (*Cyanocorax yncas*), Altamira oriole (*Icterus gularis*), Attwater's prairie-chicken (*Tympanuchus cupido attwateri*), whooping cranes (*Grus Americana*) and several duck and geese species (Wiken et al. 2011).

Macroalgae–Sargassum: Sargassum (*Sargassum sp.*) is a pelagic brown alga that grows as clumps and mats of vegetation that float on the surface of the sea and is an important marine habitat for numerous species. Sargassum mats in the region are primarily (90%) comprised of the species, *Sargassum natans*. The remaining 10% is comprised of *S. fluitans* and other SAV species (South Atlantic Fishery Management Council [SAFMC] 2002). The presence, size, and movement of sargassum mats are influenced by wind, tides, and surface circulation. As such, sargassum may occur anywhere in the Gulf of Mexico at any time (SAFMC 2002).

Migratory Birds

The Gulf of Mexico is an important pathway for many terrestrial, coastal and marine species of migratory birds. The majority of migratory birds spend the winter months in tropical Central America and South America and breed in eastern North America during the summer months. Recent studies indicate that the flight pathways of the majority of the trans-Gulf migrant birds during spring are directed toward the coastlines of Louisiana and eastern Texas (USCG 2006).

Certain coastal and adjacent inland wetland habitats of the Gulf of Mexico serve as vital overwintering habitats and temporary "staging" habitats (i.e., areas to rest and forage during migration) for shorebirds and shorebird species may gather in large numbers within these areas. In the winter months, waterfowl species may congregate on coastal and wetland habitats along the northern Gulf of Mexico. The coastal areas of Louisiana and Texas are known to support large populations of migrating birds and wintering waterfowl (USCG 2006).

The Gulf Coast states contain 193 IBAs, recognized by the National Audubon Society, many of which are associated with the coast or other watercourses. IBAs are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding

landscape. IBAs may include public or private lands, or both, and they may be protected or unprotected. Identification of a site as an IBA indicates its unique importance for birds (Audubon 2012b).

The Port of Brownsville is located in the Laguna Atascosa National Wildlife Refuge. The Laguna Atascosa National Wildlife Refuge has documented more than 400 species of birds, one of the highest diversities on National Wildlife Refuges in the nation. The Lower Laguna Madre area contains important habitat for migratory and resident waterfowl and shorebirds, as well as wading birds. It is an important migration corridor for other birds such as peregrine falcons, ospreys, and swallow-tailed kites and is an important resting and feeding area for trans-Gulf neotropical migrant bird species (USFWS 2010).

Migratory birds are frequently found in the Tampa Bay area; however, development in the port area has reduced the nesting areas available for birds. Gulls, terns, sandpipers, plovers, stilts, skimmers, and oystercatchers are known to inhabit the Bay. Wading birds such as herons, egrets, and ibises use the interior wetland areas (USACE 2002b).

The Tenn-Tom Waterway provides habitat for large resident populations of both wood ducks and Canada geese. In addition to abundant resident waterfowl populations, a variety of nonresident waterfowl species utilize the Tenn-Tom Waterway during fall and winter. Some migratory species include mallard, northern pintail, gadwall, American widgeon, ring-necked duck, green-winged teal, and Canada geese. Neotropical migratory species that have been documented in the port area include the red-eyed vireo, northern parula, Kentucky warbler, yellow-breasted chat, prothonotary warbler, pine warbler, and eastern towhee (USACE 2012a).

Mobile Bay lies within the Mississippi Flyway for migratory birds, which serves as a conduit for a variety of bird species to this area. Large numbers of migratory waterfowl congregate in Bay waters, including colonial wading birds and seabirds (Mobile Bay National Estuary Program 2002).

Fish

EFH has been designated by FMPs for managed fishes and managed invertebrates in the Gulf of Mexico by the Gulf of Mexico Fisheries Management Council (GMFMC). FMP species are grouped as either subtropical-tropical or highly migratory species. The NMFS manages the highly migratory species and the remaining species are managed by the GMFMC. HAPC for all GMFMC FMP management units are the Florida Middle Grounds, Tortugas North and South, Madison-Swanson Marine Reserve, and Pulley Ridge off Florida, and West and East Flower Garden Banks, Stetson Bank, 29 Fathom Bank, MacNeil Bank, Rezak Sidner Bank, Rankin Bright Bank, Geyer Bank, McGrail Bank, Bouma Bank, Sonnier Bank, Alderice Bank, and Jakkula Bank off Texas (NOAA 2004a). Managed fish species in the northern Gulf of Mexico are listed in Table 7.8-1.

Table 7.8-1. Managed Fish Species in the Northern Gulf of Mexico

GMFMC	
Shrimp FMP	
Brown shrimp	*Farfantepenaeus aztecus*
Pink shrimp	*F. duorarum*
Royal red shrimp	*Pleoticus robustus*
White shrimp	*Litopenaeus setiferus*

Table 7.8-1. Managed Fish Species in the Northern Gulf of Mexico	
Stone Crab FMP	
Florida stone crab	*Menippe mercenaria*
Gulf stone crab	*M. adina*
Spiny Lobster FMP	
Spiny lobster	*Panulirus argus*
Slipper lobster	*Scyllarides nodife*
Coastal Migratory Pelagic FMP	
Cobia	*Rachycentron canadum*
King mackerel	*Scomberomorus cavalla*
Spanish mackerel	*S. maculates*
Coral and Coral Reef FMP	
Class Hydrozoa (stinging and hydrocorals)	
Class Anthozoa (sea fans, whips, precious corals, sea pens, and stony corals)	
Red Drum FMP	
Red drum	*Sciaenops ocellatus*
Reef Fish FMP	
Almaco jack	*Seriola rivoliana*
Anchor tilefish	*Caulolatilus intermedius*
Banded rudderfish	*Seriola zonata*
Blackfin snapper	*Lutjanus buccanella*
Blackline tilefish	*Caulolatilus cyanops*
Black grouper	*Mycteroperca bonaci*
Blueline tilefish	*Caulolatilus microps*
Cubera snapper	*Lutjanus cyanopterus*
Dog snapper	*Lutjanus jocu*
Dwarf sand perch	*Diplectrum bivittatum*
Common Gag	*Mycteroperca microlepis*
Goldface tilefish	*Caulolatilus chrysops*
Goliath grouper	*Epinephelus itajara*
Gray snapper	*Lutjanus griseus*
Gray triggerfish	*Baliste capriscus*
Greater amberjack	*Seriola dumerili*
Hogfish	*Lachnolaimus maximus*
Lane snapper	*Lutjanus synagris*
Lesser amberjack	*Seriola fasciata*
Mahogany snapper	*Lutjanus mahogoni*
Marbled grouper	*Epinephelus inermis*
Misty grouper	*E. mystacinus*
Mutton snapper	*Lutjanus analis*
Nassau grouper	*Epinephelus striatus*
Queen snapper	*Eteils oculatus*
Red grouper	*Epinephelus morio*
Red hind	*E. guttatus*
Red snapper	*Lutjanus campechanus*
Rock hind	*Ephinephelus adscensionis*
Sand perch	*Diplectrum formosum*
Scamp	*Mycteroperca phenax*
Schoolmaster	*Lutjanus apodus*

Table 7.8-1. Managed Fish Species in the Northern Gulf of Mexico	
Silk snapper	*L. vivanus*
Snowy grouper	*Epinephelus niveatus*
Speckled hind	*E. drummondhayi*
Tilefish	*Lopholatilus chamaeleonticeps*
Vermilion snapper	*Rhomboplites aurorubens*
Warsaw grouper	*Epinephelus nigritus*
Wenchman	*Pristipomoides aquilonaris*
Yellowedge grouper	*Epinephelus flavolimbatus*
Yellowfin grouper	*Mycteroperca venenosa*
Yellowmouth grouper	*M. interstitialis*
Yellowtail snapper	*Ocyurus chrysurus*
NMFS	
Tuna	
Albacore	*Thunnus alalunga*
Atlantic bigeye	*T. obesus*
Atlantic bluefin	*T. thynnus*
Atlantic yellowfin	*T. albacares*
Skipjack	*Katsuwonus pelamis*
Swordfish	
Swordfish	*Xiphias gladius*
Billfish	
Blue marlin	*Makaira nigricans*
Longbill spearfish	*Tetrapturus pfluegeri*
Sailfish	*Istiophorus platypterus*
White marlin	*Tetrapturus albidus*
Large Coastal Sharks	
Basking shark	*Cetorhinus maximus*
Bigeye sand tiger	*Odontaspis noronhai*
Bignose shark	*Carcharhinus altimus*
Blacktip shark	*C. limbatus*
Bull shark	*C. leucas*
Great hammerhead	*Sphyrna mokarran*
Caribbean reef shark	*Carcharhinus perezi*
Dusky shark	*C. obscurus*
Galapagos shark	*C. galapagensis*
Lemon shark	*Negaprion brevirostris*
Narrowtooth shark	*Carcharhinus brachyurus*
Night shark	*C. signatus*
Nurse shark	*Ginglymostoma cirratum*
Sand tiger shark	*Odontaspis taurus*
Scalloped hammerhead	*Sphyrna lewini*
Smooth hammerhead	*S. zygaena*
Spinner shark	*Carcharhinus brevipinna*
Tiger shark	*Galeocerdo cuvieri*
Whale shark	*Rhinocodon typus*
White shark	*Carcharodon carcharias*
Small Coastal Sharks	
Atlantic angel shark	*Squatina dumerili*
Atlantic sharpnose	*Rhizoprionodon terraenovae*

Table 7.8-1. Managed Fish Species in the Northern Gulf of Mexico	
Blacknose shark	*Carcharhinus acronotus*
Bonnethead	*Sphyrna tiburo*
Caribbean sharpnose shark	*Rhizoprionodon porosus*
Finetooth shark	*Carcharhinus isodon*
Smalltail shark	*C. porosus*
Pelagic Sharks	
Bigeye sixgill shark	*Hexanchus vitulus*
Bigeye thresher shark	*Alopias superciliosus*
Blue shark	*Prionace glauca*
Common thresher shark	*Alopias vulpinus*
Longfin mako shark	*Isurus paucus*
Oceanic whitetip shark	*Carcharhinus longimanu*
Porbeagle shark	*Lamna nasus*
Shortfin mako shark	*Isurus oxyrinchus*
Sevengill shark	*Heptranchias perlo*
Sixgill shark	*Hexanchus griseus*

Source: GMFMC 2010; NOAA 2010a.

The GMFMC has identified the waters near the Port of Brownsville as EFH for adult and juvenile brown, white, and pink shrimp (*Penaeus duorarum*); red drum; adult Spanish mackerel (*Scomberomorus maculatus*); and juvenile gray snapper (*Lutjanus griseus*) (USACE 2003).

Port Manatee is located in an area identified as EFH for juvenile pink shrimp; postlarval and juvenile red drum (*Sciaenops ocellatus*); postlarval, juvenile, and adult gray snapper (*Lutjanus griseus*); and juvenile bluefish (*Pomatomus saltatrix*), Spanish mackerel (*Scomberomorus maculatus*) yellowtail snapper (*Ocyurus chrysurus*), and lane snapper (*Lutjanus synagris*) (USACE 2002b).

EFH is not known to be present in the Port of Itawamba in Fulton, MS. The GMFMC currently describes FMPs for a total of 21 selected species in Mobile Bay. These species or species complexes are shrimp (brown, pink, and white), red drum, reef fish (red, gag, and scamp grouper; red, gray, yellowtail, and lane snapper; greater and lesser amberjack; and tilefish), coastal migratory pelagic species (king and Spanish mackerel, cobia, and dolphin), stone crab, spiny lobster, and coral. For the Gulf of Mexico, EFH includes all estuarine and marine waters and substrates from the shoreline to the seaward limit of the EEZ. In Mobile Bay, EFH include areas such as estuarine emergent wetlands, seagrass beds, algae flats, mud, sand, and shell substrates, and the estuarine water column (USACE 2004).

The 2010 Gulf oil spill released substantial amounts of oil into the Gulf of Mexico impacting many aquatic species including finfish. The long-term effect on fisheries is not yet known (Smithsonian 2012).

Marine Mammals

Two major groups of marine mammals are cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals, sea lions, and walruses). All marine mammals are protected under the MMPA; some marine mammals may be designated as "depleted" under the MMPA. Endangered and threatened marine mammals are further protected under the ESA and are discussed in the following section (Threatened and Endangered Species).

A total of 30 species of marine mammals have been documented in the Gulf of Mexico: 29 cetacean species and the West Indian manatee. However, only 20 species regularly occur in the northern Gulf (Table 7.8-2). The bottlenose dolphin and the Atlantic spotted dolphin are the most commonly encountered dolphin species and are generally found in nearshore waters (NOAA 2004a).

Table 7.8-2. Marine Mammal Species Found in the Northern Gulf of Mexico

Common Name	Scientific Name	ESA Status	Occurence[1]
Whales			
Blainville's beaked whale	*Mesoplodon densirostris*		Regular
Blue whale	*Balaenoptera musculus*	Endangered	Extralimital
Bryde's whale	*Balaenoptera edeni*		Regular
Cuvier's beaked whale	*Ziphius cavirostris*		Regular
Dwarf sperm whale	*Kogia sima*		Regular
False killer whale	*Pseudorca crassidens*		Regular
Fin whale	*Balaenoptera physalus*	Endangered	Rare
Gervais beaked whale	*Mesoplodon europaeus*		Rare
Humpback whale	*Megaptera novaeangliae*	Endangered	Extralimital
Killer whale	*Orcinus orca*		Regular
Melon-headed whale	*Peponocephala electra*		Regular
Minke whale	*Balaenoptera acutorostrata*		Rare
North Atlantic right whale	*Eubalaena glacialis*	Endangered	Extralimital
Pygmy killer whale	*Feresa attenuate*		Regular
Pygmy sperm whale	*Kogia breviceps*		Regular
Sei whale	*Balaenoptera borealis*	Endangered	Extralimital
Short-finned pilot whale	*Globicephala macrorhynchus*		Regular
Sowerby's beaked whale	*Mesoplodon bidens*		Extralimital
Sperm whale	*Physeter macrocephalus*	Endangered	Regular
Dolphins			
Atlantic spotted dolphin	*Stenella frontalis*		Regular
Bottlenose dolphin	*Tursiops truncatus*		Regular
Clymene dolphin	*S. clymene*		Regular
Fraser's dolphin	*Lagenodelphis hosei*		Regular
Pantropical spotted dolphin	*Stenella attenuate*		Regular
Risso's dolphin	*Grampus griseus*		Regular
Rough-toothed dolphin	*Steno bredanensis*		Regular
Spinner dolphin	*Stenella longirostris*		Regular
Striped dolphin	*S. coeruleoalba*		Regular
Manatee			
West Indian manatee	*Trichechus manatus*	Endangered	Extralimital

Source: Davis and Fargion 1995.
Notes: [1] Regular – A species that occurs as a regular or normal part of the fauna of an area regardless of its abundance.
Rare – A species that only occurs in an area sporadically.
Extralimital – A species that does not normally occur in an area and occurrence is considered to be beyond the normal range of the species even though one or more occurrence records exist.

Marine mammal distribution is determined largely by prey availability. As a result, the region off the Mississippi River Delta appears to attract a large number of oceanic cetaceans, especially sperm whales, due to its high level of productivity. There are also large numbers of cetacean sightings in waters over the continental shelf (particularly in nearshore waters) in the northern Gulf of Mexico (NOAA 2004a).

NOAA is working with a team of marine mammal health experts to investigate an increase in dolphin strandings and to understand the potential contributing factors, including the 2010 Gulf oil spill (NOAA 2013a).

Marine mammals are likely to occur within the waters associated with the Port of Brownsville, TX. The bottlenose dolphin is likely to be the most frequently encountered marine mammal (USACE 2003).

A total of 22 species of whales and dolphins have been documented in the northern Gulf of Mexico, of which only the bottlenose dolphin, Atlantic spotted dolphin, and rough-toothed dolphin occur on the continental shelf in the eastern Gulf (USCG 2009). Other species of dolphins and an occasional whale are sometimes observed in nearshore Gulf waters and might infrequently strand on Gulf and bay beaches, but these are not considered normal occurrences.

Marine mammals are not known to occur in the Port of Itawamba. The bottlenose dolphin and West Indian manatee are the only two regularly occurring marine mammals in Alabama waters (Alabama Department of Conservation and Natural Resources 2008).

Invasive Species

Numerous invasive species are found in the Gulf Coast. Geographical distribution of these species varies widely among states. Florida has the greatest number of reported invasive species, probably reflecting the length of coastline, intensity of human influence (e.g., shipping and industrialization), and the extent of monitoring efforts in this state. Texas has the next-longest coastline and the second largest number of invasive species (Ray 2005). Invasive species documented in the Gulf of Mexico are summarized in Table 7.8-3.

Table 7.8-3. Invasive Species Found in the Gulf of Mexico

Common Name	Scientific Name	Type
Caulerpa	*Caulerpa brachypus*	Algae
Centric diatom	*Odontella sinensis*	Algae
Filamentous red alga	*Monosporus indicus*	Algae
Purple laver	*Porphyra yezoensis*	Algae
Red algae	*Acanthophora nayadiformis*	Algae
Red algae	*Neosiphonia harveyi*	Algae
Watercress alga	*Halimeda opuntia*	Algae
Reef building tube worm	*Ficopomatus enigmaticus*	Annelids-Polychaetes
Serpulid tubeworm	*F. uschakovi*	Annelids-Polychaetes
Syllid worm	*Myrianida pachycera*	Annelids-Polychaetes
Tubeworm	*Hydroides diramphus*	Annelids-Polychaetes
Tubeworm	*H. elegans*	Annelids-Polychaetes
Beach fly	*Procanace dianneae*	Arthropoda-Insects
Maritime earwig	*Anisolabis maritima*	Arthropoda-Insects
Splash midge	*Telmatogeton japonicus*	Arthropoda-Insects
Black sun coral	*Tubastraea micranthus*	Coelenterates-Anthozoan
Orange striped green anemone	*Diadumene lineata*	Coelenterates-Anthozoan
Orange cup coral	*Tubastraea coccinea*	Coelenterates-Anthozoan
Black sea jellyfish	*Blackfordia virginica*	Coelenterates-Hydrozoans
Colonial hydroid	*Cordylophora caspia*	Coelenterates-Hydrozoans
Hydroid	*Moerisia lyonsi*	Coelenterates-Hydrozoans
Immortal jellyfish	*Turritopsis dohrnii*	Coelenterates-Hydrozoans

Table 7.8-3. Invasive Species Found in the Gulf of Mexico

Common Name	Scientific Name	Type
Pelo de oso	*Garveia franciscana*	Coelenterates-Hydrozoans
Australian spotted jellyfish	*Phyllorhiza punctata*	Coelenterates-Scyphozoan
Rhizostome jellyfish	*Mastigias sp.*	Coelenterates-Scyphozoan
Amphipod	*Stenothoe gallensis*	Crustaceans-Amphipods
North American Pacific corophiid	*Laticorophium baconi*	Crustaceans-Amphipods
Skeleton shrimp	*Caprella scaura*	Crustaceans-Amphipods
Acorn barnacle	*Amphibalanus reticulatus*	Crustaceans-Barnacles
Acorn barnacle	*Balanus trigonus*	Crustaceans-Barnacles
Striped acorn barnacle	*Amphibalanus amphitrite*	Crustaceans-Barnacles
Titan acorn barnacle	*Megabalanus coccopoma*	Crustaceans-Barnacles
Bocourt swimming crab	*Callinectes bocourti*	Crustaceans-Crabs
Green porcelain crab	*Petrolisthes armatus*	Crustaceans-Crabs
Indo-Pacific swimming crab	*Charybdis hellerii*	Crustaceans-Crabs
Gribble	*Limnoria pfefferi*	Crustaceans
Isopod	*Lais floridana*	Crustaceans
Warty pillbug	*Sphaeroma terebrans*	Crustaceans
Wharf roach	*Ligia exotica*	Crustaceans
Bristled river shrimp	*Macrobrachium olfersii*	Crustaceans-Shrimp
Brittle star	*Ophiactis savignyi*	Echinoderms
Cheilostome bryozoan	*Electra bengalensis*	Bryozoans
Encrusting bryozoan	*Hippoporina indica*	Bryozoans
Invasive bryozoan	*Membraniporopsis tubigera*	Bryozoans
Common tilapia	*Oreochromis mossambicus*	Fishes
Asian swamp eel	*Monopterus albus*	Fishes
Blackchin tilapia	*Sarotherodon melanotheron*	Fishes
Lionfish	*Pterois volitans*	Fishes
Mayan cichlid	*Cichlasoma urophthalmus*	Fishes
Pike livebearer	*Belonesox belizanus*	Fishes
Spotted tilapia	*Tilapia mariae*	Fishes
Tessellated blenny	*Hypsoblennius invemar*	Fishes
Brown mussel	*Perna perna*	Mollusks-Bivalves
Charru mussel	*Mytella charruana*	Mollusks-Bivalves
Giant honey comb oysters	*Hyotissa hyotis*	Mollusks-Bivalves
Asian green mussel	*Perna viridis*	Mollusks-Bivalves
Shipworm	*Teredo navalis*	Mollusks-Bivalves
Lake Merritt cuthona	*Cuthona perca*	Mollusks-Gastropods
Malaysian trumpet snail	*Melanoides tuberculatus*	Mollusks-Gastropods
Red-tipped sea goddess	*Glossodoris sedna*	Mollusks-Gastropods
Winged thecacera	*Thecacera pennigera*	Mollusks-Gastropods
Black sea squirt	*Phallusia nigra*	Tunicates
Green tube tunicate	*Ascidia sydneiensis*	Tunicates
Pleated sea squirt	*Styela plicata*	Tunicates
Rough sea tunicate	*Styela canopus*	Tunicates
Social styelid tunicate	*Polyandrocarpa zorritensis*	Tunicates
Star tunicate	*Botryllus schlosseri*	Tunicates
Tunicate	*Didemnum psammatodes*	Tunicates
Tunicate	*Diplosoma spongiforme*	Tunicates
White crust tunicate	*Didemnum perlucidum*	Tunicates

Sources: Smithsonian Environmental Research Center 2012; Ray 2005.

Threatened and Endangered Species

Federal threatened and endangered marine species that occur along the Gulf Coast are identified in this section. Species afforded protection under the ESA that may be present in the waters of the Port of Brownsville include: leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, loggerhead sea turtle, green sea turtle, brown pelican, West Indian manatee, and smalltooth sawfish (USACE 2003).

NOAA is closely monitoring a significant increase in sea turtle strandings in Alabama, Louisiana, and Mississippi since 2010, both prior to and after the Gulf oil spill. Testing is underway to determine the cause (NOAA 2013b).

Sea turtles are common in in the waters off of Port Manatee. The loggerhead sea turtle and Kemp's ridley sea turtle are year-round residents. Loggerhead sea turtles nest annually on coastal beaches north and south of the Port region. Green and Kemp's ridley turtles have occasionally nested on area beaches.

The population and distribution of manatees in the port area varies throughout the year. Approximately 50 to 60 manatees live in Tampa Bay during the summer and about 200 may be found in the bay during the winter (USACE 2002b). The Tampa Electric Company's Big Bend Power Plant located approximately six miles north of Manatee Harbor is a winter refuge for manatees. This is the closest winter refuge to Manatee Harbor. The Little Manatee River is recognized as a preferred calving site for Tampa Bay. It empties into the bay about one mile north of the port area. Although the project area is not within designated critical habitat for the manatee, they still may use the area for travel, rest, and feeding (USACE 2002b).

Six whale species have the potential to occur in the coastal and offshore vicinity of Port Manatee (Table 7.8-4). Rare occurrences of the North Atlantic right whale *(Eubalaena glacialis)* and the humpback whale are possible off the Tampa Bay coast. The sei whale, blue whale, and fin whale are considered extralimital to the Gulf of Mexico, and though the sperm whale is common in the Gulf, it is found only around and seaward of the shelf break.

Table 7.8-4. Whale Species that Potentially Occur in Coastal and Offshore Vicinity of Port Manatee

Common Name	Scientific Name	Threatened or Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*B. physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered

The endangered smalltooth sawfish occurs on the west coast of Florida, north of Charlotte Harbor, but historically appears to never have been as common in this region as in the east coast lagoons and South Florida.

The endangered Gulf sturgeon has been recorded in Tampa Bay and sturgeon catches have been reported sporadically since 1890. Gulf sturgeon feed in estuarine waters and spawn in freshwater. Subadult and adult Gulf sturgeon are believed to spend eight to nine months in rivers and three to four

months (the cooler months) in estuaries. Gulf sturgeon that are less than two years old remain in estuaries throughout the year. In the rivers, Gulf sturgeon are known to congregate below springs and areas of turbulent flows. Open water habitats are believed to be muddy and soft bottom and possibly seagrass. There is no critical habitat for Gulf sturgeon in the Port Manatee area (USCG 2009).

No federally protected species are known to be present in the Port of Itawamba. Federally protected species known to occur in Mobile Bay in the northern Gulf of Mexico are listed in Table 7.8-5 and include sea turtles (green, hawksbill, Kemp's ridley, leatherback and loggerhead), manatee, and the Gulf sturgeon. Sea turtles are known to be present within the Mobile Bay and actively nest on adjacent Gulf of Mexico beaches. However, they are not known to actively use the upper reaches of the Bay or Mobile River (USACE 2012b).

Table 7.8-5. Federally protected Aquatic Species Occurring in the Northern Gulf of Mexico

Common Name	Scientific Name	Threatened or Endangered
Fish		
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Endangered
Smalltooth sawfish	*Pristis pectinata*	Endangered
Whales		
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*B. physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Manatee		
West Indian Manatee	*Trichechus manatus*	Endangered
Sea Turtles		
Green	*Chelonia mydas*	Endangered
Hawksbill	*Eretmochelys imbricate*	Endangered
Kemp's ridley	*Lepidochelys kempii*	Endangered
Leatherback	*Dermochelys coriacea*	Endangered
Loggerhead	*Caretta caretta*	Endangered
Olive ridley	*Lepidochelys olivacea*	Endangered

Several whale species may also occur in the Gulf of Mexico off the coast of Alabama including blue, fin, humpback, sei, and sperm whales (USACE 2010b). These species typically occur in the deeper waters off the continental shelf and are not likely to be found in the waters within the port.

Critical Habitat

Critical habitat was designated for the West Indian manatee (Figure 7-1) in 1976 (50 CFR 17.95(a)) as follows: "Crystal River and its headwaters known as King's Bay, Citrus County; the Little Manatee River downstream from the U.S. Highway 301 bridge, Hillsborough County; the Manatee River downstream from the Lake Manatee Dam, Manatee County; the Myakka River downstream from Myakka River State Park, Sarasota and Charlotte Counties; the Peace River downstream from the Florida State Highway 760 bridge, De Soto and Charlotte Counties; Charlotte Harbor north of the Charlotte-Lee County line, Charlotte County; Caloosahatchee River downstream from the Florida State Highway 31 bridge, Lee County; all U.S. territorial waters adjoining the coast and islands of Lee County; all U.S. territorial waters

adjoining the coast and islands and all connected bays, estuaries, and rivers from Gordon's Pass, near Naples, Collier County, southward to and including Whitewater Bay, Monroe County; all waters of Card, Barnes, Blackwater, Little Blackwater, Manatee, and Buttonwood Sounds between Key Largo, Monroe County, and the mainland of Dade County; Biscayne Bay, and all adjoining and connected lakes, rivers, canals, and waterways from the southern tip of Key Biscayne northward to and including Maule Lake, Dade County; all of Lake Worth, from its northernmost point immediately south of the intersection of U.S. Highway 1 and Florida State Highway A1A southward to its southernmost point immediately north of the town of Boynton Beach, Palm Beach County; the Loxahatchee River and its headwaters, Martin and West Palm Beach Counties; that section of the Intracoastal Waterway from the town of Seawalls Point, Martin County to Jupiter Inlet, Palm Beach County; the entire inland section of water known as the Indian River, from its northernmost point immediately south of the intersection of U.S. Highway 1 and Florida State Highway 3, Volusia County, southward to its southernmost point near the town of Sewall's Point, Martin County, and the entire inland section of water known as the Banana River and all waterways between Indian and Banana Rivers, Brevard County; the St. Johns River including Lake George, and including Blue Springs and Silver Glen Springs from their points of origin to their confluences with the St. Johns River; that section of the Intracoastal Waterway from its confluences with the St. Mary's River on the Georgia-Florida border to the Florida State Highway A1A bridge south of Coastal City, Nassau and Duval Counties."

Figure 7-1 West Indian Manatee Designated Critical Habitat

Several areas of a designated critical habitat for Gulf sturgeon occur along the northern Gulf Coast in intracoastal waterways between Lake Ponchartrain, LA and the Suwanee River, FL (Figure 7-2). Therefore, the presence of Gulf sturgeon along M-10 is likely. The Suwannee River is believed to currently support the largest population (estimated at over 2,500 individuals) of Gulf sturgeons (NOAA 2013c).

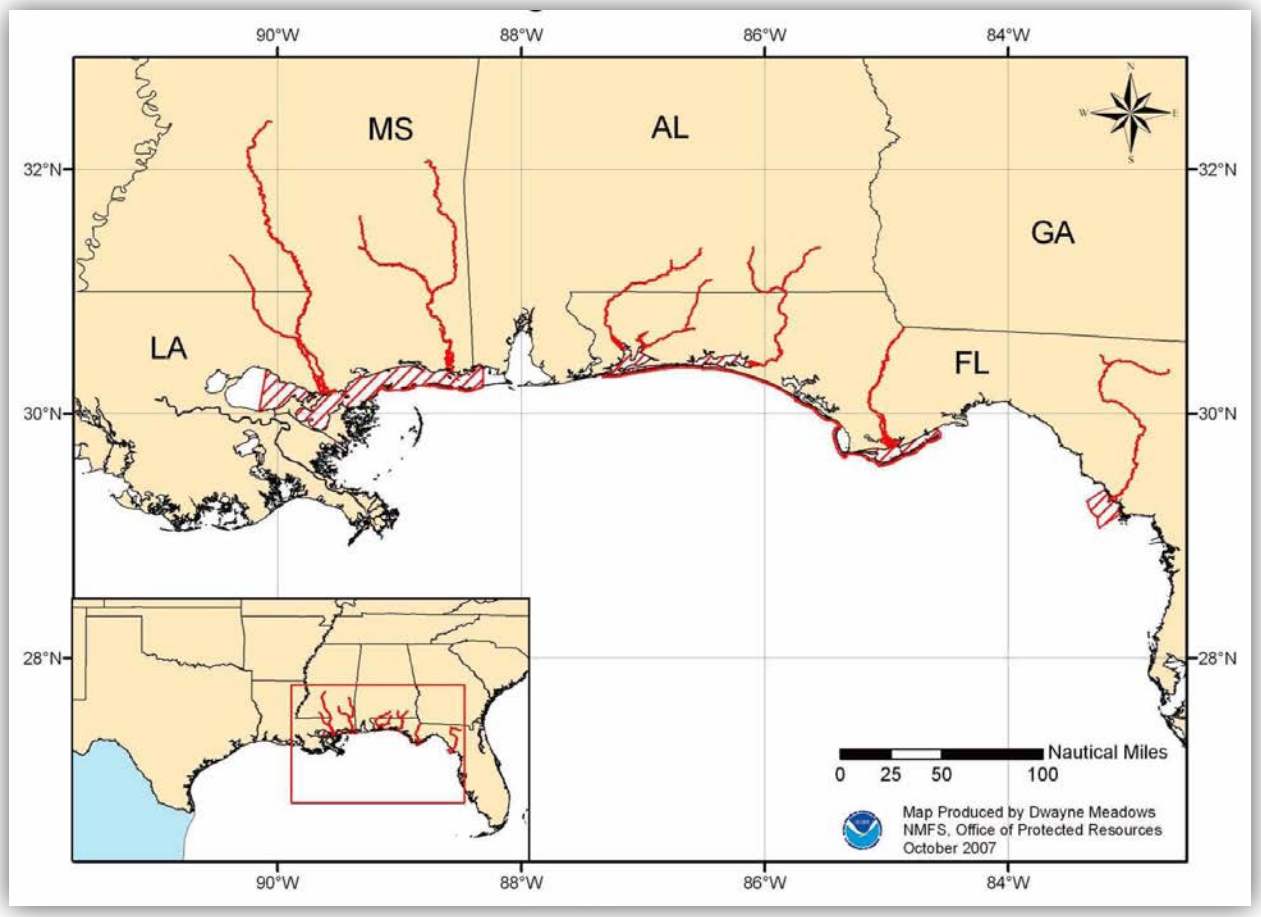


Figure 7-2 Gulf Sturgeon Critical Habitat

In September 2009, NMFS designated critical habitat for the smalltooth sawfish (*Pristis pectinata*). The critical habitat consists of two units: the Charlotte Harbor Estuary Unit, which comprises approximately 221,459 acres of coastal habitat, and the Ten Thousand Islands/Everglades Unit, which comprises approximately 619,013 acres of coastal habitat. The two units are located along the southwestern coast of Florida between Charlotte Harbor and Florida Bay (Figure 7-3).

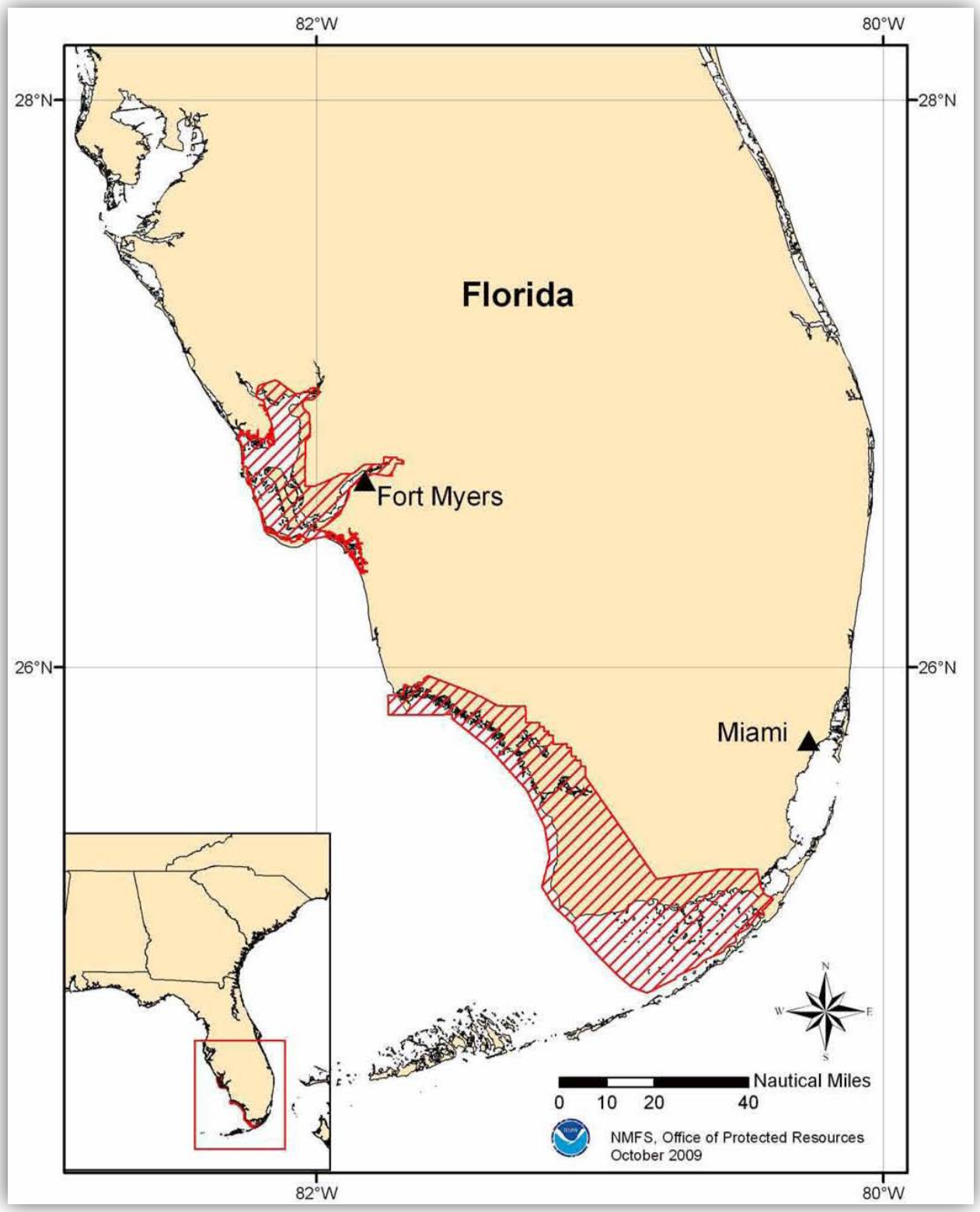


Figure 7-3 Smalltooth Sawfish Critical Habitat

7.8.2 Environmental Consequences

7.8.2.1 Proposed Action

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to vegetation or wildlife within the Gulf Coast region. Likewise, the presence of SAV within established shipping corridors is also unlikely, and therefore the use of these existing corridors by the conceptual Marine Highway services would not be expected to impact SAV.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified within the Gulf Coast region is anticipated to have minimal impacts to migratory birds along the Gulf Coast and in the port pair cities. The Marine Highway Corridors and port areas already support a high level of shipping activity and are heavily developed; therefore, no loss of habitat is anticipated from the nominal increase in vessel trips. Additionally, any impacts would be minimized through compliance with existing Federal, State, and port specific regulations promulgated to protect biological resources.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any protected species in the area that may be affected by future projects and to identify potential mitigation measures, if necessary, to ensure compliance with the MBTA.

Fish

All of the port pairs selected for the Gulf Coast region contain EFH. The Proposed Action would have no effect on EFH or fish species managed under the MSA in the port areas. Because existing ports and Marine Highway Corridors would be utilized, no loss of aquatic habitat is anticipated as a result of the Proposed Action. The increased noise associated with the nominal increase in vessel trips would be expected to be minor and would not be expected to adversely impact EFH. Additionally, fish are very motile and would avoid the area of noise if loud enough to cause annoyance.

Indirect impacts that may potentially result from collisions and accidental spills have the potential to affect EFH. Human errors in design, fabrication and operation are the cause of most, if not all serious accidents. Ship collisions would be minimized through adherence with the COLREGs. These regulations state the means that an oceangoing vessel must undertake to avoid a ship collision, such as keeping watch and maintaining reasonable speeds. In order to prevent a ship collision, COLGREGs requires that vessels keep a watch during all hours of the day. Under COLREGs, ships are also required to carry certain navigation lights to help pilots and crew members carry out watches. Depending on the length of the vessel, the masthead light, sidelights, towing light, and all around lights must be visible from distances of between one and six miles. Vessels are also required to adhere to specific regulations regarding right-of-way and traffic separation schemes. Adherence to COLREGs would minimize the potential for ship collisions and subsequent indirect impacts to EFH. Furthermore, any accidental spills

resulting from ship collisions would be responded to and contained as quickly as possible to reduce impacts to the surrounding environment. Therefore impacts to EFH resulting from the operation of the conceptual Marine Highway services within the Gulf Coast region would not be significant.

Marine Mammals

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Gulf Coast region are anticipated to have minimal impacts to marine mammals and would not be expected to result in takes or harassment as defined by the MMPA. Impacts to marine mammals would also be minimized through coordination with the various Federal and State agencies, as needed, and compliance with existing regulations promulgated to protect biological resources and prevent the release of pollutants to the environment.

For future site-specific projects developed as part of the Program, consultation may be required with NMFS and USFWS. In addition, an analysis of noise impacts on marine mammals as well as an analysis of ship strike potential may be required to determine impacts to marine mammal species and to identify minimization and mitigation measures, if necessary.

Invasive Species

The Proposed Action would not be expected to result in invasive species impacts. The nominal increase in vessel traffic with operation of the conceptual Marine Highway services, as identified for the Inland Waterways/Mississippi Coast region, in conjunction with compliance with the USCG Final Ballast Water Rule and the EPA draft VGP, would result in minimal potential for the introduction of invasive species.

The USCG and the EPA have Federal oversight of ballast water management through the Final Ballast Water Rule and the draft VGP, respectively. However, states may adopt or enforce more stringent control measures over aquatic nuisance species (Maryland Sea Grant 2010).

Impacts from invasive species would be minimized through compliance with the USCG Final Ballast Water Rule and the EPA draft VGP. The USCG Final Ballast Water Rule was issued in 2012 and is described in Section 4.8.2.1 *Invasive Species*. Compliance with port-specific ballast water management plans and rules would further reduce potential impacts.

Threatened and Endangered Species

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Gulf Coast region would be expected to have no effect on, or may affect but would not be likely to adversely affect, threatened and endangered species.

Coordination with Federal and State environmental regulatory agencies may be required for future site-specific projects under a project-based NEPA analysis to identify any protected species that may be affected by the Proposed Action and to identify potential mitigation measures, if necessary.

Critical Habitat

Operation of the conceptual Marine Highway service on the Gulf Coast is anticipated to have minimal impacts on critical habitat along the Gulf Coast. The existing shipping routes currently support a high level of shipping activity and no loss of habitat is anticipated from the nominal increase in vessel trips with the conceptual Marine Highway service. The Program would comply with existing maritime laws and procedures with regard to transit operations and cargo handling to ensure safe transport and minimize impacts to the aquatic environment and sensitive and/or important habitats.

Coordination with Federal and State environmental regulatory agencies may be required for future site-specific projects under a project-based NEPA analysis to identify any critical habitat that may be affected by a project and to identify potential mitigation measures, if necessary.

7.8.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region would not be implemented. The No Action Alternative would not result in impacts to vegetation and wildlife, migratory birds, EFH, marine mammals, invasive species, threatened and endangered species, or critical habitat.

7.9 Geological Resources

7.9.1 Affected Environment

Geology and soils are site-specific resources and their presence and composition would vary widely across the Marine Highway Corridor and at various port locations to the point where they cannot be described at a regional level. If necessary, site-specific conditions may be discussed in project-based NEPA documentation. The only geologic resource that can accurately be described at a regional level is the physiographic divisions. The USGS divides the North American continent into eight physiographic divisions based on terrain texture, rock type, and geologic structure and history. One physiographic division, Atlantic Plain (Coastal Plain Province; Floridian, East Gulf Coastal Plain, Mississippi Alluvial Plain and West Gulf Coastal Plain sections), comprises the U.S. Gulf Coast (USGS 2003).

The Coastal Plain is a wide belt of Late Cretaceous to Holocene deposits, extending from New Jersey to Texas. The belt comprises sedimentary rocks that were deposited mostly in a marine environment and were later uplifted and now tilt seaward. Part of the Coastal Plain forms the broad, submerged Atlantic Continental Shelf. Coastal Plain deposits overlap the older, more distorted, Paleozoic and Precambrian rocks immediately to the north and west.

The Floridian section is the emerged portion of an anticlinal ridge and consists of the peninsular portion of Florida. The continental shelf on the east, south (Bahama Shelf), and west (Florida Shelf) of the state are considered to be part of the arch and is considerably larger than the emerged part. This section has several distinctive features, including prominent terraces, large barrier islands and keys, coral reefs, extensive karst, significant aquifers and abundant groundwater, Lake Okeechobee and large marshes and swamps.

The East Gulf Coastal Plain section extends from south-central Georgia and the Florida panhandle westward almost to the Mississippi River. This is a region with large expanses of nearly flat terrain and slopes slightly westward toward the Mississippi River. The eastern part of this section has rivers that drain eastward to the Tennessee River and form the eastern boundary of this part of the Atlantic-Gulf Coastal Plain province. Rivers in the western portion of this province drain westward toward the Mississippi River.

The Mississippi Alluvial Plain section of the Atlantic Plain province encompasses 550 miles of the Mississippi River alluvial floodplain extending southward from southern Illinois to the Mississippi River delta at the mouth of the river at the Gulf of Mexico. The floodplain ranges between 50 to 100 miles wide and has a very gentle southward slope that averages less than one ft per mile over its entire length. This section is bordered along much of its length, especially in the north, by prominent bluffs that in some places rise 250 ft above the river, but generally decrease in height to the south.

The West Gulf Coastal Plain section extends from the western edge of the Mississippi River delta to southern Texas, covering western Louisiana, southwestern Arkansas, eastern Texas and a small part of southeastern Oklahoma. The Balcones fault zone forms a part of the western boundary in Texas.

7.9.2 Environmental Consequences

7.9.2.1 Proposed Action

The establishment and operation of the conceptual Marine Highway services as identified within the Gulf Coast region would utilize existing shipping routes and port facilities and no upgrades involving construction, dredging, or other activities that would affect geology and soils would be anticipated. Therefore, there would be no impacts to geology and soils under the Proposed Action.

7.9.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region would not be implemented. The No Action Alternative would not result in impacts to geology and soils.

7.10 Water Resources

7.10.1 Affected Environment

<u>Water Quality</u>

The water quality of the northern Gulf of Mexico has been adversely affected by the input of pollutants from both point and nonpoint sources. Nutrients, pesticides, heavy metals, and fecal coliform bacteria have been deposited into northern Gulf of Mexico waters from industrial and agricultural sources. The majority of the contaminant point sources along the northern Gulf Coast are derived from petroleum refineries or petrochemical plants. Dispersed and dissolved oil (comprised of polycyclic aromatic hydrocarbons, (PAHs) in the water can result in exposure of aquatic resources to the toxicological effects of PAHs. This contact in the water column may be exacerbated by use of surfactants, weather conditions and other dispersal methods that increase mixing.

PAHs can cause direct toxicity (mortality) to marine mammals, fish, and aquatic invertebrates through smothering and other physical and chemical mechanisms. Besides direct mortality, PAHs can also cause sublethal effects such as: DNA damage, liver disease, cancer, and reproductive, developmental, and immune system impairment in fish and other organisms. PAHs can accumulate in invertebrates, which may be unable to efficiently metabolize the compounds. PAHs can then be passed to higher trophic levels, such as fish and marine mammals, when they consume prey.

The presence of discharged oil in the environment may cause decreased habitat use in the area, altered migration patterns, altered food availability, and disrupted life cycles (NOAA 2010b).

Pollution in the northern Gulf of Mexico has resulted in the formation of a "dead zone" in the area of the Mississippi River Delta westward to Galveston, TX. This area suffers from seasonal oxygen depletion (hypoxia), a common effect of nutrient enrichment (NOAA 2004a).

The Gulf of Mexico has a surface area of 1,540,000 square kilometers and a volume of 2,430,000 cubic kilometers (EPA 2012e). Seawater enters the Gulf from the Caribbean Sea through the Yucatan Channel and exits into the northwestern Atlantic Ocean through the Florida Straits. Two major rivers, the Mississippi and the Rio Grande, discharge large volumes of fresh water into the Gulf of Mexico (NOAA 2004a). The M-10 Marine Highway is composed of coastal waters within the Gulf of Mexico environment.

Waters along M-49 and M-65 consist of riverine freshwater entering into estuarine brackish water as they flow towards and enter the saline coastal waters of the Gulf of Mexico. M-49 includes the Atchafalaya River, the J. Bennet Johnson Waterways, and connecting commercial navigation channels, ports, and harbors. M-65 Marine Highway Corridor includes the Mobile River, Tombigbee River, Black Warrior Rivers, Tenn-Tom Waterway, Tennessee River via the Ohio River in Paducah, KY to the Mississippi River.

Water quality at the port pairs selected in the Gulf Coast region: Brownsville, TX to Port Manatee, FL via Mobile, AL; and Port Itawamba in Fulton, MS to Mobile, AL, is discussed below by location.

According to raw water quality samples collected for a desalinization study within the Brownsville Ship Channel, total organic carbon averages 3.5 milligrams per liter and turbidity about 44.7 nephelometric turbidity units (NRS Consulting Engineers 2009). According to fish kill records, red tides occur along the Brownsville Ship Channel and within the South Padre Island area frequently and last occurred November 7, 2011 (Texas Parks and Wildlife Department 2012b). According to water quality assessment reporting by the EPA, the Brownsville Ship Channel is impaired for recreation and swimming, but good for fish, shellfish, and wildlife protection and propagation (EPA 2010c).

Port Manatee is located on the lower portion of Tampa Bay. Since 2008 lower Tampa Bay has improved algal abundance and visible light penetration through the water column and it currently is in green attainment, meaning planned projects can be continued (Tampa Bay Estuary Program 2011). Water quality has also been improved since 2008 and been in green attainment since 2008. According to EPA reporting from 2010, the area of Tampa Bay where Port Manatee is located is in impairment status (EPA 2010c). Causes for impairment include chlorophyll-A, fecal coliform, lead, and dissolved oxygen (EPA 2010c).

The Port of Itawamba in Fulton, MS is located on the Tenn-Tom Waterway. This area of the waterway has not been assessed since 1995 when it was found in impairment status for sediment, fecal coliform, nitrogen, phosphorus, DDT, toxaphene, low dissolved oxygen, biochemical oxygen demand, and pathogens (EPA 2010c).

The Port of Mobile, AL is located in Chacaloochee Bay. Water quality assessment status for this area from 2010 indicates that water quality is impaired for contact recreational use, but is listed as good for fishing, industrial/agricultural uses, and propagation of fish and wildlife (EPA 2010c).

Groundwater

The presence of groundwater is restricted to upland areas and would not exist beneath much of the M-10 corridor that is located in open Gulf of Mexico waters. The M-49 corridor and M-65 corridors connect through estuarine bay environments and travel inland, where aquifers may be present. Aquifer types and associated Marine Highway Corridors are presented in Table 7.10-1.

Table 7.10-1. Aquifers

Aquifer Present	Aquifer Type	Associated Corridor Aquifer
Coastal Lowlands Aquifer System	Semi-consolidated Sand Aquifers	M-49
Surficial Aquifer System	Unconsolidated Sand and Gravel Aquifers	M-65
Mississippi Embayment Aquifer System	Semi-consolidated Sand Aquifers	M-65
Southeastern Coastal Plain Aquifer System	Semi-consolidated Sand Aquifers	M-55, M-65

Source: USGS 2012.

Aquifers underlie the representative port pairs selected for the Gulf Coast region. The Coastal Lowlands Aquifer system underlies the Ports of Brownsville, TX and Mobile, AL (USGS 2012). The Surficial Aquifer system underlies the Port of Manatee, FL (USGS 2012). The Southeastern Coastal Plain aquifers underlie the port in Fulton, MS (USGS 2012).

Wetlands

Wetland loss along the Louisiana coastline has become a growing problem, resulting in an approximate 24 sq mi loss of wetland habitat each year (CPRA 2003). The main reasons for wetland loss include levees that block sediment replenishment in coastal marsh habitat, increases of saltwater intrusion, subsidence, and hurricanes (CPRA 2003). The effect of the Gulf oil spill on wetlands and coastal erosion is the subject of ongoing studies. Oil washing up on vegetated coastal shorelines could cause the vegetation to become stressed and die, weakening marsh soils. Weakened marsh soils would then be at risk of accelerated erosion from waves and storms (NOAA 2010b).

The current ship traffic associated with the M-10 corridor is a significant distance offshore and away from sensitive coastal wetland habitat. A site-specific analysis would have to be completed in order to determine specific existing wetland conditions along the Gulf of Mexico shoreline and shoreline riverine inland habitats.

Floodplains

Port communities may experience some degree of flooding because they are located at low elevations. The Gulf Coast representative port pairs have 100- and 500-year floodplains associated with the ports,

according to FEMA floodplain mapping (FEMA Map Panels 01097C0566K, 2800810005C, 1201530176C, and 4801010350B) (FEMA 2012).

7.10.2 Environmental Consequences

7.10.2.1 Proposed Action

Water Quality

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the identified conceptual Gulf Coast services would be expected to have minimal impacts to water quality. Marine Highway Corridors are within U.S. territorial waters where Federal regulations prohibit vessels from dumping untreated sewage (NOAA 2008). Ships traveling beyond 24 nm offshore can discharge black water (sewage) and gray water (non-sewage wastewater). However, discharge in open-ocean would have minimal impact on nutrient levels of the major surface waters of the port pairs and would be short-term as effluent dilutes and disperses once discharged (NOAA 2008).

Any impacts to water quality due to accidental release or vessel collision would be limited to the area of discharge and would be short-term in nature because of rapid dilution and dispersion.

There would not be an increase in vessel-to-vessel collisions or accidental oil spills because current Marine Highway Corridors are wide enough to allow vessels to avoid one another, as concluded by a USCG navigational safety analysis (USCG 2011).

Discharge of bilge and ballast water may include residual oil, lubricants, and fuel. There is also potential for pollutants from marine engines to be released into the water. However, compliance with CWA would eliminate and minimize any occurrences.

At the time this PEA was written, there was no Marine Highway service connecting terminal facilities at Port Manatee, FL and Port of Brownsville, TX. However, one is expected along the Tenn-Tom Waterway between the Ports of Itawamba, MS and Mobile, AL. Although these are major ports with consistent ship traffic, by connecting ports previously not connected there is potential for a nominal increase in vessel traffic within these ports. Additional vessel traffic in existing ports may increase the potential for additional concentrated discharges of pollutants within port areas. Adherence to rules and regulations of the various port management plans would further minimize the likelihood of adverse impacts to water quality stemming from accidental releases of pollutants. Impacts to surface waters within port areas would be minimized through adherence to the CWA and the regulations of Annex IV of MARPOL.

Groundwater

Based on the type of services that would be implemented under the Proposed Action, a large consumption of groundwater would not be required nor would they involve activities that would result in contamination of groundwater. Therefore, no impacts to groundwater are expected to occur.

Wetlands

Increased vessel traffic has the potential to increase erosion of sensitive wetland areas from increased wave action produced by ship wakes. However, because the Proposed Action would use existing Marine

Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have minimal impacts to wetlands. Potential impacts to wetlands could be minimized by the practice of reducing vessel speeds in areas containing sensitive wetlands.

For future site-specific projects, wetland identification and impact determination may be necessary. In these cases, consultations with USACE and appropriate State agencies would be conducted and the necessary permits obtained..

Floodplains

The ports along the Marine Highway Corridors have existing infrastructure and land use associated with port functions and already have flood control at these locations. It is not likely that there would be any increase in impacts to floodplains as a result of the Proposed Action. In addition, facility development is not part of the Proposed Action; therefore, no impacts to floodplains would occur.

For future site-specific projects, infrastructure improvements are not anticipated. However, if improvements are determined necessary for the ports to accommodate additional services, additional analysis may be necessary under a project-based NEPA document to analyze impacts to floodplains.

7.10.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified within the Gulf Coast region would not be implemented. Therefore, there would be no impacts to water resources under the No Action Alternative.

7.11 Cultural Resources

7.11.1 Affected Environment

Archaeological Resources

The location of archaeological resources was not divulged on any online databases of SHPOs in the Gulf Coast region.

Architectural Resources

Three of the ports serviced within the Gulf Coast region (Pascagoula, MS; New Orleans, LA; and Pensacola, FL) have NRHP-listed architectural resources within the boundaries of the ports themselves. Seven ports have NRHP-listed properties within half a mile of port facilities. These are the ports of St. Bernard, Morgan City, and New Orleans, LA; Pensacola and Tampa, FL; Mobile, AL; and Pascagoula, MS (NPS 2012). Three of the ports have inventoried properties with undetermined NRHP eligibility status (St Bernard, Morgan City, and Baton Rouge, LA) (Louisiana Department of Culture, Recreation, and Tourism 2012). No previously inventoried properties were located within ports in Mississippi or Texas (Mississippi Department of Archives and History 2012; Texas Historical Commission 2012). Online SHPO databases for the other states in the Gulf Coast region were not available or accessible.

The representative port pairs in the Gulf Coast region do not include any NRHP-listed properties within their boundaries. NRHP properties are within half a mile of the Port of Mobile, AL.

7.11.2 Environmental Consequences

7.11.2.1 Proposed Action

No known archaeological sites were identified at or near the representative port pair locations. No construction, demolition, or other activities that would require ground disturbance are currently proposed at the port pair locations in the Gulf Coast region. Therefore, there would be no impacts to archaeological resources resulting from the proposed Marine Highway services at the representative port pairs.

None of the representative port pairs in the Gulf Coast region include NRHP-listed properties. An NRHP property is within a half a mile of the Port of Mobile, TX; however, as described in Section 7.1.2, potential increased noise levels from the introduction of ATB traffic are not likely to be significant. Therefore, there would be no impacts to NRHP-listed architectural resources.

7.11.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the Gulf Coast region would not be implemented. The No Action Alternative would not result in impacts to cultural resources.

7.12 Hazardous Materials and Waste

7.12.1 Affected Environment

Hazardous materials and wastes may be used and generated during the routine operation and maintenance of marine vessels in port areas. These substances may also be transported as cargo and, as such, may be present anywhere along existing Marine Highway Corridors.

<u>Hazardous Materials Management</u>

Large commercial vessels routinely discharge ballast water, gray and black water, bilge water, and deck runoff consistent with applicable international and national standards. Discharges of sewage (also known as black water) and gray water, which is the effluent generated from wash basins and showers on board ships, are regulated under MARPOL Annex IV. Discharges of black water are prohibited except for specific conditions stipulated under the Annex. In addition to the international standards established under MARPOL Annex IV, the U.S. regulates vessel discharges of gray water, bilge water, and a variety of other vessel discharges through the EPA's VGP (EPA 2008a).

Accidental spills of oil and fuel can also cause significant damage to the environment and extensive standards have been put in place to prevent such accidents and to respond to such incidents when they do occur. Regulations for the prevention of oil pollution are set out in Annex I to MARPOL as well as the CWA.

Some specialized hull coatings that serve to prevent organisms from attaching to a ship's hull also release substances that may be considered to be vessel discharges. All ocean-going commercial vessels utilize hull coatings designed to minimize resistance to movement through the water and the

attachment of both soft and hard-shell organisms. These coatings are often referred to as "antifouling" coatings.

Antifouling coatings work by different methods. Some coatings make the hull surface slick, which causes fouling organisms to fall off once the vessel reaches a specific operating speed. Other compounds provide a controlled release of biocides to prevent the attachment of organisms such as barnacles and slime. Standards for the manufacture and use of these biocidal products are established through the CWA. In addition, the AFS Treaty prohibits the use of organotins as an active antifouling agent and sets forth a structure for international restrictions on other antifouling compounds deemed to be harmful to the marine environment. The AFS Treaty eliminated the use of TBT on ships in 2008 due its persistence in the marine environment and its effect on non-target species.

Hazardous Waste Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway service activities generates small quantities of hazardous wastes. These wastes include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries.

7.12.2 Environmental Consequences

7.12.2.1 Proposed Action

Hazardous Materials Management

Operation and maintenance of vessels, trains, trucks, cranes and forklifts used for Marine Highway activities would involve the use of small quantities of hazardous materials (e.g., fuel, oil, solvents, hydraulic fluid, antifreeze, lubricants, and/or paints) and generation of hazardous wastes. Any differences in the quantities of hazardous materials used over current baseline conditions are anticipated to be negligible and would not be significant. Appropriate procedures for the handling, storage, and transport of hazardous materials would be implemented at each port location and during transport, in accordance with RCRA, all applicable DOT, EPA, OSHA, and Nuclear Regulatory Commission regulations, and other applicable State and local regulations.

Accidental releases of hazardous materials would be reduced or eliminated through compliance with EPA and DOT procedures and through the development and implementation of a SPCC Plan. Both the port facility and the vessel would be responsible for preparing their own spill plans and ensuring their personnel are adequately trained in spill response procedures.

Fuels, such as diesel, needed to power vessels and port machinery would be stored in accordance with EPA regulations and site-specific BMPs for their handling, storage and use, and would include regularly monitoring and inspecting tanks for leaks. A SPCC Plan would also be prepared by the port, as well as the vessel owner/operator, in the event of an accidental release of fuel.

Impacts from antifouling paints are not anticipated to be significant. The hull coating in most general use is biocidal antifouling paint, which leaches copper and a number of other biocides into the water in order to kill off fouling organisms that attach to the ship bottom. These paints gradually release the toxic substances into the water over a period of three to five years, after which time they become

depleted and need to be replaced (EPA 1999). The slow release nature of the coating coupled with the transient nature of the vessels would not result in a significant impact to the environment.

Hazardous or toxic materials would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks.

Hazardous Waste Management

All hazardous wastes associated with the Marine Highway program would be managed and disposed of in accordance with all applicable DOT, EPA, and OSHA regulations. Appropriate procedures for the handling, storage, transport and disposal of hazardous wastes would be identified in site-specific Hazardous Waste Management Plans implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, and OSHA regulations, and other applicable State and local regulations. Compliance with applicable regulations, plans, policies and procedures would minimize potential impacts to hazardous wastes and hazardous waste management and impacts would not be significant.

7.12.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Implementation of conceptual Marine Highway services as identified for the Gulf Coast region would not occur. No impacts associated with hazardous materials or waste management would occur under the No Action Alternative.

8.0 EAST COAST

This chapter describes the existing environmental conditions in and around the Marine Highway Corridors on the East Coast for resources potentially affected by implementation of the Proposed Action as described in Chapter 2. In addition, this chapter identifies and evaluates the potential impacts of implementing the Proposed Action.

Three port pairs have been selected within the East Coast region: NY/NJ to Norfolk, VA; Norfolk, VA to Port Canaveral, FL; and NY/NJ to Portland, ME. The Port of NY/NJ is a large seaport located at the mouth of the Hudson River in the vicinity of Staten Island. The port handles multiple cargo types including containers, dry bulk, liquid bulk, break bulk, RORO, general cargo, and over-sized project cargo. The Port of Virginia/Norfolk is a large deepwater seaport located on 600 acres on the Elizabeth River at the mouth of the Chesapeake Bay that includes four general cargo terminals capable of handling all types of cargo.

Port Canaveral is located on approximately 49 acres on Canaveral Island, a barrier island off Florida's Atlantic Coast. It is primarily known for its busy cruise port, but it also operates a medium-size seaport. Commercial cargo handled at Port Canaveral includes dry bulk, liquid bulk, break bulk, general purpose cargo, containers, and RORO. The Port of Portland is a medium-size seaport located along the Atlantic Coast in Casco Bay with a total of eight terminals for handling multiple cargo types, including liquid bulk, dry bulk, break bulk, and containers.

8.1 Noise

8.1.1 Affected Environment

Land Based Noise

These port communities are located in developed industrialized areas and are assumed to have noise levels similar to other industrial areas. The principal noise sources are from ships, cranes, fork lifts, trucks/trains, and container handling equipment (Khoo and Nguyen 2011).

Marine Noise along Shipping Routes

In the aquatic environment, land uses as well as in-water activities contribute to ambient noise levels. Similar to land based noise in the corridor, noise measurements are not available along specific Marine Highway Corridors on the East Coast. Table 4.1-1 in Section 4.4.1 presents ambient aquatic noise levels measured in similarly developed port areas. Similar ambient aquatic noise levels are assumed for the proposed project port areas.

8.1.2 Environmental Consequences

8.1.2.1 Proposed Action

Land Based Noise

No project-based baseline noise metrics have been collected in association with the identified conceptual Marine Highway services. Therefore, potential noise impacts evaluated herein are qualitative in nature and based on the activities normally associated with shipping ports.

Land based noise impacts attributable to the Proposed Action would result from increases in the amount of vessels using the port facilities and the increased use of cranes and other machinery used to load and unload cargo. Using the parameters and assumptions presented in Section 2.0 and Table 2.1-10, the anticipated weekly increases in vessel trips in each port is summarized in Table 8.1-1.

Table 8.1-1. Anticipated Weekly Increases Vessel Trips in Port Areas

Port	Number of Vessel Trips
New York/New Jersey	2 (ATB)
	4 (OGV)
Norfolk, VA	2 (ATB)
	4 (OGV)
Port Canaveral, FL	1 (ATB)
	2 (OGV)
Portland, ME	1 (ATB)
	2 (OGV)

Because no expansion of port facilities is anticipated, the increase in cargo load at the ports may result in increased noise at the ports currently impacted by port-associated noise. Any increases in ambient noise levels would be associated with typical operational noise would occur during similar timeframes as existing noise. Because the increase in new vessel trips and operation of equipment would be minor compared with existing levels at the ports, the associated increase in noise would be minor. Therefore, land based noise impacts associated with the Proposed Action are not anticipated to be significant.

Marine Noise along Shipping Routes

The operation of the conceptual Marine Highway services as identified within the East Coast region would be expected to result in a small increase in vessel traffic along the nearshore area of the U.S. Atlantic Coast by an estimated three to six vessel trips per week (refer to table 8.1-1). These vessels would be expected to be smaller and quieter than the larger container ships already in operation along the coast and therefore would not be expected to result in noise increases above *de minimis* levels. The noise produced by these vessels is dependent on the size of the vessel and the rate of speed as well as specific design characteristics (e.g., engine size, propeller placement) (NOAA 2004a). Underwater noise from commercial ships is generated during normal operation, most notably from propeller cavitation (when air spaces created by the motion of propellers collapse) (McKenna et al. 2012). Incorporating noise reduction measures into ship design and operation, such as reducing engine size, and vessel speed and placement of propellers lower in the water, may mitigate the impact of minor increases in noise from Marine Highway vessel trips.

Whether or not, and how, human-generated sounds in the ocean affect marine life has become an issue of increasing public concern. Increased noise levels associated with shipping can interfere with communication, foraging, prey evasion and other important life history functions in marine mammals. It can also disrupt their behavior and may become compounded with other human-induced stressors with detrimental effects (Wright 2008).

Vessel traffic associated with the Marine Highway Corridors on the East Coast would occur at such a distance from the shoreline as to make the noise impacts negligible to humans and wildlife in shoreline communities and natural and recreational areas.

As site-specific projects are further developed for the Program, project-based noise analyses may need to be conducted to quantify noise impacts to the marine environment.

8.1.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Therefore, there would be no impacts to noise under the No Action Alternative.

8.2 Air Quality

8.2.1 Affected Environment

Air quality within the East Coast region is highly variable, ranging from very good to deteriorated, with a strong south to north and west to east alignment that relates to the more rural predominance of the southern coastal region and interior areas compared to the heavily populated and industrialized northern coastal portion of the corridor. Table 8.2-1 summarizes the air quality in the regions surrounding ports in the East Coast region.

Table 8.2-1. Status of Compliance with NAAQS for Port Areas Included in the East Coast Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
M-95 Marine Corridor								
Portland, ME	▫							
Boston, MA	•			▫				
New Bedford, MA	•							
Providence/Quonset, RI	•							
New York/New Jersey	•			▫		•	•	
Delaware River								
Paulsboro, NJ	•						•	
Trenton, NJ	•			▫			•	
Chester, PA	•						•	
Philadelphia, PA	•			▫			•	
Wilmington, DE	•						•	
Baltimore, MD	•			▫			•	
Norfolk, VA	▫							
Wilmington, NC								✓
Charleston, SC								✓
Savannah, GA								✓
Jacksonville, FL								✓
Palm Beach, FL								✓
Miami, FL								✓

Table 8.2-1. Status of Compliance with NAAQS for Port Areas Included in the East Coast Region

Locality	Nonattainment or Maintenance							Attainment
	O_3	NO_x	SO_2	CO	Pb	PM_{10}	$PM_{2.5}$	
Key West, FL								✓
Port Canaveral, FL								✓
M-87 Marine Connector								
Albany, NY	•							
Catskill, NY	•							
Kingston, NY								✓
Poughkeepsie, NY	•							
Newburgh, NY	•						•	
Yonkers, NY	•						•	
New York City	•						•	
M-64 Marine Connector								
Norfolk, VA	▫							
Newport News, VA	▫							
Hopewell, VA	▫							
Richmond, VA	▫							
M-2 Marine Corridor								
Arecibo, PR					◊			
Ceiba, PR								✓
Fajardo, PR								✓
Guanica, PR								✓
Guayama, PR								✓
Guayanilla, PR								✓
Jobos Bay, PR								✓
Mayaguez, PR								✓
Ponce, PR								✓
San Juan/Guaynabo, PR						▫		
Yabucoa, PR								✓

Source: 40 CFR 81.
Notes: • denotes nonattainment designation. For $PM_{2.5}$, nonattainment can be for annual standard, 24-hour standard, or both.
▫ denotes maintenance area.
◊ denotes nonattainment for 2008 Pb standard.
✓denotes an area that is, and always has been, in attainment for all criteria pollutants.

Ground-level, or tropospheric, O_3 forms when emissions of NOx and VOCs photo chemically react with sunlight. For this reason, NO_x and VOCs are considered O_3 precursors. O_3 exposure is linked to acute respiratory problems, aggravated asthma, reduced lung capacity, inflamed lung tissue, and impairment of the body's immune system. The 1990 CAA Amendments set out specific requirements for a group of northeast states that make up the OTR. States in the OTR are required to submit a SIP and install a certain level of controls for the pollutants that form O_3, even if they meet the NAAQS O_3 standards. The states in the OTR are: Maine (ME), New Hampshire, Vermont, Massachusetts (MA), RI, Connecticut (CT), New York New Jersey, Pennsylvania, Delaware (DE), Maryland (MD), and the Washington, D.C. Metropolitan Statistical Area, including the northern Virginia suburbs.

States in the East Coast region have SIPs, and there may also be applicable TIPs, developed to achieve or maintain attainment levels for various criteria pollutants. Any project proposed under the Program would need to address state-specific requirements included under these implementation plans. Many of the regional requirements discussed above are also included in these SIPs and would need to be addressed during NEPA review of any proposed project. In addition, some of the larger urban areas of the northeast, such as New York City and Philadelphia, have their own regulations for air quality management and their own regulatory agencies. Any proposed project under the Program would need to account for such local requirements in project-based NEPA documentation.

All the states in the East Coast region, as well as Puerto Rico and many localities, have specific requirements for permitting of air emissions sources. Permitting requirements for construction and operation of stationary sources may need to be addressed in a project-based NEPA document. Additionally, construction activities, including building a road or preparing land to erect a tower, may require a permit. This would depend on the site location and its air quality, as the activity may increase PM_{10} through ground disturbance. In most cases, a permit may not be required for temporary, small-scale construction measures.

Mobile sources include vehicles that operate on roads and highways ("on-road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earth-moving equipment, lawn and garden power tools, marine vessels, railroad locomotives, and airplanes. All of the various forms of transportation used to haul freight and transport cargo are mobile sources that can contribute substantially to air pollution.

Some of the ports in the East Coast region are the busiest in the U.S., based on the throughput of cargo. The USACE Navigation Data Center maintains statistics on waterborne commerce, including the volume of cargo that transits major U.S. ports. New York (including the Ports of New Jersey and New York in the New York City area) ranks third in the nation in throughput with over 4.2 million TEUs. In the East Coast region, the Port of Savannah, GA ranks second (and fourth nationally) with 2.1 million TEUs, and Norfolk, VA, located in EPA Region 3, is ranked seventh nationally. Of the 16 ports in the region, nine rank in the top 20 nationally.

The majority of the freight hauled along the East Coast of the U.S. is transported by truck (see Table 8.2-2). The East Coast region includes a concentration of interstates traversing both north-south and east-west. I-2 circles the island of Puerto Rico.

The data used in this document for the volume of cargo hauled by truck were derived from the FAF3 program. FAF3 is a FHWA funded and managed data and analysis program that provides estimates of the total volumes of freight moved into, out of, and within the U.S., between individual states, major metropolitan areas, sub-state regions, and major international gateways.

The East Coast region was subdivided into four market areas: New England, Mid-Atlantic, South Atlantic, and Florida to determine and present general data on the volume and value of the commodities hauled through the East Coast region by truck. Table 8.2-2 presents the FAF3 data for truck hauling of freight in the four East Coast region market areas.

Table 8.2-2. Bulk Commodity Data for Freight Hauled by Truck in East Coast Region, FAF3 2007 Data		
Market Area	**Hauled by Truck in Ton Miles**	
	South Bound	**North Bound**
	Truck	**Truck**
New England	2,298,040,000	2,260,820,000
Mid-Atlantic	4,895,240,000	4,598,600,000
South Atlantic	1,855,480,000	1,536,160,000
FL	3,276,200,000	1,896,410,000
Totals	12,324,960,000	10,291,990,000

8.2.2 Environmental Consequences

8.2.2.1 Proposed Action

The Proposed Action would shift land-based, long-haul truck freight movements to Marine Highway services. Additional information would be needed to fully assess the impacts of these changes to air quality. The assessment of air quality impacts for site-specific projects in criteria pollutant nonattainment areas would require additional emissions analysis under the CAA General Conformity regulations.

As indicated in Section 3.2.6, a general set of calculations have been developed to compare potential environmental impacts of short sea shipping, and hauling by heavy-duty truck. These calculations only include emissions associated with the actual movement of cargo from the specified origin to the specified destination and do not take into account truck idling or the operation of auxiliary engines used by marine vessels when at berth. Details on the resources used and the methodology for estimating emissions can be found with the calculations in Appendix B.

Tables 8.2-3 and 8.2-4 present the comparisons of moving cargo using ATB versus trucks and OGV versus trucks. It should be noted that the truck data differs for each of the vessel scenarios based on the volume and frequency of cargo movement. Specific information on the distances, load capacities, and trip frequencies can be found in Appendix B. All trucks were assumed to be heavy-duty diesel trucks in the 33,000 pounds or greater vehicle class. The data tables demonstrate that freight movement by ATB for all port pairs would result in small increases in VOCs and PM emissions. Additionally, for the NY/NJ to Portland ME port pair, there would also be an increase in CO. For all of the port pairs the use of OGVs would result in decreases of all pollutants except SO_2, which would modestly increase. A decrease in air emissions caused by the substitution of OGVs for truck transportation in the East Coast region could help portions of the region reach attainment status for two criteria pollutants. From Boston, MA to Baltimore, MD, the East Coast is in nonattainment for O_3. The cities along the M-87 marine connector (Albany, Kingston, Newburgh, etc.) are also in nonattainment for O_3. Most of these same areas are considered maintenance areas for CO. The East Coast areas in Virginia are also maintenance areas for O_3.

A decrease in VOC and NO_x emissions from the substitution of truck transport with OGVs could be significant and could help areas reach attainment status for O_3. In addition, the drop in CO emissions from such a substitution could help these same areas keep their maintenance status for CO. The area

from New York City to Baltimore is also in nonattainment for $PM_{2.5}$. A decrease in $PM_{2.5}$ emissions from the substitution of truck transport with OGVs could also be significant and could help areas reach attainment status for this criteria pollutant. As the entire region is in attainment for SO_2, a modest increase in this pollutant is unlikely to result in significant impacts.

As previously discussed, congestion was not factored in to the general set of calculations for this PEA; however, congestion is a major contributor to air emissions in the East Coast region, particularly in the region from Baltimore to Boston, and could result in higher air emissions from trucks. Any future site-specific projects proposed for this region would need to account for traffic congestion when assessing air emissions.

8.2.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. There would be no operation of the conceptual Marine Highway services as identified for the East Coast region. Therefore, air quality in the East Coast region would not be impacted, either beneficially or negatively, from the implementation of the conceptual Marine Highway services. Therefore, there would be no air quality impacts under the No Action Alternative.

Table 8.2-3. East Coast Region Annual Emission in Total Tons by Transport Type

East Coast Region	VOCs	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
NY/NJ to Norfolk, VA	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**	**Tons/Year**
ATB	6.40	100.08	14.94	0.01	4.80	4.42
Truck[1]	3.24	76.90	17.15	0.04	3.21	3.11
OGV	13.38	250.89	29.43	10.62	12.57	11.57
Truck[2]	19.46	461.41	102.87	0.23	19.25	18.65
Norfolk, VA to Port Canaveral, FL						
ATB	13.92	217.52	32.47	0.03	10.44	9.60
Truck[1]	5.46	129.42	28.85	0.06	5.40	5.23
OGV	29.08	545.30	63.97	23.09	27.33	25.14
Truck[2]	32.74	776.51	173.13	0.39	32.39	31.39
NY/NJ to Portland, ME						
ATB	9.28	145.01	21.65	0.02	6.96	6.40
Truck[1]	2.61	61.90	13.80	0.03	2.58	2.50
OGV	19.38	363.53	42.64	15.39	18.22	16.76
Truck[2]	20.88	495.17	110.40	0.25	20.65	20.02

Notes: [1] Comparison of moving cargo using trucks versus ATBs, based on volume and frequency of cargo movement.
[2] Comparison of moving cargo using trucks versus OGVs, based on volume and frequency of cargo movement.

Table 8.2-4. East Coast Region Single Trip Emission per TEU by Transport Type						
East Coast Region	**VOCs**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
NY/NJ to Norfolk, VA	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**	**Tons/TEU**
ATB	0.00031	0.00541	0.00072	0.00000	0.00023	0.00021
Truck[1]	0.00016	0.00370	0.00082	0.00000	0.00015	0.00015
OGV	0.00011	0.00226	0.00024	0.00009	0.00010	0.00009
Truck	0.00016	0.00370	0.00082	0.00000	0.00015	0.00015
Norfolk, VA to Port Canaveral, FL						
ATB	0.00067	0.01175	0.00156	0.00000	0.00050	0.00046
Truck[1]	0.00026	0.00622	0.00139	0.00000	0.00026	0.00025
OGV	0.00023	0.00491	0.00051	0.00018	0.00022	0.00020
Truck[1]	0.00026	0.00622	0.00139	0.00000	0.00026	0.00025
NY/NJ to Portland, ME						
ATB	0.00045	0.00783	0.00104	0.00000	0.00033	0.00031
Truck[1]	0.00013	0.00298	0.00066	0.00000	0.00012	0.00012
OGV	0.00012	0.00245	0.00026	0.00009	0.00011	0.00010
Truck[1]	0.00013	0.00298	0.00066	0.00000	0.00012	0.00012

Notes: [1] Indicates that the truck data differs for each of the vessel scenarios based on the volume and frequency of cargo movement

8.3 Land Use (Including Section 4(f) Properties and Coastal Zone Management)

8.3.1 Affected Environment

Land Use (Including Section 4(f) Properties)

Twenty-five of the 35 ports serviced in the East Coast region are located in urban areas. Six ports are located in suburban areas, and include Wilmington, NC; Catskills, Kingston, Poughkeepsie, and Newburgh, NY; and Ceiba, Puerto Rico. Ports located in rural settings include Yabucoa, Guayanilla, Fajardo, and Jobos Bay, Puerto Rico. Ports within suburban or rural settings are generally located along rivers as opposed to oceans and near smaller towns as opposed to larger cities. The representative port pairs identified in the East Coast region are located in urban, developed areas surrounded by similar land use (commercial/industrial).

Seventeen of the 35 ports within the East Coast region have NRHP-listed properties within the boundaries of the port or adjacent to it (refer to Section 8.11.1). Eleven of these ports have parks within a half mile radius. However, the use of a Section 4(f) property, and thus the applicability of Section 4(f), can only be determined after specific sites for Marine Highway Projects are selected.

The representative port pairs for the East Coast region include several Section 4(f) properties. A State park, a national monument, and NRHP-listed properties are within or near the NY/NJ Port (refer to Section 8.11.1). NRHP-listed properties are also located in or near the ports of Norfolk and Portland. Three parks and a public beach are within proximity of Port Canaveral, FL.

Coastal Zone Management

Local CZMPs would be identified when a project-based NEPA document is prepared for a Marine Highway Project that is proposed to be implemented under the Program. The representative port pairs identified for the conceptual Marine Highway services on the East Coast region in Table 2.1-10 would need to be consistent with the CZMPs identified for Florida, Maine, New York, New Jersey, and Virginia. Refer to Section 5.3.1 for an in-depth discussion of the CZMPs for New York and Pennsylvania, and Section 7.3.1 for a discussion of Florida's CZMP.

The CZMP for Maine was accepted by NOAA in 1978 and is administered by the State Planning Office. It draws authority from a network of 19 State laws. The coastal zone extends to the inland boundary of all towns bordering tidal waters. It also includes all islands. The State Planning Office is particularly interested in balancing development and conservation of coastal areas. For instance, the State Planning Office has begun the Maine's Working Waterfront Access Preservation Pilot program whose purpose is to preserve access to the water for businesses dependent on the water, such as the commercial fishing industry. Additionally, the CZMP is also focused on sustainability, climate change adaptation, and offshore energy sources (NOAA 2011l).

The CZMP for New Jersey was accepted by NOAA in 1978 and is administered by the NJ Department of Environmental Protection in partnership with the NJ Meadowland's Commission. It draws its authority from three pieces of legislation: the Coastal Area Facilities Review Act, the Wetlands Act of 1970, and the Waterfront Development Law (NJ Department of Environmental Protection 2012). The coastal

boundary encompasses tidal and nontidal waters, waterfronts, and inland areas. It begins with the Hudson River at the interstate border with New York, and continues south to the Raritan Bay, Sandy Hook, and Cape May. From Cape May it extends north to Trenton, NJ containing waters for the Delaware Bay and River, including tidal portions of their tributaries. Upland areas along these bodies of water are included in the coastal zone. Currently the CZMP is focused on population density, coastal hazards, polluted run-off, and impaired water quality. Major economic activities involving the coastal zone include ports, tourism, fishing, and shell fishing (NOAA 2011m).

The CZMP for Virginia was accepted by NOAA in 1986 and is administered by the Department of Environmental Quality. The coastal zone encompasses 29 coastal counties and includes beaches, salt marshes, islands, and transition and intertidal areas. Areas of particular concern are protection of coastal resources, air and water quality, preventing the loss of coastal habitats and loss of life from coastal hazards, promoting renewable energy, and improving access. Additionally, the Department of Environmental Quality is also interested in living shorelines as a way of preventing erosion (NOAA 2011n).

Coastal Barrier Resources

Twelve states with coastal barrier resources are located in the East Coast region: Georgia, Massachusetts, New Jersey, Connecticut, New York, Delaware, Maine, Rhode Island, Virginia, Florida, North Carolina, and South Carolina (USFWS 2012a). The East Coast region also includes one U.S. territory, Puerto Rico, with coastal barrier resources. The ports included in the conceptual Marine Highway services in the East Coast region are all located in states with coastal barrier resources.

8.3.2 Environmental Consequences

8.3.2.1 Proposed Action

Establishing the conceptual Marine Highway service between the representative port pairs identified for the East Coast region would increase the number of TEUs being shipped between the identified port pairs from 0 to 800 per week, or in the case of NY/NJ to Portland port pair, from 0 to 1,000 per week, resulting in an increase in ATB and OGV traffic between the ports. For the East Coast ports, it is unlikely that port or terminal infrastructure will need to be improved, but even in the event that improvements would need to be made, they would not be paid for through the Marine Highways Program. Because the Proposed Action utilizes existing ports, these improvements are not anticipated to result in land use changes at the port or in the surrounding community. Most likely, there would be no land use impacts as a result of the Program; however, site-specific projects would be assessed in project-based NEPA documents.

The representative port pairs identified in Table 2.1-10 under the Proposed Action have ample capacity and appropriate existing facilities and equipment to handle any incremental cargo volumes generated by a new conceptual Marine Highway service. Therefore, they are not expected to require improvements to port and terminal infrastructure to handle the increase in containerized cargoes. However, any potential future improvements would occur in an area that is already in use as a port and would have no impact to Section 4(f) resources. No impacts to Section 4(f) resources are anticipated with the representative port pairs under the Proposed Action. However, should future projects under

the Proposed Action identify the need to convert a Section 4(f) resource to a non-Section 4(f) use, then a Section 4(f) study would be required.

Because the Proposed Action would utilize existing ports and the Marine Highway Corridors are already used to transport cargo, the Proposed Action is anticipated to be consistent with the CZMPs of Florida, Maine, New Jersey, New York, and Virginia. Therefore, impacts to the coastal zone are not anticipated.

Impacts to coastal barrier resources are not anticipated because additional land development is not part of the Proposed Action.

8.3.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region representative port pairs would not be implemented. Therefore, there would be no impact to land use, Section 4(f) properties, or the coastal zone.

8.4 Infrastructure and Utilities

8.4.1 Affected Environment

Infrastructure

The Port of NY/NJ includes numerous terminals in New York and New Jersey, in the vicinity of Staten Island, six of which are dedicated to handling containers. In 2012, the port utilized 54 container cranes to facilitate the movement of approximately four million TEUs (Port of NY/NJ 2012).

The Port of Virginia/Norfolk includes four general cargo terminals that are capable of handling all types of cargo. Currently, the Port of Virginia/Norfolk operates 14 container cranes and handles approximately 1.2 million TEUs per year of containerized cargo (Port of Virginia 2012).

Port Canaveral handles dry bulk, liquid bulk, break bulk, general purpose cargo, containers, and RORO. Currently, the port handles approximately 4.5 million tons of cargo each year (Port Canaveral 2012).

The Port of Portland has eight terminals for handling multiple cargo types, including liquid bulk, dry bulk, break bulk, and containers. Currently, the Port of Portland handles approximately 14 million tons of cargo each year (Port of Portland, ME 2012).

Utilities

Utility services such as potable water supply, wastewater collection, and electrical supply require a network of components. These components include pipelines, pumps, treatment units, and storage basins for potable water and wastewater systems, as well as electrical systems such as transmission lines, substations, transformers, and distribution lines. Water and wastewater services are typically provided by the local municipality, whereas electrical service is typically provided by private companies.

Utility providers for the representative port pairs selected for the East Coast region are listed in Table 8.4-1.

Table 8.4-1. Utility Providers for the Representative Port Pairs in the East Coast Region

Port	Potable Water	Wastewater	Electrical Service
New York/New Jersey	New York City Water Utilities	New York City Water Utilities	New York Power Authority
Norfolk, VA	Norfolk Dept. of Utilities	Norfolk Dept. of Utilities	Dominion Virginia Power
Port Canaveral, FL	City of Cape Canaveral Public Works Dept.	City of Cape Canaveral Public Works Dept.	FL Power and Light Company
Portland, ME	Portland Water District	Portland Water District	Central Maine Power

8.4.2 Environmental Consequences

8.4.2.1 Proposed Action

The Proposed Action has the potential to increase the number and type of vessel calls and cargo handling requirements at the East Coast region participating ports, which in turn could potentially impact the existing equipment, infrastructure, and utilities at these ports. The impact is dependent on the available capacity and the increase in demands.

All of the port pairs selected for the East Coast region have appropriate existing infrastructure, port facilities, and equipment to handle any incremental cargo volumes generated by a new conceptual Marine Highway service. Therefore, infrastructure impacts associated with the Proposed Action are not anticipated to be significant.

The increases in water demand, wastewater flow, and electrical load associated with three additional vessels per week at each of the ports would be nominal compared to utility requirements associated with the vessels currently received. Therefore, utility impacts associated with the Proposed Action are not anticipated to be significant.

As future site-specific projects are developed, it may be necessary to determine which physical components of the terminal infrastructure and cargo handling equipment would be impacted and perform the necessary assessments to determine if there is sufficient capacity within all the components to meet the increased cargo handling at the participating ports.

8.4.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified for the East Coast region would not be implemented. Therefore, no impacts to infrastructure and utilities would occur under the No Action Alternative.

8.5 Socioeconomics

8.5.1 Affected Environment

<u>Employment and Income</u>

There are a number of large ports located along the East Coast of the U.S. The Port of NY/NJ, the largest East Coast port, supports nearly 280,000 jobs, of which, approximately 170,000 are direct port industry

jobs. The Port of Virginia/Norfolk supports approximately 26,000 regional jobs, with smaller ports such as Port Canaveral supporting about 2,400 jobs in its region.

The U.S. Bureau of Labor and Statistics keeps statistics on the number of people employed regionally for specific industries. Table 8.5-1 estimates the number of people employed in the Transportation and Warehousing Industry for the past 10 years in the East Coast region by port pair. These numbers are included to provide a general indication of the transportation industry in the regions. Although it is assumed that many of the transportation jobs in the port regions would be either directly or indirectly associated with the port, all jobs are not necessarily attributed to port operations.

Table 8.5-1. Transportation and Warehousing Regional Employment – East Coast Region (in thousands)

Year	NY/NJ and Norfolk, VA	Norfolk, VA and Canaveral, FL	NY/NJ and Portland, ME
2002	164.3	3.3	171.3
2003	184.9	26.2	169.0
2004	184.2	27.0	168.1
2005	184.3	27.7	167.8
2006	187.2	27.2	170.8
2007	187.8	26.6	171.8
2008	187.0	25.7	171.6
2009	177.1	23.9	162.7
2010	174.1	24.3	159.2
2011	176.9	25.2	161.8

Source: U.S. Bureau of Labor Statistics 2012.

8.5.2 Environmental Consequences

8.5.2.1 Proposed Action

Employment and Income

The methods and assumptions for estimating impacts of the Proposed Actions in this PEA were described in Section 4.5.2. The substitution of the conceptual Marine Highway service for long haul truck service between the port pairs identified for the East Coast region were estimated to result in the creation of jobs and income associated with the proposed Marine Highway service and the loss of jobs and income associated with the reduction of long haul (one-way) trucking along these routes. The gains and losses associated with the cargo volumes listed in Table 2.1-10 are estimated in Table 8.5-2.

The operation of the conceptual Marine Highway service between the Ports of NY/NJ and Norfolk is estimated to result in a loss of 118 direct trucking jobs in the long haul sector, and the creation of 325 direct port industry jobs. The majority of port sector jobs would be with members of the ILA and U.S. merchant mariners onboard the vessels and ATB providing the service between the Port of NY/NJ and the Port of Virginia/Norfolk (Norfolk marine terminals).

The operation of the conceptual Marine Highway service between the Ports of Virginia/Norfolk and Canaveral is estimated to result in a reduction of 296 direct long haul truck jobs, which would be replaced with 480 port sector jobs. The majority of the port sector jobs would be held by members of the ILA as well as crew on the ATB.

The operation of the conceptual Marine Highway service between the Ports of NY/NJ and Portland is estimated to result in a reduction of 158 direct long haul truck jobs, which would be replaced with 389 port sector jobs.

Table 8.5-2. Economic Impacts of the Marine Highway Service - East Coast Region

	Long Haul Trucking (Losses)	Marine Highway Service (Gains)	Net Impacts
New York/New Jersey to Norfolk, VA			
Jobs			
Direct	118	325	207
Induced	126	395	269
Indirect	66	183	117
TOTAL JOBS	**310**	**903**	**593**
Personal Income (1,000)			
Direct	$5,310	$17,290	$11,980
Re-spending/Local Consumption	$11,495	$37,430	$25,935
Indirect	$2,705	$7,458	$4,753
TOTAL (1,000)	**$19,510**	**$62,178**	**$42,668**
Federal, State, and Local Taxes (1,000)	$5,794	$18,467	$12,673
Norfolk, VA to Canaveral, FL			
Jobs			
Direct	296	480	184
Induced	316	623	307
Indirect	166	270	104
TOTAL JOBS	**778**	**1,373**	**595**
Personal Income (1,000)			
Direct	$13,320	$27,825	$14,505
Re-spending/Local Consumption	$28,835	$60,236	$31,401
Indirect	$6,785	$11,011	$4,226
TOTAL (1,000)	**$48,940**	**$99,072**	**$50,132**
Federal, State, and Local Taxes (1,000)	$14,535	$29,424	$14,889
New York/New Jersey to Portland, ME			
Jobs			
Direct	158	389	231
Induced	169	477	308
Indirect	89	219	130
TOTAL JOBS	**416**	**1,085**	**669**
Personal Income (1,000)			
Direct	$7,110	$20,982	$13,872
Re-spending/Local Consumption	$15,392	$45,421	$30,029
Indirect	$3,622	$8,914	$5,292
TOTAL (1,000)	**$26,124**	**$75,317**	**$49,193**
Federal, State, and Local Taxes (1,000)	$7,759	$22,369	$14,610

The majority of the port sector jobs would be held by members of the ILA as well as U.S. merchant marine crew on the vessels.

For all three port pairs identified for the East Coast region, the estimated results of transitioning from the long haul truck service to the Marine Highway service indicate that while there are lost jobs and income, it is estimated that there would be increases in both the overall number of jobs created and personal income. Therefore, there are no significant employment and income impacts associated with the Proposed Action for the East Coast region.

These findings are based on general formulas used for calculating employment and income. A more in-depth assessment may be required for future site-specific projects in the East Coast region to better define the measureable logistics costs of the proposed services and to further assess the impacts to the logistics supply chains and strategies of the targeted users.

8.5.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region representative port pairs would not be implemented. Therefore, there would be no impact to employment and income.

8.6 Recreation

8.6.1 Affected Environment

Regional

The East Coast region provides a wealth of coastal- and water-dependent recreational opportunities from the rocky coastline of Maine to the Caribbean beaches of Puerto Rico. Recreational activities range from boating, surfing, kiteboarding, swimming, diving, fishing, and hunting to walking, sunning, wildlife viewing, and picnicking. Public access to coastal and inland bodies of water is a vital component of local quality of life and an important draw for tourism.

The waterways potentially affected by projects in the East Coast region include coastal waters of the Atlantic Ocean, the Atlantic Intracoastal Waterway, Hudson River, Hampton Roads, Chesapeake Bay, James River, and Caribbean Sea. Ports would be served in Maine, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Florida, and Puerto Rico (refer to Section 2.1, *Proposed Action*, for additional detail).

Recreational activities, such as boating, fishing, and hunting, are protected and regulated by a number of State, regional, and local agencies and jurisdictions.

Port Pairs

The Port of NY/NJ is located in Newark Bay and Upper Bay. The area contains numerous recreational resources including the Statue of Liberty National Monument, Ellis Island Immigration Museum, Liberty State Park, as well as recreational boating marinas. The Port of Virginia is located in Norfolk, VA, in the Hampton Roads area at the mouth of the Chesapeake Bay. There are numerous recreational opportunities in the area, including the Nauticus Maritime Center, Hampton Roads Naval Museum, USS *Wisconsin*, boat tours, and recreational boating and fishing.

Port Canaveral is located in Cape Canaveral, FL. In addition to the wealth of water-related activities in the area, the port includes restaurants, shops, three public parks, boat ramps, an oceanfront beach with camping, playground, store, and fishing pier. The Port of Portland, ME is located in Portland Harbor. Recreational opportunities in the area include boating, fishing, and sightseeing.

8.6.2 Environmental Consequences

8.6.2.1 Proposed Action

Regional

Given the frequency of the conceptual Marine Highway service between the selected East Coast region port pairs and the vessels intend to utilize existing shipping routes between existing ports, the Proposed Action is not expected to impact recreation opportunities within the East Coast region. However, potential impacts to recreation from future site-specific actions proposed for implementation under the Program may need to be addressed in project-based NEPA documents.

Port Pairs

At the time this PEA was written there is no Marine Highway service connecting the terminal facilities at the Port of NY/NJ and Norfolk, VA or Portland, ME, nor is there a service between Norfolk and Canaveral. The conceptual Marine Highway services as depicted in Table 2.1-10 would be completely new services along this corridor and between these port pairs. However, given the frequency of the conceptual Marine Highway service between the port pairs and the vessels that would transit along existing routes between existing ports, negligible impacts to recreation are anticipated.

8.6.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region representative port pairs would not be implemented. Therefore, there would be no change or impact to recreation under the No Action Alternative.

8.7 Traffic and Transportation

8.7.1 Affected Environment

Truck Traffic

New York/New Jersey to Norfolk, VA

The landside corridor between the ports of NY/NJ and Norfolk, VA is predominantly I-95. I-95 is the major north-south landside freight corridor on the East Coast. The highway distance from NY/NJ to Norfolk is approximately 360 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately seven hours. This corridor is home to 15 large marine ports and much of the freight originating from these ports includes transportation along I-95. This results in more than a dozen major freight truck bottlenecks along this route.

The Port of NY/NJ terminals are all located in areas with landside congestion. The port is served by a network of collector and arterial roads with access to I-78 and I-95 within a few miles.

The Port of Virginia/Norfolk is a large deepwater port located on the Elizabeth River at the mouth of the Chesapeake Bay. It occupies nearly 650 acres of land in downtown Norfolk. There is a network of collector roads just east of the port that provides access to the port and multiple access points to I-564, within two miles of the port.

Norfolk, VA to Canaveral, FL

The landside corridor between the ports of Norfolk, VA and Canaveral, FL is the southern extension to the I-95 corridor. The highway distance from Norfolk to Canaveral is approximately 750 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately 12 hours. As discussed above, the entire I-95 corridor is home to 15 large marine ports and much of the freight originating from these ports includes transportation along I-95. This results in more than a dozen major freight truck bottlenecks along this route.

The Port of Virginia/Norfolk is described above. Port Canaveral is accessed directly from FL A1A. The A1A is a four-lane divided highway connecting Canaveral Island to the mainland and access to I-95 is 13 miles west.

New York/New Jersey to Portland, ME

The landside corridor between the ports of NY/NJ and Portland, ME is the northern extension of the I-95 corridor. The highway distance from NY/NJ to Portland is approximately 325 miles. At driving speeds of 55 to 65 miles per hour, driving time is estimated to be approximately six hours. As noted, the I-95 corridor already includes numerous freight truck bottlenecks and it is anticipated that future freight volumes would further increase the congestion challenges.

The Port of NY/NJ is described above. The Port of Portland is served by a network of arterial and connector roads that provide access to the port and multiple access points to I-295, within one mile of the port.

<u>Vessel Traffic</u>

New York/New Jersey to Norfolk, VA

The Marine Highway Corridor associated with the ports of NY/NJ and Norfolk is the M-95 corridor and other connecting commercial navigation channels. This segment of the corridor represents the central portion of the Marine Highway Corridors on the East Coast, with a distance of approximately 360 miles. Currently, there are no Marine Highway services operating between these or any other East Coast port pairs.

Norfolk, VA to Canaveral, FL

One of the Marine Highway Corridors associated with the Port of Virginia/Norfolk and Port Canaveral is the southern extension of the M-95 corridor. This route continues to use the coastal waters of the Atlantic Ocean and the Atlantic Intracoastal Waterway and includes a waterway distance of approximately 575 miles. With the exception of a barge service between Norfolk and Richmond, VA, there are no Marine Highway services operating on the M-95 corridor at this time.

New York/New Jersey to Portland, ME

The Marine Highway associated with the ports of NY/NJ and Portland is the northern extension of the M-95 corridor. This route continues to use the coastal waters of the Atlantic Ocean and the Atlantic Intracoastal Waterway and includes a waterway distance of approximately 400 miles. As discussed above, there are no Marine Highway services operating between these or any other East Coast port pairs on the M-95 Marine Highway Corridor at this time.

8.7.2 Environmental Consequences

8.7.2.1 Proposed Action

The Proposed Action has the potential to reduce traffic congestion along the busy roadways traveled by long haul trucks in the East Coast region. By transferring the transportation of cargo from trucks to vessels, there would be a decrease in the number of trucks on the nation's highways. Consequently, there would be an increase in the amount of vessel trips within the existing Marine Highway Corridors on the East Coast.

This section identifies the number of truck miles and hours of long haul transport that are being reduced as a result of the implementation of the Proposed Action, as well as the additional vessel traffic that would be introduced to the existing Marine Highway Corridors. Similar assessments of impacts to ground and vessel traffic may be required for future site-specific projects proposed in the East Coast region to confirm effects are comparable along all corridors.

<u>Truck Traffic</u>

New York/New Jersey to Norfolk, VA

Based on the conceptual Marine Highway services outlined in Table 2.1-10, there would be a reduction of 1,400 truck trips along this corridor each week. This equates to a reduction of 504,000 miles and 9,800 hours of truck traffic along this route each week. As the ports served by this route have relatively high volumes of traffic, this reduction of truck traffic would not be significant. However, any reduction indicates there would be positive impacts from reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between the ports of NY/NJ and Norfolk, VA.

Norfolk, VA to Canaveral, FL

Based on the conceptual Marine Highway services outlined in Table 2.1-10, a reduction of 1,400 truck trips per week would be expected along this corridor. This equates to a total of 1,050,000 miles and 16,800 hours of truck traffic reduced along this route each week. As the ports served by this route have relatively high volumes of traffic, this reduction of truck traffic would not be significant. However, any reduction indicates there would be positive impacts from reduction in traffic congestion associated with long haul trucking traffic with implementation of the proposed Marine Highway service between the ports of Norfolk, VA and Canaveral, FL.

New York/New Jersey to Portland, ME

Based on the conceptual Marine Highway services outlined in Table 2.1-10, a reduction of 1,800 truck trips per week would be expected along this corridor. This equates to a total reduction of 585,000 miles and 10,800 hours of truck traffic along this route each week. Because of the relative size of the two ports, the decrease in truck traffic in and around NY/NJ would be much less noticeable than the reduction in truck traffic closer to Portland. Regardless of the degree of impacts to truck traffic in, around, and between the ports, this assessment indicates that there would be positive impacts from the reduction in traffic congestion associated with long haul trucking traffic with the implementation of the proposed Marine Highway service between the ports of NY/NJ and Portland, ME.

<u>Vessel Traffic</u>

New York/New Jersey to Norfolk, VA

Based on the conceptual Marine Highway services outlined in Table 2.1-10, the number of vessel trips would increase along this corridor by six vessel trips per week (three in each direction). For OGVs traveling at 20 knots, this route would require approximately 15 hours for one-way operation. For the ATB vessels, operating at 12 knots, the one-way operation would require approximately 25 hours. Assuming two OGVs and one ATB per week, a total of 110 hours of additional vessel traffic would be seen along this corridor. As both ports currently support over a million tons of cargo handling each year, this increase in vessel traffic would have negligible impact on the Marine Highway Corridors on the East Coast and therefore, vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

Norfolk, VA to Canaveral, FL

Based on the conceptual Marine Highway services outlined in Table 2.1-10, the number of vessel trips would increase along this corridor by six vessel trips per week (3 in each direction). For OGVs, traveling at 20 knots, this route would require approximately 32 hours for one-way operation. For the ATB vessels, operating at 12 knots, the one-way operation would require approximately 53 hours. Assuming two OGVs and one ATB per week, a total of 234 hours of additional vessel traffic would be seen along this corridor. As both ports currently support over a million tons of cargo handling each year, this increase in vessel traffic would have minimal impact on the Marine Highway Corridors on the East Coast and therefore, vessel traffic impacts associated with the Proposed Action would not be significant.

New York/New Jersey to Portland, ME

Based on the conceptual Marine Highway services outlined in Table 2.1-10, the number of vessel trips would increase along this corridor by six vessel trips per week (three in each direction). For OGVs, traveling at 20 knots, this route would require approximately 21 hours for one-way operation. For the ATB vessels, operating at 12 knots, the one-way operation would require approximately 36 hours. Assuming two OGVs and one ATB per week, a total of 156 hours of additional vessel traffic would be seen along this corridor. Because of the size of the Port of NY/NJ, the increase in vessel traffic in and around this area would be negligible. However, due to the relative size of the Port of Portland, the increased vessel traffic in and around this port may be more noticeable, but not significant. Although there would likely be some impact to vessel traffic on portions of the Marine Highway Corridors on the East Coast, the vessel traffic impacts associated with the Proposed Action are not anticipated to be significant.

8.7.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region representative port pairs would not be implemented. Truck traffic would continue as it is today, with landside routes that suffer congestion.

8.8 Biological Resources

8.8.1 Affected Environment

<u>Vegetation and Wildlife</u>

Because the establishment and operation of the conceptual Marine Highway services along the East Coast would occur in existing ports and along established shipping corridors, extensive stands of upland vegetation or SAV are not anticipated to be present in the area that could be affected by the Proposed Action. Upland areas within the ports are expected to be developed and devoid of vegetation while ship berthing areas and navigation channels are expected to be too deep for the establishment of SAV. Because of the broad geographic scale of the Proposed Action, biological resources cannot be described in detail at this time. Site-specific analysis of vegetation and wildlife communities at each port location and along the existing Marine Highway Corridors may be needed during the preparation of project-based NEPA documentation to determine the presence and composition of vegetation and wildlife communities in the project area, if necessary. A general discussion of vegetation and wildlife on a regional scale is presented herein.

The composition of upland vegetation communities in the East Coast region varies by location and is largely dependent on temperature, soil type, and the availability of sunlight and water. Wildlife populations are generally determined by the habitat quality (e.g., size, composition, level of human disturbance) and food and water availability of the area. The broad ecological communities of North America have been categorized and mapped at three levels. Level I is the most general of the classification systems and presents a continental perspective; dividing North America in 15 ecoregions. Level II presents more of a national/regional perspective and divides the continent into 52 ecoregions,

whereas Level III presents a regional perspective and divides the continent into approximately 200 ecoregions (CEC 1997). Six ecoregions comprise the East Coast region under the Level III classification system (CEC 2006). The vegetation and wildlife commonly associated with each of these ecoregions is described in the following paragraphs.

Northeastern Coastal Zone: This ecoregion covers most of southern New England and the coastal areas of New Hampshire and southern Maine. The natural vegetation found in this ecoregion consists of Appalachian oak forest and northeastern oak-pine forest. Species associated with these forest types include white oak, red oak, hickories *(Carya sp.)*, and white pine. In cooler or moderately moist areas, maple *(Acer sp.)*, beech *(Fagus sp.)*, birch (*Betula sp.*), and hemlock (*Tsuga sp.*) are found. Wildlife native to this ecoregion includes: white-tailed deer, black bear, bobcat, coyote, beaver, gray squirrel, and white-footed mouse (*Peromyscus leucopus*) (Wiken et al. 2011).

Atlantic Coastal Pine Barrens: This region includes the Pine Barrens area of New Jersey, Long Island, NY, and Cape Cod and nearby islands in Massachusetts. Vegetation found in this ecoregion mostly consists of pine-oak forest stands with pitch pine (*Pinus rigida*), scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), shortleaf pine, and chestnut oak (*Quercus prinus*). In inland areas, mixed oak forests with white and black oaks, American beech (*Fagus grandifolia*), pignut (*Carya glabra*), and mockernut hickories occur. Historically, black walnut, tulip tree (*Lirirodendron tulipifera*), and red maple were present but have largely been cleared. Some Atlantic white cedar swamps occur in this ecoregion and in many areas are protected resources. Near the coast, there are dune woodlands composed of American holly, black cherry (*Prunus serotina*), red cedar (*Juniperus virginiana*), red maple, pitch pine, hackberry (*Celtis occidentalis*), and sassafras (*Sassafras albidum*). Low, shrub thickets of bayberry (*Myrica sp.*), beach plum (*Prunus maritime*), shadbush (*Amelanchier Canadensis*), and highbush blueberry (*Vaccinium corymbosum*) can also be found near the coast in this ecoregion. On outer dunes, there is a sparse cover of dune grass (*Leymus mollis sp.*), sea rocket (*Cakile edentula*), dusty miller (*Senecio cineraria*), saltwort (*Salsola kali*), and seaside spurge (*Euphorbia polygonifolia*). The region represents the northern limit for many southern plant species. Wildlife associated with this ecoregion includes: white-tailed deer, red fox, raccoon, cottontail rabbit, gray squirrel, ring-neck pheasant, bobwhite quail, piping plover, black skimmer (*Rynchops niger*), least tern (*Sterna antillarum*) and loggerhead turtle (Wiken et al. 2011).

Northern Piedmont: This ecoregion lies between more mountainous regions to the west and coastal plains to the east, in northern New Jersey, southeast Pennsylvania, northern Delaware, central Maryland, and northern Virginia. This ecoregion was historically dominated by Appalachian oak forest; however, much of the natural vegetation has been cleared. Vegetation species such as chestnut oak, white oak, red oak, hickories *(Carya sp.)*, ash (*Fraxinus sp.)*, elm (*Ulmus sp.)*, and tulip poplar occur, and eastern red cedar is common on abandoned farmland. Wildlife species associated with this ecoregion include: White-tailed deer, gray fox, red squirrel, raccoon, cottontail rabbit, mink, muskrat, ruffed grouse, meadowlark (*Sturnella sp.)*, field sparrow (*Spizella pusilla)*, and blue heron (*Ardea herodias)* (Wiken et al. 2011).

Middle Atlantic Coastal Plain: This ecoregion covers parts of the outer coastal plain, from southern NJ to the South Carolina/Georgia border. Forest cover in this region was once dominated by longleaf pine (*Pinus palustris)*, with a mix of oak *(Quercus sp.)*, hickory *(Carya sp.),* and pine (*Pinus sp.)* in the more

northern areas. Currently this ecoregion consists mostly of loblolly pine and some shortleaf pine, with patches of oak *(Quercus sp.)*, sweetgum, and cypress *(Taxiodium sp.)* occurring near major streams. On southern barrier islands, there are maritime forests of live oak *(Quercus sp.)*, sand laurel oak, and loblolly pine. Cordgrass (*Spartina sp.)*, saltgrass, and rushes (*Juncus sp.)* grow in coastal marshes in this region, and beach grass (*Ammophila sp.)* and sea oats (*Uniola paniculata)* dominate coastal dunes. Wildlife associated with this ecoregion include: black bear, white-tailed deer, bobcat, gray fox, raccoon, cottontail rabbit, gray squirrel, wild turkey, bobwhite quail, mourning dove, cormorants, herons *(Ardeidae spp.)*, northern cardinal, prothonotary warbler (*Protonotaria citrea)*, and box turtle (*Terrapene sp.)* regionwide and alligator may be present in the southern extent of the region (Wiken et al. 2011).

Southern Coastal Plain: This ecoregion extends from South Carolina and Georgia through much of central Florida, and along the Gulf Coast lowlands of the Florida Panhandle, Alabama, Mississippi, and eastern Louisiana. Upland forest vegetation native to this ecoregion includes longleaf pine, slash pine, pond pine, pond cypress, beech *(Fagus sp.)*, sweetgum, southern magnolia, white oak, and laurel oak. Floodplain forests found in the southern portion of this ecoregion contain bald cypress, pond cypress, water tupelo, bottomland oaks *(Quercus sp.)*, sweetgum, green ash, and water hickory. Black bear, white-tailed deer, bobcat, marsh rabbit, fox squirrel *(Sciurus sp.)*, manatee, egret *(Ardea sp.)*, blue heron, redcockaded woodpecker, indigo bunting, Florida scrub jay, box turtle, gopher tortoise, southern dusky salamander, scrub lizard, cottonmouth, and alligator occur within this ecoregion (Wiken et al. 2011).

Southern Florida Coastal Plain: This ecoregion is located at the southern tip of Florida, from Lake Okeechobee in the north to Key West in the south. Vegetation in this ecoregion is dominated by the Everglades and consists of extensive sawgrass, marshes with some tree-islands of slash pine, gumbo limbo, live oak, strangler fig, and royal palm. To the west in the Big Cypress area, cypress *(Callistris sp.)* are found in wet areas, and gumbo limbo, pigeon plum, live oak, and laurel oak are found in drier areas. On the eastern coastal strip are areas of slash pine, sand pine, scrub oak, and saw palmetto. Mangrove swamps are common on the southern coast and the islands of the Florida Keys. Wildlife associated with this ecoregion includes: alligator, American crocodile, Florida panther, Key deer, white-tailed deer, manatee, brown pelican, woodstork, ibis, and herons (Wiken et al. 2011).

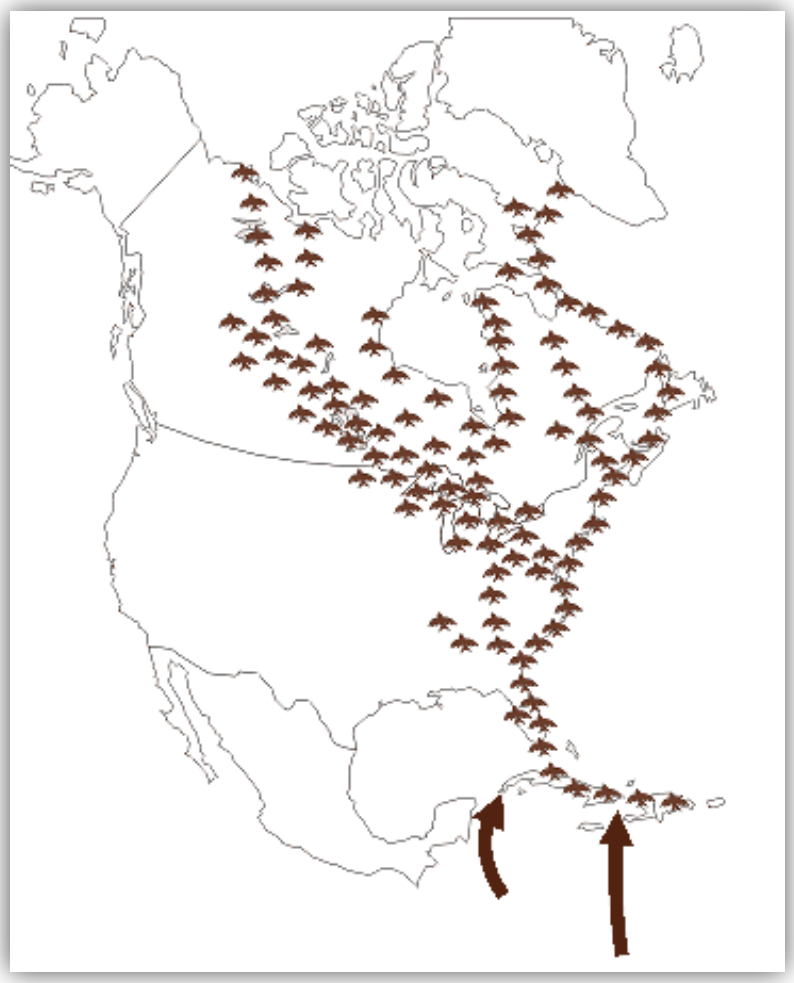
Migratory Birds

The East Coast region is an important bird migration corridor known as the Atlantic Flyway. The Atlantic Flyway extends from South America to Canada (Figure 8.9-1), and is traveled by hundreds of species of birds and millions of individuals during any single migration season. There are tens of thousands of exits and rest stops along the Flyway that migratory birds utilize to access natural habitat that suits their needs for refueling or breeding (Audubon 2012a). As such, it is not feasible to identify every bird species that may occur along the U.S. Atlantic coast.

The U.S. Atlantic states contain 908 IBAs, recognized by the National Audubon Society, many of which are associated with the coast or other watercourses. IBAs are sites that provide essential habitat for one or more species of bird. IBAs include sites for breeding, wintering, and/or migrating birds. IBAs may be a few acres or thousands of acres, but usually they are discrete sites that stand out from the surrounding landscape. IBAs may include public or private lands, or both, and they may be protected or

unprotected. Identification of a site as an IBA indicates its unique importance for birds (Audubon 2012b).

Due to the level of activity in the Portland, ME area and lack of suitable nesting habitat, the Port of Portland does not support large populations of migratory birds. However, Casco Bay is an important migratory stopover for birds as well as an important nesting site. Islands are often a preferred location for migratory birds as island locations have fewer disturbances from humans, fewer predators, and have a natural isolation. Maine's coastal islands provide important habitat for numerous species of birds. Many islands and their associated mudflats are used for feeding and resting by large numbers of migrating waterfowl and shorebirds. Islands also provide important habitat for neotropical migratory birds.



Source: Texas Parks and Wildlife Department 2012a.

Figure 8-1 Atlantic Flyway

The majority of birds that use the Port of NY/NJ area are water birds. These include loons, grebes, cormorants, waders, waterfowl (Anseriformes), shorebirds, gulls, and terns. A few areas along the west

(New Jersey) side of the port area are shallow and hold the potential to attract waders such as herons and egrets, and at low tide shorebirds such as dowitchers, sandpipers, and plovers.

Shooters Island Bird Sanctuary is located in Kill Van Kull near the southern extent of Newark Bay. This Island is part of the Harbor Herons Complex. This complex is considered significant habitat by USFWS because of the presence of major nesting colonies and foraging areas for herons, egrets, and ibises (USACE 2008).

The peregrine falcon has been removed from the Federal Endangered Species list and remains listed as endangered in New York and New Jersey. Peregrine falcons are known to nest within the study area, primarily on bridges and buildings. The nesting adults tend to stay in the vicinity during winter. The NY/NJ metropolitan area is important for peregrines, in that it is along the migratory route for the highly migratory subspecies that nest in Canada (USACE 2008).

Due to the level of activity in the port area and lack of suitable nesting habitat, the Port of Virginia/Norfolk does not support large populations of migratory birds. However, the Chesapeake Bay is an important migratory stopover for birds as well as an important nesting site. Islands are often a preferred location for migratory birds as island locations have fewer disturbances from humans, fewer predators, and have a natural isolation.

Activity levels in Port Canaveral preclude the area as habitat for most bird species; however, the port is located near the Merritt Island National Wildlife Refuge, which is an important stopping point for migratory birds and Canaveral National Seashore, which is an important habitat for over 300 species of birds (World Port Source2012c).

Fish

Numerous species of fish occur along the East Coast region, many of which are important species for commercial harvesting or are prey species for commercially harvested species. Commercially important fish species are managed under the MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). Three FMCs are responsible for managing fish stocks on the Atlantic coast: the New England FMC, the Mid-Atlantic FMC, and the South Atlantic FMC.

The managed fish species along the East Coast region are summarized in Table 8.8-1.

Table 8.8-1. Managed Fish Species of the East Coast Region

New England FMC	
American plaice	*Hippoglossoides platessoides*
Atlantic cod	*Gadus morhua*
Atlantic halibut	*Hippoglossus hippoglossus*
Atlantic herring	*Clupea harengus*
Atlantic sea scallop	*Placopecten magellanicus*
Barndoor skate	*Dipturus laevis*
Clearnose skate	*Raja eglanteria*
Goosefish	*Lophius americanus*
Haddock	*Melanogrammus aeglefinus*
Little skate	*Leucoraja erinacea*
Ocean pout	*Macrozoarces americanus*

Table 8.8-1. Managed Fish Species of the East Coast Region	
Offshore hake	*Merluccius albidus*
Pollock	*Pollachius virens*
Red deepsea crab	*Chaceon quinquedens*
Redfish	*Sebastes spp.*
Red hake	*Urophycis chuss*
Rosette skate	*Leucoraja garmani virginica*
Silver hake	*Merluccius bilinearis*
Smooth skate	*Malacoraja senta*
Thorny skate	*Amblyraja radiate*
Winter skate	*Leucoraja ocellata*
White hake	*Urophycis tenuis*
Windowpane flounder	*Scophthalmus aquosus*
Winter flounder	*Pseudopleuronectes americanus*
Winter skate	*Leucoraja ocellata*
Witch flounder	*Glyptocephalus cynoglossus*
Yellowtail flounder	*Limanda ferruginea*
Mid-Atlantic FMC	
Atlantic mackerel	*Scomber scombrus*
Atlantic surfclam	*Spisula solidissima*
Black sea bass	*Centropristis striata*
Bluefish	*Pomatomus saltatrix*
Butterfish	*Peprilus triacanthus*
Longfin inshore squid	*Loligo pealeii*
Northern shortfin squid	*Illex illecebrosus*
Ocean quahog	*Arctica islandica*
Scup	*Stenotomus chrysops*
Spiny dogfish	*Squalus acanthias*
Summer flounder	*Paralichthys dentatus*
Tilefish	*Lopholatilus chamaeleonticeps*
South Atlantic FMC	
Almaco jack	*Seriola rivoliana*
Atlantic spade	*Chaetodipterus faber*
Banded rudderfish	*Seriola zonata*
Bank sea bass	*Centropristis ocyurus*
Blackfin snapper	*Lutjanus buccanella*
Black grouper	*Mycteroperca bonaci*
Black margate	*Anisotremus surinamensis*
Black sea bass	*Centropristis striata*
Black snapper	*Apsilus dentatus*
Blueline tilefish	*Caulolatilus microps*
Blue Stripe grunt	*Haemulon sciurus*
Cero	*Scomberomorus regalis*
Cobia	*Rachycentron canadum*
Coney	*Epinephelus fulvus*
Cubera snapper	*Lutjanus cyanopterus*
Dog snapper	*L. jocu*
Dolphin	*Coryphaena hippurus*
French grunt	*Haemulon flavolineatum*
Gag	*Mycteroperca microlepis*

Table 8.8-1. Managed Fish Species of the East Coast Region	
Golden crab	*Chaceon fenneri*
Goliath grouper	*Epinephelus itajara*
Graysby	*E. cruentatus*
Gray snapper	*Lutjanus griseus*
Gray triggerfish	*Balistes capriscus*
Greater amberjack	*Seriola dumerili*
Hogfish	*Lachnolaimus maximus*
Jolthead porgy	*Calamus bajonado*
King mackerel	*Scomberomorus cavalla*
Knobbed porgy	*Calamus nodosus*
Lane snapper	*Lutjanus synagris*
Lesser amberjack	*Seriola fasciata*
Little tunny	*Euthynnus alletteratus*
Mahogany snapper	*Lutjanus mahogoni*
Margate	*Haemulon album*
Misty grouper	*Epinephelus mystacinus*
Mutton snapper	*Lutjanus analis*
Nassau grouper	*Epinephelus striatus*
Penaeid shrimp (brown)	*Farfantepenaeus aztecus*
Penaeid shrimp (pink)	*F. duorarum*
Penaeid shrimp (white)	*Litopenaeus setiferus*
Ocean triggerfish	*Canthidermis sufflamen*
Queen snapper	*Etelis oculatus*
Queen triggerfish	*Balistes vetula*
Red grouper	*Epinephelus morio*
Red hind	*E. guttatus*
Red porgy	*Pagrus pagrus*
Red snapper	*Lutjanus campechanus*
Rock hind	*Epinephelus adscensionis*
Rock sea bass	*Centropristis philadelphica*
Rock shrimp	*Sicyonia brevirostris*
Saucereye porgy	*Calamus calamus*
Scamp	*Mycteroperca phenax*
Schoolmaster	*Lutjanus apodus*
Scup	*Stenotomus chrysops*
Sheepshead	*Archosargus probatocephalus*
Silk snapper	*Lutjanus vivanus*
Snowy grouper	*Epinephelus niveatus*
Spanish mackerel	*Scomberomorus maculatus*
Speckled hind	*Epinephelus drummondhayi*
Spiny lobster	*Panulirus argus*
Tiger grouper	*Mycteroperca tigris*
Tilefish	*Lopholatilus chamaeleonticeps*
Tomtate	*Haemulon aurolineatum*
Vermilion snapper	*Rhomboplites aurorubens*
Wahoo	*Acanthocybium solanderi*
Warsaw grouper	*Epinephelus nigritus*
Whiteboned porgy	*Calamus leucosteus*
White grunt	*Haemulon plumieri*

Table 8.8-1. Managed Fish Species of the East Coast Region	
Wreckfish	*Polyprion americanus*
Yellowmouth grouper	*Mycteroperca interstilitialis*
Yellowtail snapper	*Ocyrus chrysurus*

The New England FMC designated HAPCs for two of its managed species, Atlantic cod and Atlantic salmon. The Council designated a gravel/cobble bottom area on Georges Bank as an HAPC for juvenile Atlantic cod and 11 Maine rivers (Dennys, Machias, East Machias, Pleasant, Narraguagus, Ducktrap, Kennebec, Penobscot, St. Croix, Tunk Stream, and Sheepscot) as HAPCs for Atlantic salmon. The Atlantic cod HAPC is located outside of the M-95 operating area and would not be affected.

The Mid-Atlantic FMC has designated HAPCs for summer flounder (NOAA 2011o). HAPC for this species is described as "all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH." SAV is defined as "rooted, vascular, flowering plants that, except for some flowering structures, live and grow below the surface." Macroalgae is also designated because it serves a similar ecological function. The Council did not propose any special regulations for the areas designated as HAPCs and encourages states to take the measures necessary to protect HAPCs. Maps or geographic coordinates of the designated HAPCs were not available.

The South Atlantic FMC designated the following areas as HAPCs for the species within its jurisdiction (Figure 8.9-2):

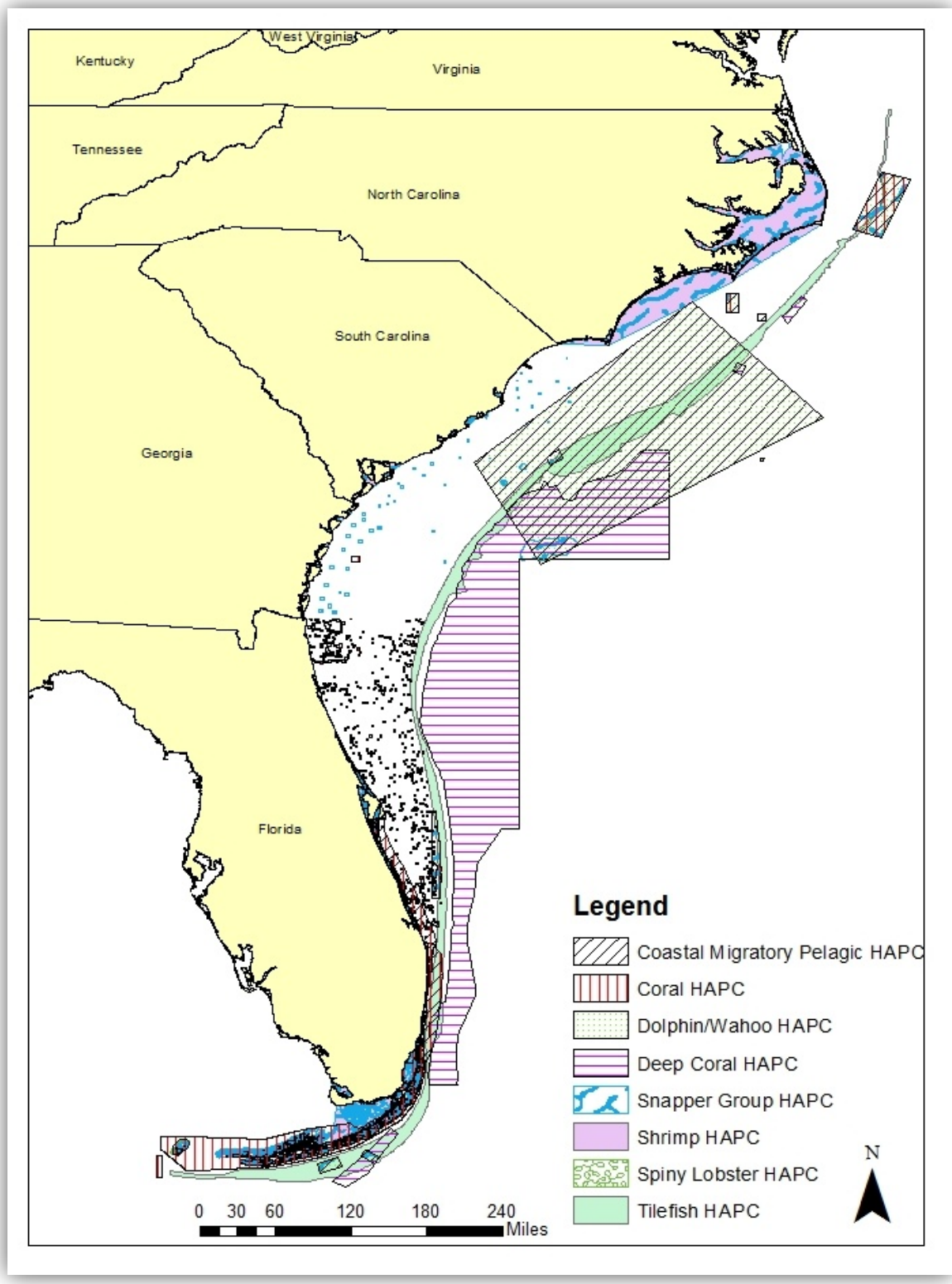


Figure 8-2 HAPC for Fish Species Managed by South Atlantic FMC

- Penaeid shrimp (white, pink, and brown):
    - all coastal inlets
    - all State-designated nursery habitats of particular importance to shrimp
    - State-identified overwintering areas
- Red drum (*Sciaenops ocellatus*):
    - all coastal inlets
    - all State-designated nursery habitats of particular importance to red drum
    - documented sites of spawning aggregations in North Carolina, South Carolina, Georgia, and Florida described in the Habitat Plan
    - other spawning areas identified in the future
    - SAV-identified areas
- Snapper-grouper management unit:
    - medium to high profile offshore hard bottoms where spawning normally occurs
    - areas of known or likely spawning aggregations
    - nearshore hard bottom areas
    - the Point
    - the Ten Fathom Ledge
    - Big Rock
    - the Charleston Bump
    - mangrove habitat
    - seagrass habitat
    - oyster/shell habitat
    - all coastal inlets
    - all State-designated nursery habitats of particular importance to snapper grouper
    - pelagic and benthic Sargassum
    - Hoyt Hills for wreckfish
    - the Oculina Bank HAPC
    - All hermatypic (type involved in reef formation) coral habitats and reefs
    - Manganese outcroppings on the Blake Plateau

Council-designated Artificial Reef Special Management Zones

- Coastal Migratory Pelagic Species:
    - sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras from the shore to the ends of the respective shoals (shoreward of the Gulf stream)
    - the Point
    - the Ten-Fathom Ledge
    - Big Rock
    - the Charleston Bump
    - Hurl Rocks

  - the Point off Jupiter Inlet
  - Worm reefs off the central east coast of Florida
  - nearshore hard bottom south of Cape Canaveral
  - the Hump off Islamorada, FL
  - the Marathon Hump off Marathon, FL
  - the "Wall" off the Florida Keys
  - Pelagic sargassum
  - Atlantic coast estuaries with high numbers of Spanish mackerel and cobia (abundance based on ELMR data) including Bogue Sound, New River, and Broad River

- Spiny Lobster (*Palinuridae*):
  - Florida Bay
  - Biscayne Bay
  - Card Sound
  - Coral/hard bottom habitat from Jupiter Inlet, FL through the Dry Tortugas, FL

- Coral, coral reefs, and live/hard bottom habitat:
  - 10-Fathom Ledge
  - Big Rock
  - the Point
  - Hurl Rocks
  - the Charleston Bump
  - Gray's Reef National Marine Sanctuary
  - Worm reefs off the central east coast of Florida
  - Oculina Banks off east coast of Florida from Ft. Pierce to Cape Canaveral
  - Nearshore hard bottom off east coast of Florida from Cape Canaveral to Broward County
  - Offshore hard bottom off the east coast of Florida from Palm Beach County to Fowey Rocks
  - Biscayne Bay
  - Biscayne National Park
  - the Florida Keys National Marine Sanctuary

NMFS designated HAPCs for sandbar shark, but not for any other Atlantic highly migratory species due to a general lack of scientific information detailing highly migratory species-habitat associations.

The FMP for Atlantic tunas, swordfish, and sharks designated "important nursery and pupping grounds" in several Atlantic coast estuaries as HAPCs for sandbar sharks, specifically shallow areas and the mouth of the Great Bay, NJ, lower and middle Delaware Bay, lower Chesapeake Bay, MD, and near the Outer Banks, NC in areas of Pamlico Sound adjacent to Hatteras and Ocracoke Islands and offshore those islands (Figure 8.9-3) (NMFS 1999).

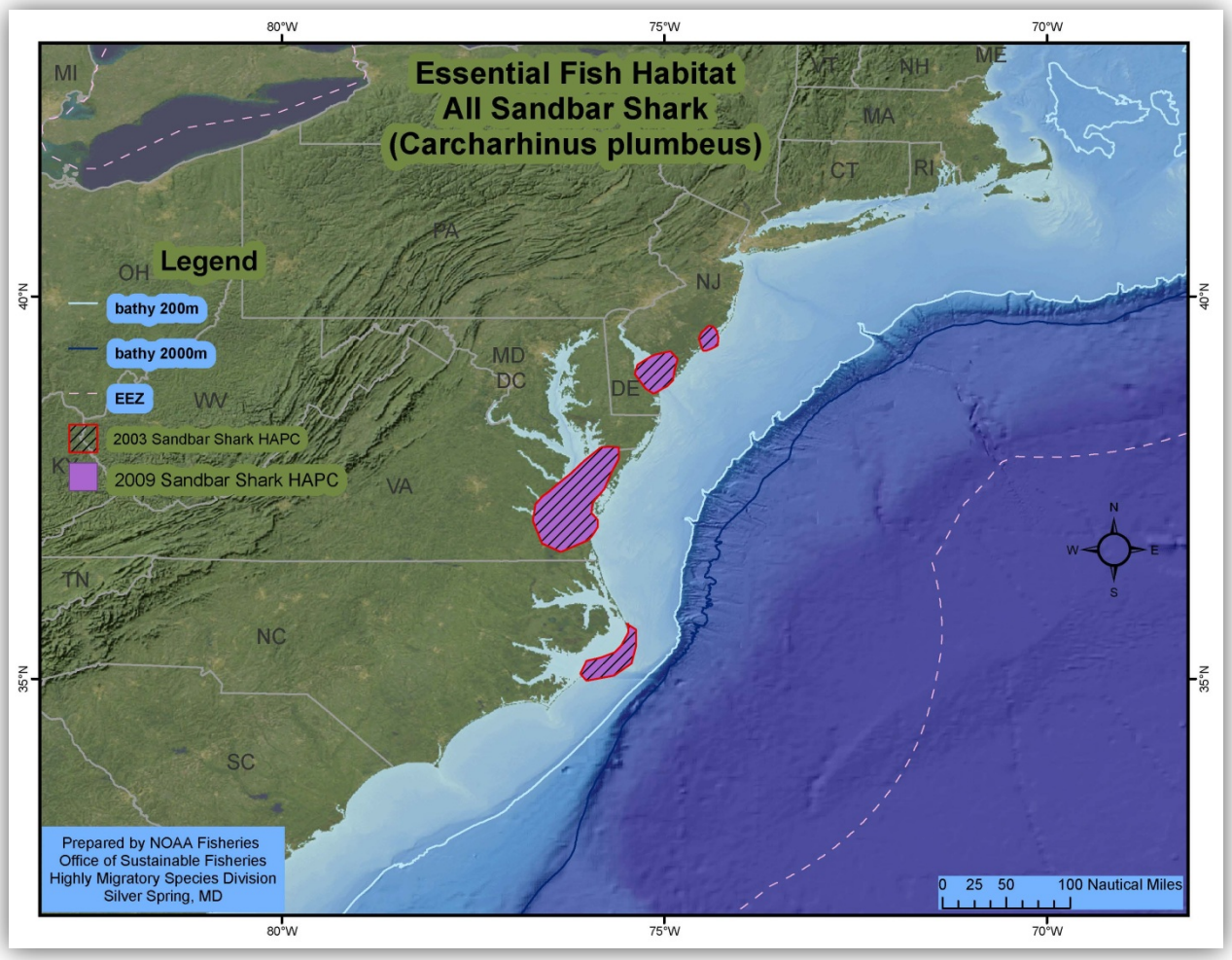


Figure 8-3 HAPC for Sandbar Shark

EFH has been designated in the Portland port area for several finfish species and life stages (Table 8.8-2).

Table 8.8-2. Essential Fish Habitat in the Port of Portland

Species	Eggs	Larvae	Juvenile	Adults
American plaice *(Hippoglossoides platessoides)*	X	X	X	X
Atlantic cod *(Gadus morhua)*	X	X	X	X
Atlantic halibut *(Hippoglossus hippoglossus)*	X	X	X	X
Atlantic herring *(Clupea harengus)*		X	X	X
Atlantic mackerel *(Scomber scombrus)*			X	X
Atlantic salmon *(Salmo salar)*				X
Atlantic sea scallop *(Placopecten magellanicus)*	X	X	X	X
Bluefin tuna *(Thunnus thynnus)*				X
Bluefish *(Pomatomus saltatrix)*			X	X
Haddock *(Melanogrammus aeglefinus)*				X
Ocean pout *(Macrozoarces americanus)*	X	X	X	X
Pollock *(Pollachius virens)*			X	
Red hake *(Urophycis chuss)*			X	X
Silver hake *(Merluccius bilinearis)*			X	X
White hake *(Urophycis tenuis)*			X	X
Windowpane flounder *(Scophthalmus aquosus)*	X	X	X	X
Winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
Yellowtail flounder *(Limanda ferruginea)*	X	X	X	X

Source: NOAA 2012b.

EFH has been designated in the NY/NJ port area for several finfish species and life stages (Table 8.8-3). The Port area encompasses two 10-minute by 10-minute squares provided for use in determining the presence of EFH by the NMFS (NMFS 2011a).

Table 8.8-3. EFH in the Port of New York/New Jersey

Species	Eggs	Larvae	Juvenile	Adults
Atlantic herring (*Clupea harengus)*		X	X	X
Atlantic mackerel *(Scomber scombrus)*			X	X
Black sea bass *(Centropristus striata)*			X	X
Bluefish *(Pomatomus saltatrix)*			X	X
Butterfish *(Peprilus triacanthus)*		X	X	X
Cobia *(Rachycentron canadum)*	X	X	X	X
Dusky shark *(Carcharinus obscurus)*		X	X	
King mackerel *(Scomberomorus cavalla)*	X	X	X	X
Sand tiger shark *(Odontaspis taurus)*		X		
Sandbar shark *(Carcharinus plumbeus)*		X	X	X
Scup *(Stenotomus chrysops)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
Summer flounder *(Paralichthys dentatus)*		X	X	X
Red hake *(Urophycis chuss)*	X	X	X	X
Winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
Windowpane flounder *(Scophthalmus aquosus)*	X	X	X	X

Source: NOAA 2012b.

The Port of Virginia/Norfolk is classified by NOAA as EFH for those species and life stages listed in Table 8.8-4.

Table 8.8-4. EFH in the Port of Virginia/Norfolk

Species	Eggs	Larva	Juvenile	Adults
Atlantic butterfish *(Peprilus triacanthus)*	X	X	X	X
Bluefish *(Pomatomus saltatrix)*			X	X
Black sea bass *(Centropristus striata)*	N/A		X	X
Clearnose Skate *(Raja elaganteria)*			X	X
Cobia *(Rachycentron canadum)*	X	X	X	X
Dusky shark *(Carcharinus obscurus)*		X	X	
King mackerel *(Scomberomorus cavalla)*	X	X	X	X
Little Skate *(Leucoraja erinacea)*			X	X
Red drum *(Sciaenops occelatus)*	X	X	X	X
Sandbar shark *(Carcharinus plumbeus)*		X	X	X
Sandbar shark *(C. plumbeus)*		HAPC	HAPC	HAPC
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
Summer flounder *(Paralicthys dentatus)*		X	X	X
Windowpane flounder *(Scopthalmus aquosus)*	X		X	X
Winter Skate *(Leucoraja ocellata)*			X	X

Source: NOAA 2012b.
Note: X indicates EFH is designated for the lifestage
HAPC: habitat area of particular concern
N/A: not applicable

The Virginia port area is classified as HAPC for larvae, juvenile and adult sandbar shark (*Carcharhinus plumbeus*). This designation denotes EFH that is particularly important to the long term productivity of the species and/or is particularly vulnerable to degradation. The intent of the designation is to focus greater attention on conservation efforts. The lower Chesapeake Bay and the lagoons along the Eastern Shore constitute the principal nursery grounds for sandbar sharks.

Port Canaveral is classified as EFH for 37 fish species as well as brown shrimp, white shrimp, pink shrimp, and spiny lobster (Table 8.8-5). Six coastal migratory pelagic fish species have also been included as a result of their distribution patterns along the Florida coast. In addition, the nearshore bottom and offshore reef habitats of South Florida have also been designated as HAPC (Port Canaveral 2011).

Marine Mammals

Two major groups of marine mammals are cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals, sea lions, and walruses). All marine mammals are protected under the MMPA; some marine mammals may be designated as "depleted" under the MMPA. Endangered and threatened marine mammals are further protected under the ESA and are discussed in the following section (Threatened and Endangered Species).

Table 8.8-5. EFH in Port Canaveral	
Bar jack	*Caranx rubber*
Black grouper	*Mycteroperca bonaci*
Black margate	*Anisotremus surinamensis*
Black sea Bass	*Centropristis striata*
Blue runner	*Caranx crysos*
Blue stripe grunt	*Haemulon sciurus*
Brown shrimp	*Farfantepenaeus aztecus*
Cero*	*Scomberomorus regalis*
Cobia*	*Rachycentron canadum*
Cottonwick	*Haemulon melanurum*
Crevalle jack	*Caranx hippos*
Dog snapper	*Lutjanus jocu*
Dolphin	*Coryphaena hippurus*
French grunt	*Haemulon flavolineatum*
Gag	*Mycteroperca microlepis*
Goliath grouper	*Epinephelus itajara*
Gray snapper	*Lutjanus griseus*
Gray triggerfish	*Balistes capriscus*
Greater amberjack	*Seriola dumerili*
Hogfish	*Lachnolaimus maximus*
Jolthead porgy	*Calamus arctifrons*
King mackerel*	*Scomberomorus cavalla*
Lane snapper	*Lutjanus synagris*
Little tunny*	*Euthynnus alletteratus*
Mahogany snapper	*Lutjanus mahogoni*
Margate	*Haemulon album*
Mutton snapper	*Lutjanus analis*
Ocean triggerfish	*Canthidermis sufflamen*
Pink shrimp	*Farfantepenaeus duorarum*
Porkfish	*Anisotremus virginicus*
Puddingwife	*Halichoeres radiatus*
Queen triggerfish	*Balistes vetula*
Rock sind	*Epinephelus adscensionis*
Red grouper	*E. morio*
Sailors choice	*Haemulon parra*
Schoolmaster	*Lutjanus apodus*
Sheepshead	*Archosargus probatocephalus*
Smallmouth grunt	*Haemulon chrysargyreum*
Spadefish	*Chaetodipterus faber*
Spanish grunt	*Haemulon macrostomum*
Spanish mackerel*	*Scomberomorus maculates*
Spiny lobster	*Panulirus argus*
Tomtate	*Haemulon aurolineatum*
White grunt	*H. plumieri*
White shrimp	*Litopenaeus setiferus*
Yellow jack	*Caranx bartholomaei*
Yellowtail snapper	*Ocyurus chrysurus*

Source: Port Canaveral 2011.
Note: * indicates coastal migratory pelagic fish species.

Thirty-two marine mammal species have the potential to occur in the waters off of the East Coast region and are listed in Table 8.8-6. Species with an asterisk are protected under the ESA and are discussed under Threatened and Endangered Species.

Table 8.8-6. Marine Mammal Species Potentially Occurring in the Waters Off of the East Coast

Seals	**Occurrence**
Gray seal *(Halichoerus grypus*)	W. North Atlantic
Harbor seal *(Phoca vitulina*)	W. North Atlantic
Harp seal *(Pagophilus groenlandicus*)	NW North Atlantic
Hooded seal *(Cystophora cristata*)	NW North Atlantic
Whales, Dolphins and Porpoises	**Occurrence**
Atlantic spotted dolphin (*Stenella frontalis)*	W. North Atlantic
Atlantic white-sided dolphin *(Lagenorphynchus acutus)*	W. North Atlantic
Bottlenose dolphin (*Tursiops truncatus)*	W. North Atlantic Coastal
Blue whale *(Balaenoptera musculus)**	W. North Atlantic
Clymene dolphin (*Stenella clymene)*	W. North Atlantic
Cuvier's beaked whale *(Ziphius cavirostris)*	W. North Atlantic
Dwarf sperm whale *(Kogia sima)*	W. North Atlantic
Fin whale *(Balaenoptera physalus)**	W. North Atlantic
Fraser's dolphin *(Lagenodelphis hosei)*	W. North Atlantic
Harbor porpoise *(Phocoena phocoena)*	Gulf of Maine/Bay of Fundy
Humpback whale *(Megaptera novaeangliae)**	Gulf of Maine
Killer whale *(Orcinus orca)*	W. North Atlantic
Long-finned pilot whale *(Globicephala melas)*	W. North Atlantic
Melon-headed whale (*Peponocephala electra)*	W. North Atlantic
Mesoplodont beaked whales (*Mesoplodon sp.)*	W. N. Atlantic
Minke Whale *(Balaenoptera acutorostrata)*	North Atlantic
North Atlantic right whale*(Eubalaena glacialis)**	Western
Northern bottlenose whale (*Hyperoodon ampullatus)*	W. North Atlantic
Pantropical spotted dolphin (*Stenella attenuate)*	W. North Atlantic
Pygmy killer whale (*Feresa attenuate*)	W. North Atlantic
Pygmy sperm whale (*Kogia breviceps)*	W. North Atlantic
Risso's dolphin (*Grampus griseus)*	W. North Atlantic
Sei whale *(Balaenoptera borealis)**	Nova Scotia
Short-beaked common dolphin (*Delphinus delphis)*	W. North Atlantic
Short-finned pilot whale (*Globicephala macrorhynchus)*	W. North Atlantic
Sperm whale *(Physeter macrocephalus)**	North Atlantic
Spinner dolphin (*Stenella longirostris)*	W. North Atlantic
Striped dolphin (*S. ceoruleoalba)*	W. North Atlantic
White-beaked dolphin (*Lagenorhynchus albirostris)*	W. North Atlantic
West Indian manatee*(Trichechus manatus)**	FL

Source: NMFS 2009.
Note: * indicates species protected under the ESA.

The greatest threats to marine mammal species are from ship strikes, encounters with fishing gear, hunting, viral infections and toxic pollution. Ship strikes are more common to larger marine mammal species (i.e., whales). Strikes to pilot whale and dolphin species have been recorded, but are not as common (IWC 2011).

Many of the larger marine mammal species listed above prefer deeper, open ocean waters while others prefer nearshore environments and would be more likely to occur in the project area.

According to the Gulf of Maine Research Institute, 22 species of whales and 6 species of seals have been observed in the waters between Cape Cod and the southern tip of Labrador. These species have the potential to occur off of the waters of the Port of Portland and are summarized in Table 8.8-7.

Table 8.8-7. Species That Have the Potential to Occur Off the Waters of the Port of Portland

Atlantic walrus	*Odobenus rosmarus rosmarus*
Atlantic white-sided dolphin	*Lagenorphynchus acutus*
Beluga whale	*Delphinapterus leucas*
Blue whale	*Balaenoptera musculus*
Bottlenose dolphin	*Tursiops truncatus*
Dense-beaked whale	*Mesoplodon densirostris*
Fin whale	*Balaenoptera physalus*
Gray seal	*Halichoerus grypus*
Harbor porpoise	*Phocoena phocoena*
Harbor seal	*Phoca vitulina*
Harp seal	*Pagophilus groenlandicus*
Hooded seal	*Cystophora cristata*
Humpback whale	*Megaptera novaeangliae*
Killer whale	*Orcinus orca*
Long-finned pilot whale	*Globicephala melas*
Minke whale	*Balaenoptera acutorostrata*
North Atlantic right whale	*Eubalaena glacialis*
North sea beaked whale	*Mesoplodon bidens*
Northern bottlenosed whale	*Hyperoodon ampullatus*
Pygmy sperm whale	*Kogia breviceps*
Ringed seal	*Pusa hispida*
Risso's dolphin	*Grampus griseus*
Sei whale	*Balaenoptera borealis*
Short-beaked common dolphin	*Delphinus delphis*
Sperm whale	*Physeter macrocephalus*
Striped dolphin	*P. catodon*
True's beaked whale	*Mesoplodon mirus*
White-beaked dolphin	*Lagenorhynchus albirostris*

Humpback whales have been recorded in the Hudson-Raritan estuary; however, marine mammals are not known to occur in the NY/NJ port area.

The bottlenose dolphin occurs in the Chesapeake Bay. Individuals are sighted in the Chesapeake Bay beginning in about mid-April and are prevalent in the lower Chesapeake Bay from May through October (U.S. Fleet Forces 2009). Only sporadic occurrences are noted during the remainder of the year.

Thirty-five marine mammal species have records in nearshore waters of the mid to northern Florida Atlantic coast. Of these 35 species, only 15 are expected to occur regularly in the region (Table 8.8-8). Some marine mammal species occur in the area year-round (e.g., bottlenose dolphins and beaked whales), while others (e.g., North Atlantic right and humpback whales) occur seasonally as they migrate through the area.

Table 8.8-8. Marine Mammal Species that Regularly Occur in the Port Canaveral Region

Common Name	*Scientific Name*	(Federal Status) occurrence
Atlantic spotted dolphin	*Stenella frontalis*	Regular
Blainville's beaked whale	*Mesoplodon densirostris*	Regular
Blue whale	*Balaenoptera musculus*	(Endangered) Rare
Bottlenose dolphin	*Tursiops truncatus*	Regular
Bryde's whale	*B. edeni/brydei*	Regular
Clymene dolphin	*Stenella clymene*	Regular
Cuvier's beaked whale	*Ziphius cavirostris*	Regular
Dwarf sperm whale	*Kogia sima*	Regular
False killer whale	*Pseudorca crassidens*	Rare
Fin whale	*Balaenoptera physalus*	(Endangered) Rare
Fraser's dolphin	*Lagenodelphis hosei*	Rare
Gervais' beaked whale	*Mesoplodon europaeus*	Regular
Harbor porpoise	*Phocoena phocoena*	Extralimital
Harbor seal	*Phoca vitulina*	Extralimital
Hooded seal	*Cystophora cristata*	Extralimital
Humpback whale	*Megaptera novaeangliae*	(Endangered) Rare
Killer whale	*Orcinus orca*	Rare
Long-finned pilot whale	*Globicephala melas*	Extralimital
Melon-headed whale	*Peponocephala electra*	Rare
Minke whale	*Balaenoptera acutorostrata*	Rare
North Atlantic right whale	*Eubalaena glacialis*	(Endangered) Regular
Pantropical spotted dolphin	*Stenella attenuate*	Regular
Pygmy killer whale	*Feresa attenuate*	Rare
Pygmy sperm whale	*Kogia breviceps*	Regular
Risso's dolphin	*Grampus griseus*	Regular
Rough-toothed dolphin	*Steno bredanensis*	Rare
Sei whale	*Balaenoptera borealis*	(Endangered) Rare
Short-beaked common dolphin	*Delphinus delphis*	Rare
Short-finned pilot whale	*Globicephala macrorhynchus*	Regular
Sowerby's beaked whale	*Mesoplodon bidens*	Extralimital
Sperm whale	*Physeter macrocephalus*	(Endangered) Regular
Spinner dolphin	*Stenella longirostris*	Rare
Striped dolphin	*S. coeruleoalba*	Regular
True's beaked whale	*Mesoplodon mirus*	Rare
West Indian manatee	*Trichechus manatus*	(Endangered) Rare

The North Atlantic right whale, while not found within the confines of Port Canaveral, has been occasionally found in the Atlantic Ocean off the coast of Brevard County. The Port has participated and supported the Right Whale Monitoring Program for many years. There have been few incidences of right whale-ship incidents along the Florida Atlantic coast, with none being reported as far south as Brevard County (Port Canaveral 2011).

Port Canaveral is frequented by the West Indian manatee year round (Port Canaveral 2011). Port Canaveral has had a Manatee Protection Plan for the harbor in place since 1996. Port Canaveral designed and was the first in Florida to implement manatee plates at its commercial piers. The metal bumpers protect manatees from being crushed by holding the ship away from the seawall (Canaveral Port Authority 2011).

Invasive Species

Invasive aquatic species present along the East Coast are listed in Table 8.8-9.

Table 8.8-9. Invasive Aquatic Species in the Waters of the East Coast

Asian red seaweed	*Grateloupia turuturu*	Algae
Bladder wrack	*Fucus serratus*	Algae
Brown algae	*Stictyosiphon soriferus*	Algae
Brown algae	*Striaria attenuata*	Algae
Brown algae	*Ulonema rhizophorum*	Algae
Centric diatom	*Coscinodiscus wailesii*	Algae
Centric diatom	*Thalassiosira punctigera*	Algae
Centric diatom	*Odontella sinensis*	Algae
Dark sea tubes	*Melanosiphon intestinalis*	Algae
Dead man's fingers	*Codium fragile ssp .fragile*	Algae
Orkney bead-weed	*Lomentaria orcadensis*	Algae
Oyster theif	*Colpomenia peregrina*	Algae
Pink cotton wool	*Bonnemaisonia hamifera*	Algae
Purple laver	*Porphyra yezoensis*	Algae
Red algae	*Antithamnion hubbsii*	Algae
Red algae	*Gracilaria vermiculophylla*	Algae
Red algae	*'Heterosiphonia' japonica*	Algae
Red algae	*Lomentaria clavellosa*	Algae
Red algae	*Neosiphonia harveyi*	Algae
Red algae	*Polysiphonia breviarticulata*	Algae
Red algae	*Porphyra katadae*	Algae
Red algae	*Rhodymenia delicatula*	Algae
Rock weed	*Dumontia contorta*	Algae
Sea lettuce	*Ulva pertusa*	Algae
Sea palm	*Porphyra suborbiculata*	Algae
Bristleworm	*Janua pagenstecheri*	Annelids-Polychaetes
Reef building tube worm	*Ficopomatus enigmaticus*	Annelids-Polychaetes
Serpulid tube worm	*F. uschakovi*	Annelids-Polychaetes
Tubeworm	*Hydroides diramphus*	Annelids-Polychaetes
Beach fly	*Procanace dianneae*	Arthropoda-Insects
Beetle	*Pselactus spadix*	Arthropoda-Insects
Jumping bsistletail	*Petrobius brevistylis*	Arthropoda-Insects
Maritime earwig	*Anisolabis maritima*	Arthropoda-Insects
Splash midge	*Telmatogeton japonicus*	Arthropoda-Insects
Orange striped green anenome	*Diadumene lineata*	Coelenterates-Anthozoan
Sea anenome	*Sagartia elegans*	Coelenterates-Anthozoan
Black sea jellyfish	*Blackfordia virginica*	Coelenterates-Hydrozoans
Black sea jellyfish	*Maeotias marginata*	Coelenterates-Hydrozoans
Clinging jellyfish	*Gonionemus vertens*	Coelenterates-Hydrozoans

Table 8.8-9. Invasive Aquatic Species in the Waters of the East Coast		
Colinial hydroid	*Cordylophora caspia*	Coelenterates-Hydrozoans
Hydroid	*Moerisia lyonsi*	Coelenterates-Hydrozoans
Pelo de oso	*Garveia franciscana*	Coelenterates-Hydrozoans
Australian spotted jellyfish	*Phyllorhiza punctata*	Coelenterates-Scyphozoan
Amphipod	*Stenothoe gallensis*	Crustaceans-Amphipods
Japanese skeleton shrimp	*Caprella mutica*	Crustaceans-Amphipods
North Amerian pacific Corophiid	*Laticorophium baconi*	Crustaceans-Amphipods
Skeleton shrimp	*Caprella scaura*	Crustaceans-Amphipods
Tube building amphipod	*Microdeutopus gryllotalpa*	Crustaceans-Amphipods
Acorn barnacle	*Amphibalanus reticulatus*	Crustaceans-Barnacles
Acron barnacle	*Balanus trigonus*	Crustaceans-Barnacles
Acorn barnacle	*Chthamalus fragilis*	Crustaceans-Barnacles
Sacculinid parasitic barnacle	*Loxothylacus panopaei*	Crustaceans-Barnacles
Striped acorn barnacle	*Amphibalanus amphitrite*	Crustaceans-Barnacles
Titan acorn barnacle	*Megabalanus coccopoma*	Crustaceans-Barnacles
Asian shore crab	*Hemigrapsus sanguineus*	Crustaceans-Crabs
Chinese Mitten Crab	*Eriocheir sinensis*	Crustaceans-Crabs
Green crab	*Carcinus maenas*	Crustaceans-Crabs
Green porcelain crab	*Petrolisthes armatus*	Crustaceans-Crabs
Indo-Pacific swimming crab	*Charybdis hellerii*	Crustaceans-Crabs
Isopod	*Ianiropsis sp*	Crustaceans-Isopods
Isopod	*Paradella dianae*	Crustaceans-Isopods
Isopod	*Sphaeroma walkeri*	Crustaceans-Isopods
Isopod	*Synidotea laevidorsalis*	Crustaceans-Isopods
Mangrove boring isopod	*Sphaeroma terebrans*	Crustaceans-Isopods
Wharf roach	*Ligia exotica*	Crustaceans-Isopods
Bristled river shrimp	*Macrobrachium olfersii*	Crustaceans-Shrimp
Oriental shrimp	*Palaemon macrodactylus*	Crustaceans-Shrimp
Rockwool prawn	*P. elegans*	Crustaceans-Shrimp
Chamaeleon shrimp	*Praunus flexuosus*	Crustaceans-Mysids
Brown bryozoan	*Bugula neritina*	Ectoprocts
Bryozoan	*Celleporaria pilaefera*	Ectoprocts
Bryozoan	*Electra bengalensis*	Ectoprocts
Bryozoan	*Sinoflustra annae*	Ectoprocts
Bryozoan	*Tricellaria inopinata*	Ectoprocts
Encrusting bryozoan	*Hippoporina indica*	Ectoprocts
Lacy crust bryozoan	*Membranipora membranacea*	Ectoprocts
Kamptozoan	*Barentsia benedeni*	Entoprocts
Kamptozoan	*Loxosomatoides laevis*	Entoprocts
Gizzard shad	*Dorosoma cepedianum*	Fishes
Lionfish	*Pterois miles*	Fishes
Lionfish	*P. volitans*	Fishes
Mosquitofish	*Gambusia affinis*	Fishes
Threadfin shad	*Dorosoma petenense*	Fishes
Asian green mussel	*Perna viridis*	Mollusks-Bivalves
Charru mussel	*Mytella charruana*	Mollusks-Bivalves
European oyster	*Ostrea edulis*	Mollusks-Bivalves
Florida marshclam	*Cyrenoida floridana*	Mollusks-Bivalves
False dark mussel	*Mytilopsis leucophaeata*	Mollusks-Bivalves

Table 8.8-9. Invasive Aquatic Species in the Waters of the East Coast		
Gulf wedge clam	*Rangia cuneata*	Mollusks-Bivalves
Hooked mussel	*Ischadium recurvum*	Mollusks-Bivalves
Shipworm	*Teredo navalis*	Mollusks-Bivalves
Common periwinkle	*Littorina littorea*	Mollusks-Gastropods
Egg melampus	*Tralia ovula*	Mollusks-Gastropods
Florida rocksnail	*Stramonita haemastoma floridana*	Mollusks-Gastropods
Lake Merritt cuthona	*Cuthona perca*	Mollusks-Gastropods
Mouse ear snail	*Myosotella myosotis*	Mollusks-Gastropods
Pulmonate snail	*Creedonia succinea*	Mollusks-Gastropods
Veined rapa whelk	*Rapana venosa*	Mollusks-Gastropods
Winged thecacera	*Thecacera pennigera*	Mollusks-Gastropods
Eel swimbladder nematode	*Anguillicoloides crassus*	Nematodes
Green and yellow ribbon worm	*Emplectonema 'gracile'*	Nemerteans
Black Spot parasite	*Cryptocotyle lingua*	Platyhelminthes
Gill worm fluke	*Pseudodactylogyrus anguillae*	Platyhelminthes
Salmon fluke	*Gyrodactylus anguillae*	Platyhelminthes
Colonial sea squirt	*Didemnum vexillum*	Tunicates
Compound sea squirt	*Diplosoma listerianum*	Tunicates
European sea squirt	*Ascidiella aspersa*	Tunicates
Leathery sea squirt	*Styela clava*	Tunicates
Light bulb sea squirt	*Clavelina lepadiformis*	Tunicates
Mangrove tunicate	*Ecteinascidia turbinata*	Tunicates
Orange sheath tunicate	*Botrylloides violaceus*	Tunicates
Pleated sea squirt	*Styela plicata*	Tunicates
Rough sea tunicate	*S. canopus*	Tunicates
Star tunicate	*Botryllus schlosseri*	Tunicates
Tunicate	*Didemnum psammatodes*	Tunicates

Source: Smithsonian Environmental Research Center 2012.

Threatened and Endangered Species

The Marine Highway Corridors on the East Coast have the potential to affect populations and habitats of federally protected species as a result of proximity to marine species habitat. Federally threatened or endangered marine species that may occur in the waters off of the East Coast are listed in Table 8.8-10.

Table 8.8-10. Federally Protected Marine Species Occurring Along the East Coast		
Invertebrates		
Elkhorn coral	*Acropora palmata*	Threatened
Staghorn coral	*A. cervicornis*	Threatened
Fish		
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Atlantic Salmon	*Salmo salar*	Endangered
Whales		
Blue whale	*Balaenoptera musculus*	Endangered
Fin whale	*B. physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter catodon*	Endangered

Table 8.8-10. Federally Protected Marine Species Occurring Along the East Coast		
Manatee		
West Indian Manatee	*Trichechus manatus*	Endangered
Sea Turtles		
Green	*Chelonia mydas*	Endangered
Kemp's ridley	*Lepidochelys kempii*	Endangered
Leatherback	*Dermochelys coriacea*	Endangered
Loggerhead	*Caretta caretta*	Endangered
Olive ridley	*Lepidochelys olivacea*	Endangered

Port of Portland, ME

Five federally protected whale species (finback whale, humpback whale, North Atlantic right whale, sei whale and sperm whale), three sea turtle species (Kemp's ridley, loggerhead, and leatherback), and two fish species (Atlantic Salmon (*Salmo salar*) and Shortnose Sturgeon [*Acipenser brevirostrum*]) have the potential to occur in the waters of the Port of Portland (Maine Department of Inland Fisheries and Wildlife 2010).

Port of New York/New Jersey

The short-nosed sturgeon, a federally endangered species, has been recorded in the NY/NJ port area. This sturgeon occasionally enters the port area during times of heavy rains, which reduce salinity in the port (USACE 2008).

Sea turtles do not occur in the NY/NJ port area. Diamondback terrapin (*Malaclemys terrapin*) may occur in small numbers in areas to the north and south of the port where some marsh habitat still exists, especially along the Arthur Kill.

Port of Virginia/Norfolk, VA

Loggerhead turtle (*Caretta caretta*) and Kemp's ridley turtle both are known to occur in the Chesapeake Bay. The loggerhead is by far the most common and most widely distributed sea turtle species encountered in the Chesapeake Bay. The residency season for Chesapeake Bay loggerhead turtles is between May and late October/early November and the Kemp's ridley is resident from May through October. Southern migrations out of bay waters in the fall are typically triggered when water temperature drops below 20°C (U.S. Fleet Forces [USFF] 2009).

Port Canaveral, FL

Five species of sea turtle are found in the waters offshore of Brevard County (Loggerhead, green, leatherback, hawksbill and Kemp's ridley), and of these, three have been documented as nesting on Brevard County beaches. These species include the loggerhead, leatherback, and green sea turtles. It is important to note however, that there are no sea turtles nesting in Port Canaveral. However, Algal communities within the Port and the Trident Basin serve as a source of nutrition for juvenile green sea turtles. Loggerhead turtles do not typically forage in the harbor at Port Canaveral but can occasionally be found swimming in the harbor. Leatherback turtles seldom use the inshore waters of Brevard County and only are known to frequent the area during nesting periods (Port Canaveral 2011).

As seasonal water temperatures increase, juvenile loggerhead, green, and Kemp's ridley sea turtles migrate northward along the U.S. Atlantic Coast in search of feeding grounds and return in the fall, traveling at least as far as Cape Hatteras, as waters cool. Large concentrations of sea turtles may occur along the northern Florida Atlantic coast during the spring and fall migration periods. These large concentrations result from the combination of migrating individuals and the presence of year-round residents.

The West Indian manatee is also frequent in Port Canaveral.

Critical Habitat

Elkhorn (*Acropora palmate)* and staghorn corals (*Acropora cervicornis)* were once the most abundant and most important species on Caribbean coral reefs in terms of accretion of reef structure. Relative to other corals, elkhorn and staghorn corals have high growth rates that have allowed reef growth to keep pace with past changes in sea level. Both species exhibit branching morphologies that provide important habitat for other reef organisms. Disease, temperature-induced bleaching, and hurricanes are considered to be the major factors in the decline of these species. In November 2006, NMFS designated critical habitat for elkhorn and staghorn corals. Four specific areas were designated, one of which was located off of the coast or Florida and is referred to as the "the Florida area". The Florida Area comprises approximately 1,329 sq mi of marine habitat (Figure 8.9-4).

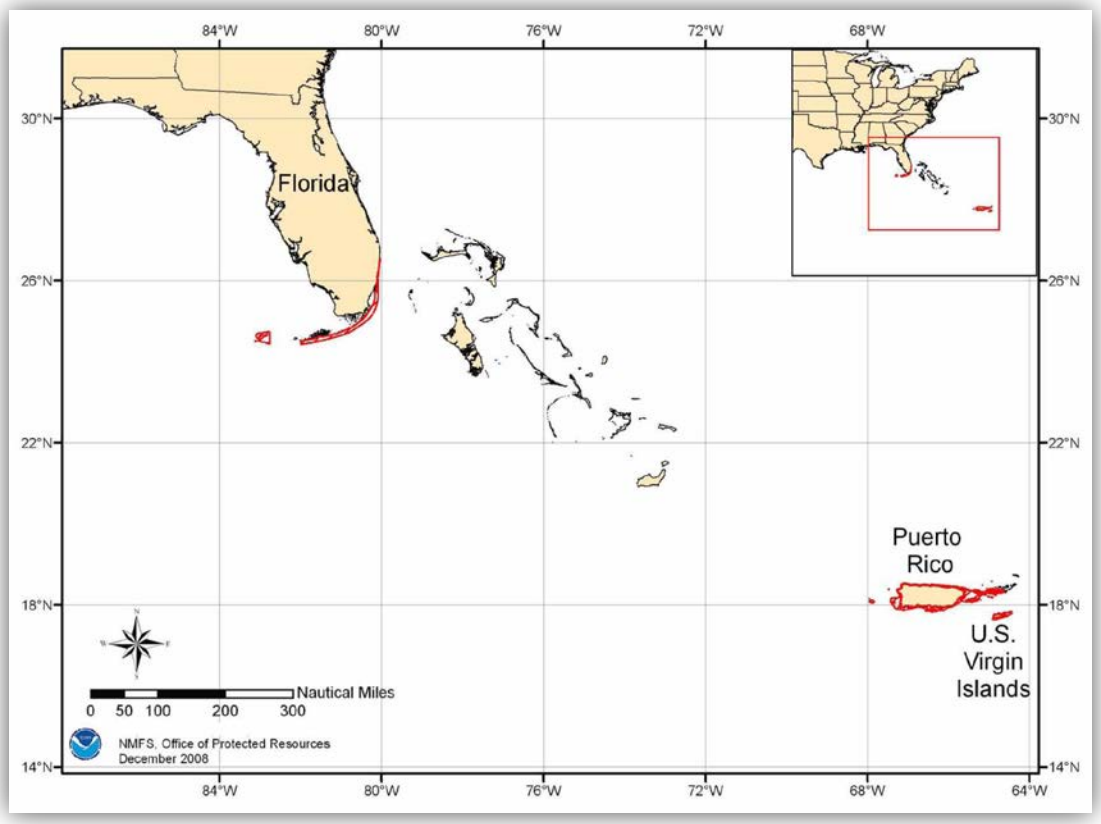


Figure 8-4 Critical Habitat Areas for Elkhorn and Staghorn Coral

The North Atlantic right whale is the rarest of the whale species and its preferred habitat is the busy waters off the east coast of the U.S. and Canada, making it particularly susceptible to ship strikes. It is thought that mortality due to ship strikes may make the difference between extinction and survival for this species (IWC 2011). As a result, critical habitat areas for this species have been designated along the U.S. Atlantic coast (Figure 8.9-5) and NMFS has taken both regulatory and nonregulatory steps to reduce the threat of ship collisions, including:

- Mandatory vessel speed restrictions in Seasonal Management Areas (Figure 8.9-6)
- Voluntary speed reductions in Dynamic Management Areas and a seasonal Area To Be Avoided (Figure 8.9-7)
- Recommended shipping routes (Figures 8.9-8 through 8.9-11)
- Modification of international shipping routes
- Aircraft surveys and right whale alerts
- Ship speed advisories
- Mandatory Ship Reporting Systems: ships greater than 300 gross tons enter two key right whale habitats – one off the northeast U.S. and one off the southeast U.S. –are required to report to a shore-based station. In return, ships receive a message about right whales, their vulnerability to ship strikes, precautionary measures the ship can take to avoid hitting a whale, and locations of recent sightings.

On June 1, 2009, the North-South lanes of the Traffic Separation Scheme servicing Boston were modified. Each of the lanes was reduced to 1.5 to move ships away from the greatest density of right whales and thus minimizing the overlap between whales and ships (NMFS 2011b).

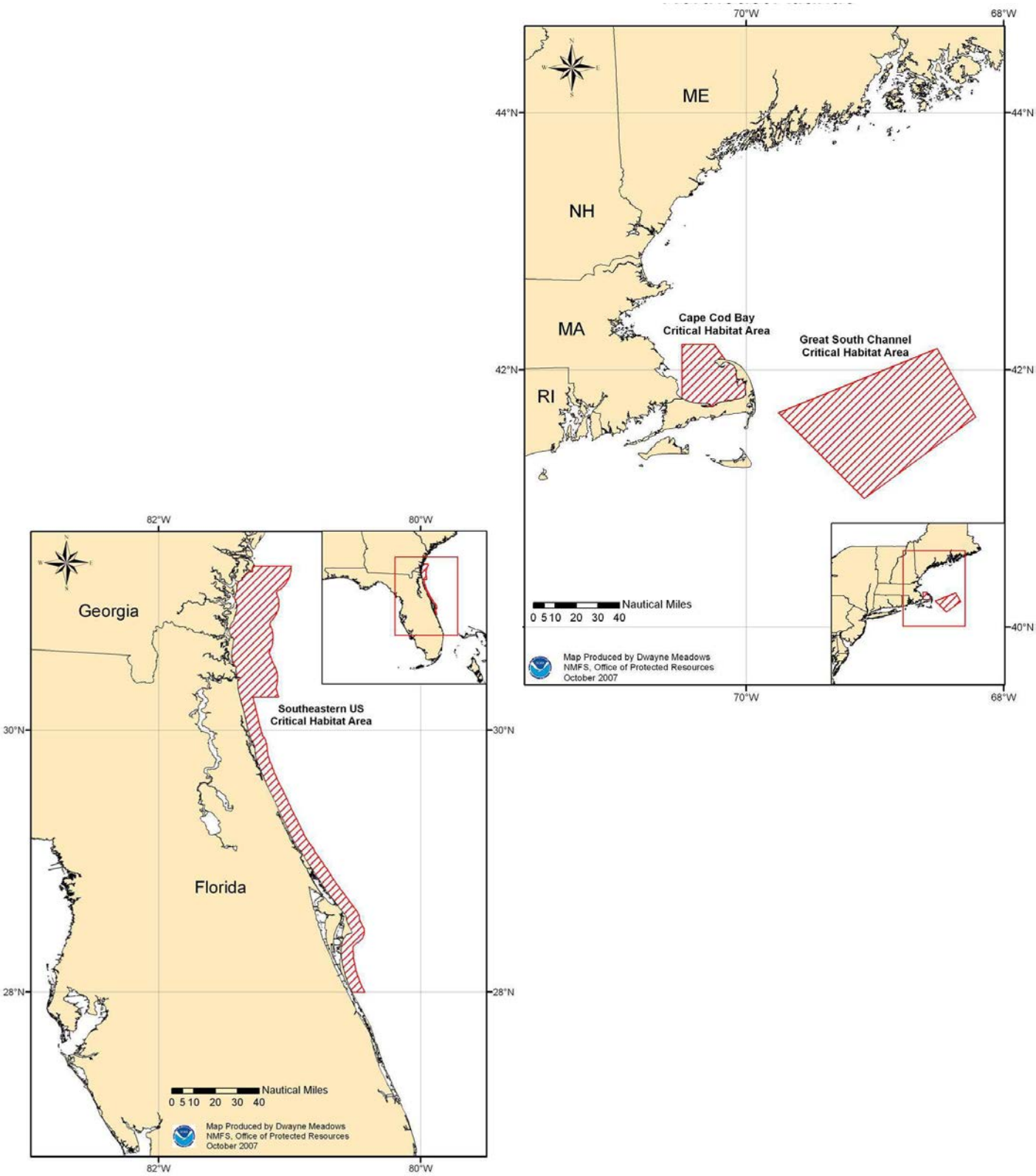


Figure 8-5 Northern Right Whale Critical Habitat (NMFS 2011b)

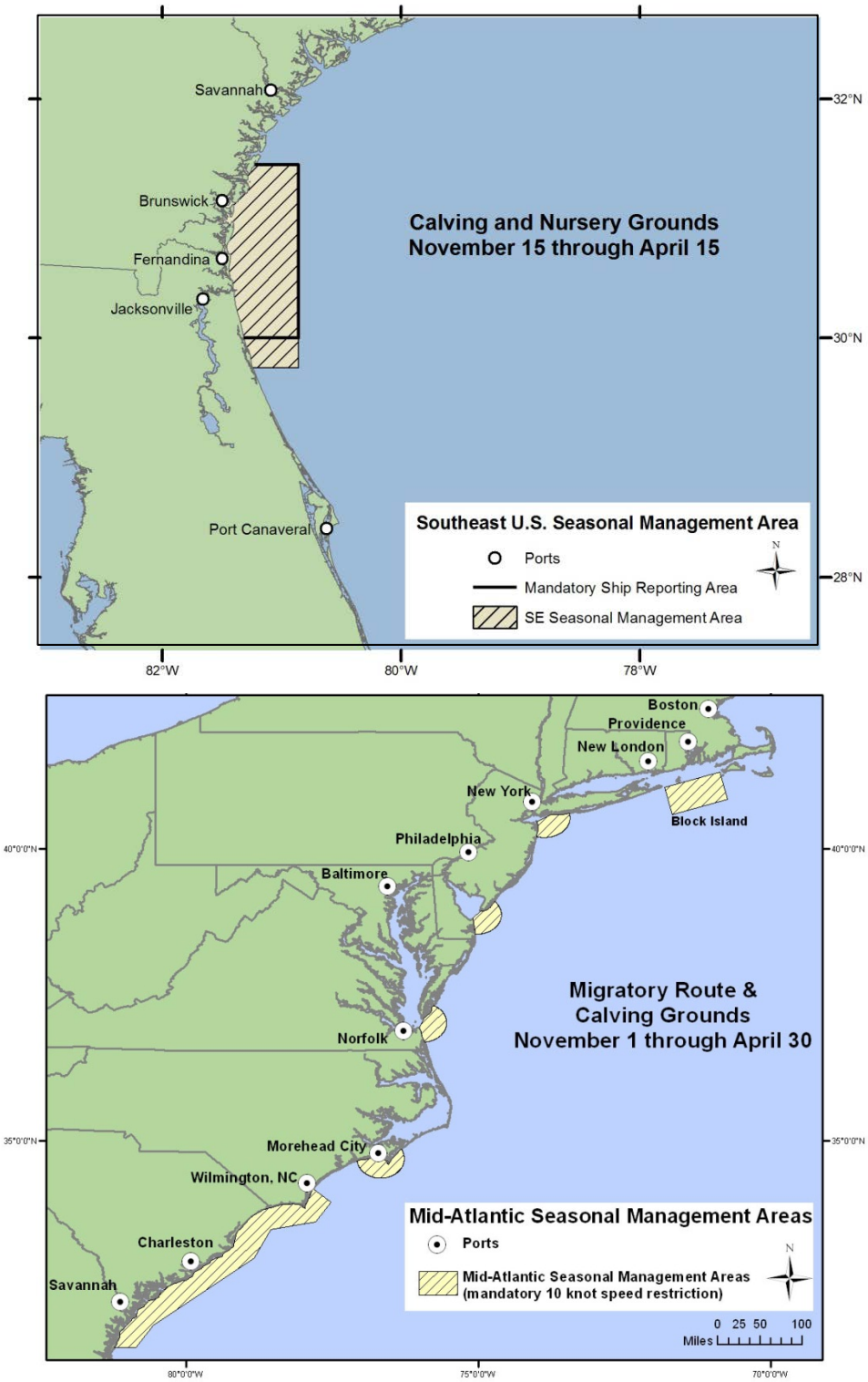


Figure 8-6 North Atlantic Right Whale Seasonal Management Areas (NMFS 2011b)

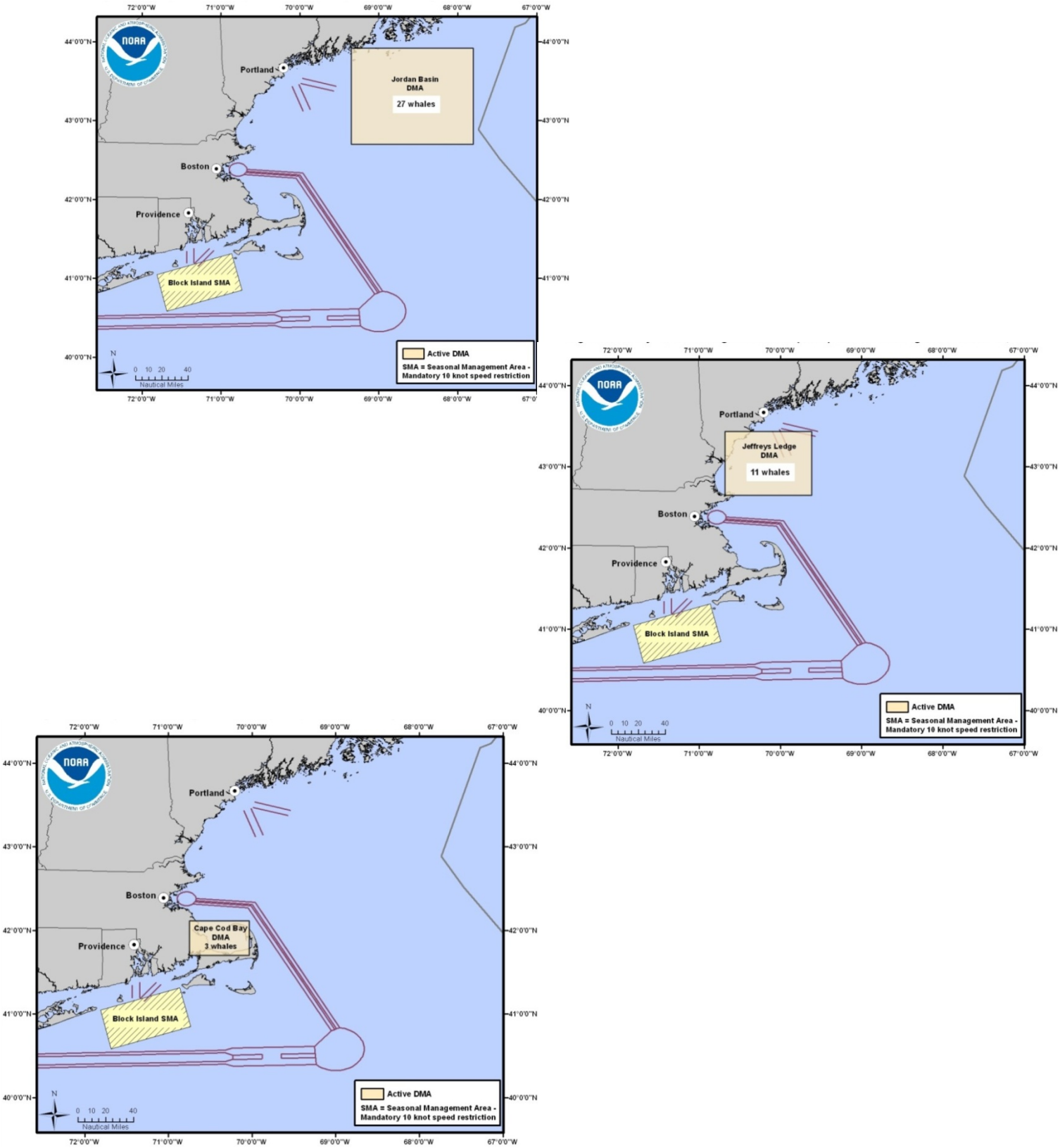


Figure 8-7 North Atlantic Right Whale Dynamic Management Areas (NMFS 2011b)

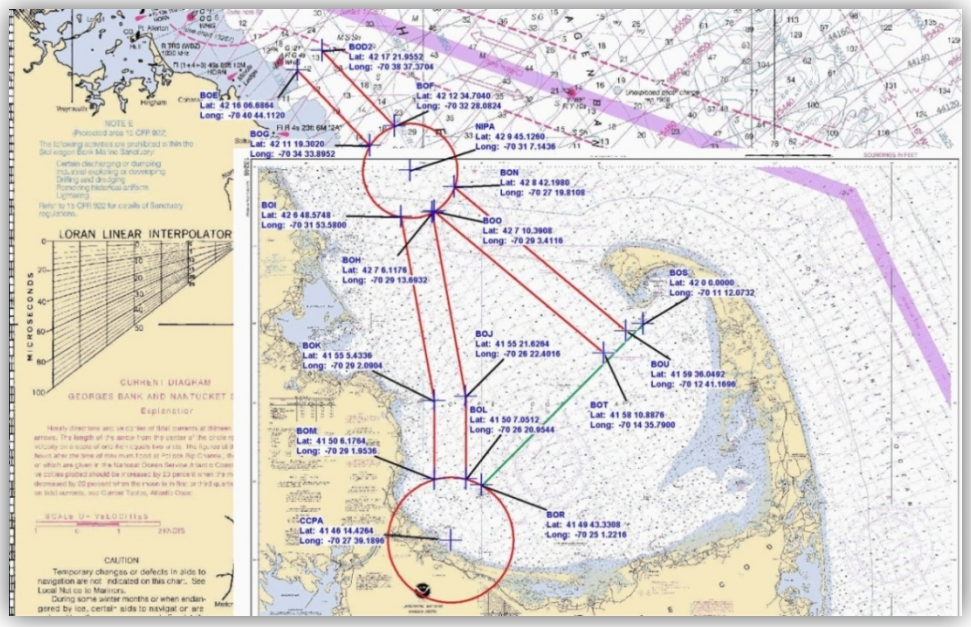


Figure 8-8 Recommended Shipping Routes (Cape Cod Bay, MA) to Reduce Ship Strikes to North Atlantic Right Whales (NMFS 2011b)

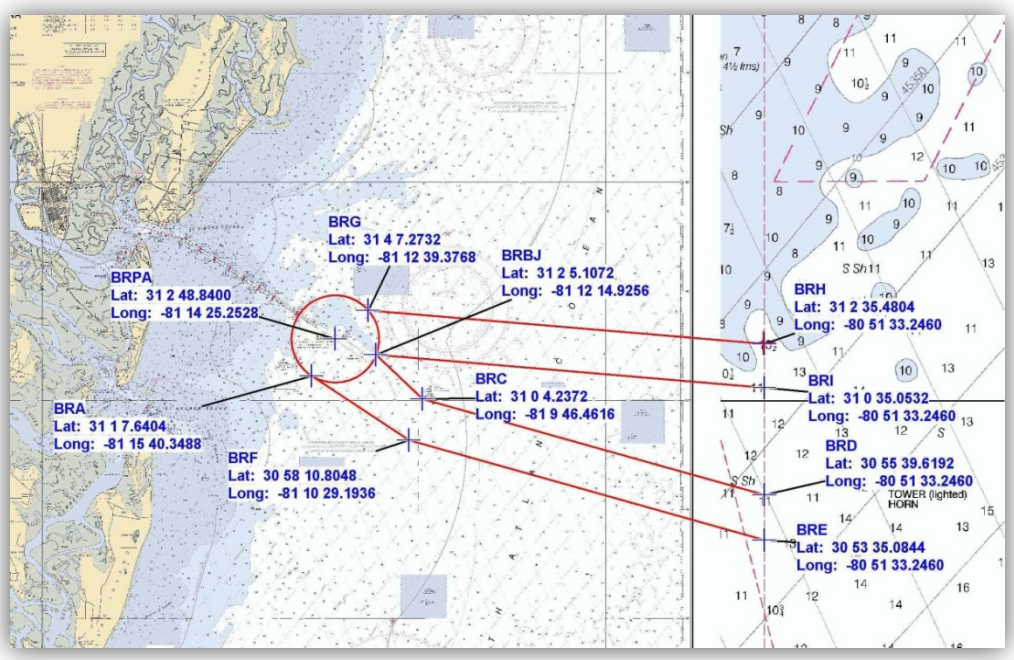


Figure 8-9 Recommended Shipping Routes (Brunswick, GA) to Reduce Ship Strikes to North Atlantic Right Whales (NMFS 2011b)

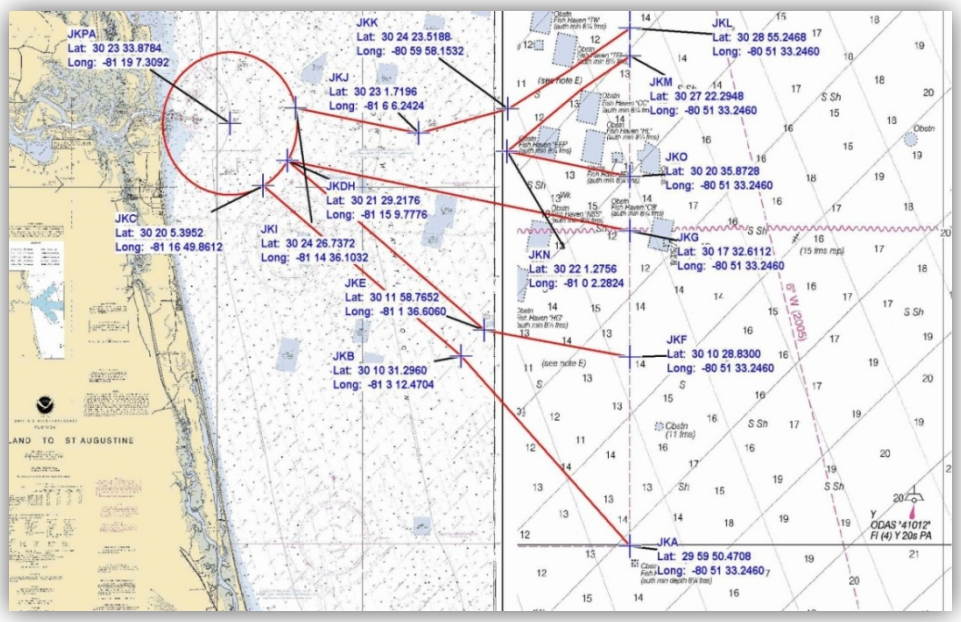


Figure 8-10 Recommended Shipping Routes (Jacksonville, FL) to Reduce Ship Strikes to North Atlantic Right Whales (NMFS 2011b)

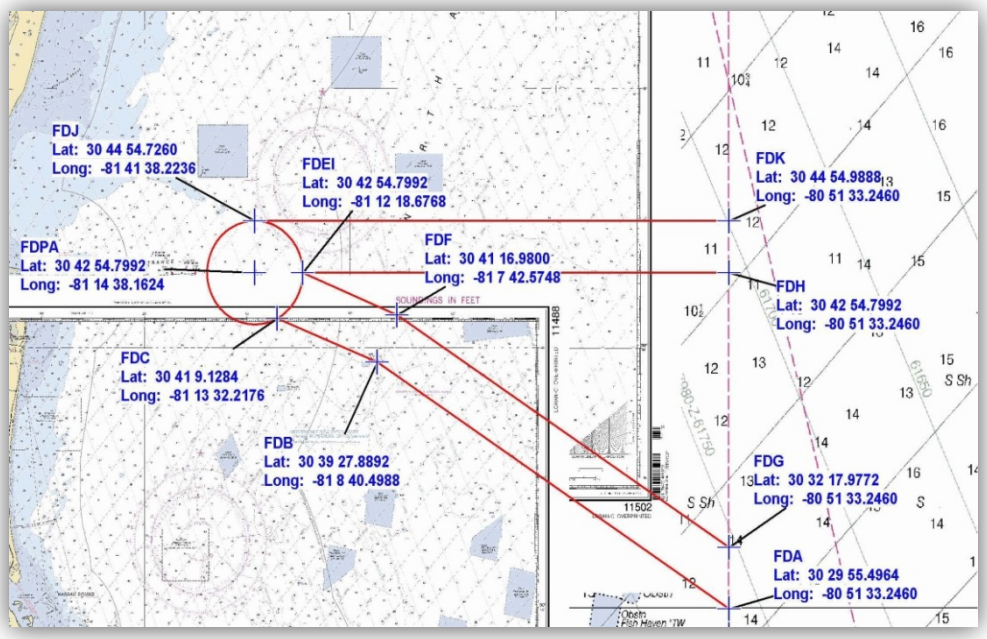


Figure 8-11 Recommended Shipping Routes (Fernandina, FL) to Reduce Ship Strikes to North Atlantic Right Whales (NMFS 2011b)

West Indian Manatee

Manatee prefer the warmer waters of the southern U.S. Atlantic coast and can be found from North Carolina to Florida. In general, manatees feed primarily on freshwater plants, submerged sea grasses, and plants along shorelines. In northeastern Florida, manatees feed in salt marshes on smooth cordgrass. Springs and freshwater runoff sites are used for drinking water (USFWS 2001).

Manatee prefer large, slow-moving rivers, river mouths, and shallow coastal areas such as coves and bays and can travel great distances as they migrate between winter and summer grounds. During the winter, manatees congregate around warm springs and around power plants that discharge warm water. During summer months, they have occasionally been seen as far north as Virginia and Maryland (USFWS 2008).

Boat traffic and development are the main threats to manatee populations. Other causes of injury or death include ingestion of debris, entanglement in fishing gear, cold stress, red tide, and entrapment or crushing in water control structures and navigational locks (USFWS 2008).

In 1978, Florida designated the entire state as a "refuge and sanctuary for manatees" through the West Indian Manatee Sanctuary Act. This law allows the state to designate manatee sanctuaries and establish speed zones for boats.

Critical habitat was designated for the West Indian manatee in Florida. Refer to Section 7.8.1 and Figure 7-1 for the locations.

8.8.2 Environmental Consequences

8.8.2.1 Proposed Action

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to vegetation or wildlife within the Gulf Coast region. Likewise, the presence of SAV within established shipping corridors is also unlikely, and therefore the use of these existing corridors by the conceptual Marine Highway services would not be expected to impact SAV.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the Marine Highway in the East Coast region is anticipated to have minimal impacts to migratory birds along the Atlantic coast and in the port cities. The Marine Highway Corridors and port areas already support a high level of shipping activity and are heavily developed; therefore, no loss of habitat is anticipated from the nominal increase in vessel trips. Additionally, any impacts would be minimized through compliance with existing Federal, State, and port-specific regulations promulgated to protect biological resources.

Coordination with Federal and State environmental regulatory agencies may be required under a corridor-specific NEPA analysis to identify any migratory bird species habitat in the area that may be

affected by the Proposed Action and to identify potential mitigation measures, if necessary, to ensure compliance with the MBTA.

Fish

All of the port pairs selected for the East Coast region contain EFH. The Proposed Action would have no effect on EFH or fish species managed under the MSA in the port areas. Because existing ports and Marine Highway Corridors would be utilized, no loss of aquatic habitat is anticipated as a result of the Proposed Action. The increased noise associated with the nominal increase in vessel trips would be expected to be minor and would not be expected to adversely impact EFH. Additionally, fish are very motile and would avoid the area of noise if loud enough to cause annoyance. Indirect impacts that may potentially result from collisions and accidental spills have the potential to affect EFH. Human errors in design, fabrication and operation are the cause of most, if not all serious accidents. Ship collisions would be minimized through adherence with the COLREGs. These regulations state the means that an oceangoing vessel must undertake to avoid a ship collision, such as keeping watch and maintaining reasonable speeds. In order to prevent a ship collision, COLGREGs requires that vessels keep watch during all hours of the day. Under COLREGs, ships are also required to carry certain navigation lights to help pilots and crew members carry out watches. Depending on the length of the vessel, the masthead light, sidelights, towing light, and all around lights must be visible from distances of between one and six miles. Vessels are also required to adhere to specific regulations regarding right-of-way and traffic separation schemes. Adherence to COLREGs would minimize the potential for ship collisions and subsequent indirect impacts to EFH. Furthermore, any accidental spills resulting from ship collisions would be responded to and contained as quickly as possible to reduce impacts to the surrounding environment. Therefore impacts to EFH resulting from the operation of the conceptual Marine Highway services within the East Coast region would not be significant.

Marine Mammals

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the Gulf Coast region are anticipated to have minimal impacts to marine mammals and would not be expected to result in takes or harassment as defined by the MMPA. Impacts to marine mammals would also be minimized through coordination with the various Federal and State agencies, as needed, and compliance with existing regulations promulgated to protect biological resources and prevent the release of pollutants to the environment. The conceptual Marine Highway services would be conducted in compliance with North Atlantic right whale regulations.

For future site-specific projects developed as part of the Program, consultation may be required with NMFS and USFWS. In addition, an analysis of noise impacts on marine mammals as well as an analysis of ship strike potential may be required to determine impacts to marine mammal species and to identify minimization and mitigation measures, if necessary.

Invasive Species

The Proposed Action would not be expected to result in invasive species impacts. The nominal increase in vessel traffic with operation of the conceptual Marine Highway services, as identified for the Inland

Waterways/Mississippi Coast region, in conjunction with compliance with the USCG Final Ballast Water Rule and the EPA draft VGP, would result in minimal potential for the introduction of invasive species.

The USCG and the EPA have Federal oversight of ballast water management through the Final Ballast Water Rule and the draft VGP, respectively. However, states retain authority to "adopt or enforce control measures over aquatic nuisance species" (Maryland Sea Grant 2010).

Impacts from invasive species would be minimized through compliance with the USCG Final Ballast Water Rule and the EPA draft VGP. The USCG Final Ballast Water Rule was issued in 2012 and is described in Section 4.8.2.1, *Invasive Species*. Compliance with port-specific ballast water management plans and rules would further reduce potential impacts.

Threatened and Endangered Species

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services as identified for the East Coast region would be expected to have no effect on, or may affect but would not be likely to adversely affect, threatened and endangered species.

Coordination with Federal and State environmental regulatory agencies may be required under a project-based NEPA analysis to identify any protected species in the area that may be affected by the Proposed Action and to identify potential mitigation measures, if necessary.

Critical Habitat

Operation of the conceptual Marine Highway services as identified within the East Coast region is anticipated to have minimal impacts on critical habitat along the Atlantic Coast. The existing shipping routes currently support a large amount of shipping activity and no loss of habitat is anticipated from the nominal increase in vessel trips with the conceptual Marine Highway services. The Program would comply with existing maritime laws and procedures with regard to transit operations and cargo handling to ensure safe transport and minimize impacts to the aquatic environment and sensitive and/or important habitats.

Coordination with Federal and State environmental regulatory agencies may be required future site-specific projects under a project-based NEPA analysis to identify any critical habitat in the area that may be affected by a project and to identify potential mitigation measures, if necessary.

8.8.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region would not be implemented. The No Action Alternative would not result in impacts to vegetation and wildlife, migratory birds, EFH, marine mammals, invasive species, threatened and endangered species, or critical habitat.

8.9 Geological Resources

8.9.1 Affected Environment

Geology and soils are site-specific resources and their presence and composition would vary widely across the Marine Highway Corridor and at various port locations to the point where they cannot be described at a regional level. If necessary, site-specific conditions would be discussed in project-based NEPA documentation. The only geologic resource that can accurately be described at a regional level is the physiographic divisions. The USGS divides the North American continent into eight physiographic divisions based on terrain texture, rock type, and geologic structure and history. Two physiographic divisions, the Appalachian Highlands and the Atlantic Plain comprise the eastern U.S. coast.

The Appalachian Highlands physiographic division extends from Maine to Alabama (USGS 2004). The region's most ancient rocks are the foundation of the Appalachian Highlands region. The region is characterized by metamorphic and igneous rocks of Late Precambrian and Early Paleozoic age that crop out in northeast-trending belts of rock and form the core of the Appalachian Mountains (USGS 2012).

The Atlantic Plain is a wide belt of Late Cretaceous to Holocene deposits, extending from New Jersey to Texas. The belt is comprised of sedimentary rocks that were deposited mostly in a marine environment and were later uplifted and now tilt seaward. Part of the Atlantic Plain forms the broad, submerged Atlantic Continental Shelf. Atlantic Plain deposits overlap the older, more distorted, Paleozoic and Precambrian rocks immediately to the north and west.

The northern portion of the Atlantic Plain, including Cape Cod, Long Island, and the smaller islands of Martha's Vineyard and Nantucket Island off the coast of Massachusetts, and Block Island 9 miles south of Rhode Island, were covered by Pleistocene continental glaciers.

The Sea Islands section of the Atlantic Plan includes southeastern SC, southeastern Georgia, and a very small part of northeastern Florida, extending from near the mouth of the Santee River north of Charleston southwestward to the mouth of the St. Johns River in northeastern Florida. The terraces in this section do not extend inland to the Fall Line as with the more northern sections of this province. This section also lacks the relatively long, sandy barrier islands and beaches generally found in the northern sections of this province. Instead, this section contains distinctive islands, referred to as Sea Islands, just off the coast. These islands are comparatively short, separated by numerous tidal inlets, and often have a rectangular or so-called drumstick shape, with subdued relief and a height that is usually less than about 30 ft, although sand dunes on some reach heights of 50 ft.

The Floridian section of the Atlantic Plain is the emerged portion of an anticlinal ridge and consists of the peninsular portion of Florida. The continental shelf on the east, south (Bahama Shelf), and west (Florida Shelf) of the State are considered to be part of the arch and is considerably larger than the emerged part. This section has several distinctive features, including prominent terraces, large barrier islands and keys, coral reefs, extensive karst, significant aquifers and abundant groundwater, Lake Okeechobee and large marshes and swamps.

Geologic hazards relevant to the Marine Highway Corridors on the East Coast include landslides and seismic and faulting hazards. The East Coast experiences relatively low seismicity and seismic episodes are not likely to affect Marine Highway operations.

8.9.2 Environmental Consequences

8.9.2.1 Proposed Action

The operation of the conceptual Marine Highway services as identified within the East Coast region would utilize existing shipping routes and port facilities and no upgrades involving construction, or dredging or other activities that would affect geology and soils are anticipated. Therefore, there would be no impacts to geology and soils.

8.9.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services identified for the East Coast region would not be implemented. The No Action Alternative would not result in impacts to geology and soils.

8.10 Water Resources

8.10.1 Affected Environment

<u>Water Quality</u>

The history of settlement and the industrial nature of the New England region have contributed to historical water quality issues. Water quality would be expected to be reduced in port areas because of the concentration of ship traffic, surface water discharge from developed surrounding areas, and the confined nature and reduced circulation within the near-shore bay environments. Water quality in ocean shipping routes would be expected to be better than port areas as these are open, unconfined waters and any minor additions of contaminants from ships would be quickly dissipated throughout the water.

Surface water of the East Coast region primarily consists of the Atlantic Ocean, in addition to numerous bay environments with rivers and smaller tributaries discharging into its waters. Surface waters within M-95 consist of marine habitat with saline water environments.

Three port pairs have been selected to represent the conceptual Marine Highway services within the East Coast region including: NY/NJ to Norfolk, VA; Norfolk, VA to Port Canaveral, FL; and NY/NJ to Portland, ME. Existing water quality within each port varies by city.

The NY/NJ port is located in Newark Bay at the confluence of the Passaic and Hackensack Rivers and is linked to New York Bay by both the Kill Van Kull and the Arthur Kill channels. Newark Bay is classified as SE3 saline estuarine waters by the NJ Department of Environmental Protection with the designated uses of: (1) secondary contact recreation; (2) maintenance and migration of fish populations; (3) migration of diadromous fish; (4) maintenance of wildlife; and (5) any other reasonable uses. According to the water quality standards established by the NJ Department of Environmental Protection, fecal coliform in Class SE3 waters shall not exceed a geometric mean of 1500 counts/100 milliliters.

The NY/NJ Harbor estuary is one of the most urbanized and industrialized areas in the nation. However, in general, surface waters within the Port of NY/NJ have concentrations of dissolved pesticides and nutrients below the national median concentrations (USGS 1998). According to the NY State Department of Environmental Protection, most of the area is classified I, for fishing or boating, but portions are classified SD, for fish survival only (NY State Department of Environmental Protection 2010). State water quality standards approved by EPA for New York State report coastal shoreline waters were 100% good for State-designated use of fish, shellfish, and wildlife protection and propagation (NOAA 2008). Water quality for NJ's near-coastal waters was 21.2% good and 78.8% impaired for use of fish, shellfish, and wildlife protection and propagation (NOAA 2008).

The Port of Virginia/Norfolk has implemented structural and terminal design controls that have enabled pollutant removal of stormwater discharge. Because of these controls, they exceed State stormwater discharge requirements by 50% (Port of Virginia 2012). As reported by the EPA, water quality for Virginia's assessed waters for bays and estuaries was 5.83%, 29.76% threatened, and 64.41% impaired for fish, shellfish, and wildlife protection and propagation (NOAA 2008). Water quality designated for recreation was 95.7% good, 0.03% threatened, and 4.27% impaired (NOAA 2008). Water quality for waters designated for harvesting of aquatic-life were reported 79% good, 13.48% threatened, and 7.53% impaired (NOAA 2008). Impairment was reported to be mostly caused by nutrients, organic enrichment, turbidity, and low dissolved oxygen (NOAA 2008).

Water quality in Port Canaveral is dependent, in part, on water exchange with the ocean, allowing the water in the harbor to be flushed with ocean water. Monthly water quality sampling has been performed continuously by Canaveral Port Authority in Port Canaveral Harbor since 1992. Based on the Port Canaveral Harbor Water Quality Monitoring 2006 Annual Report, Port Canaveral Harbor generally met requirements of its designation as a Class III predominantly marine water body, per 62-302 FL Administrative Code. Class III marine waters are designated for recreation, propagation and maintenance of a healthy, well balanced population of fish and wildlife (Port Canaveral 2011).

Water quality for Maine's assessed waters for near-coastal waters were 100% good for State-designated use of fish, shellfish, and wildlife protection and propagation (NOAA 2008).

<u>Groundwater</u>

The presence of groundwater is restricted to upland areas and would not exist beneath much of the M-95 corridor that is located in open Atlantic Ocean waters. The M-64 connector along the James River links the tidewater area to M-95.

Aquifer types and associated Marine Highway Corridors in the East Coast region are presented in Table 8.10-1. The Port of NY/NJ and the Port of Virginia/Norfolk, VA are underlain by the North Atlantic Coastal Plain aquifers (USGS 2012). Port Canaveral, FL is underlain by the Surficial Aquifer system (USGS 2012).

Table 8.10-1. Aquifers

Aquifer Present	Aquifer Type	Associated Corridor Aquifer
North Atlantic Coastal Plain Aquifers	Semi-consolidated Sand Aquifer	M-64
Piedmont Blue Ridge Crystalline Rock Aquifers	Igneous and Metamorphic Rock	M-64
New York and New England Carbonate Rock Aquifers	Carbonate Rock Aquifers	M-87
Surficial Aquifer System	Unconsolidated Sand and Gravel Aquifers	M-95

Source: USGS 2012.

Wetlands

Ports with long riverine entrance channels, such as the Port of NY/NJ, may contain wetland areas that are more susceptible to impacts from wave action.

According to the USFWS National Wetlands Inventory Wetlands Mapper, numerous small wetland areas exist along the Banks of Arthur Kill and Kill Van Kull. Coastal beaches are also found in Lower New York Bay. There three water bodies are the primary access routes to the Port of NY/NJ.

The Port of Norfolk is a heavily developed area with a largely hardened shoreline. According to the USFWS National Wetlands Inventory Wetlands Mapper, coastal wetland and beaches are present along the Atlantic facing areas, terminating at Willoughby Spit at the southern entrance to Hampton Roads and Fort Monroe at the northern entrance. An area of wetlands is also present at the eastern portion of Willoughby Bay and along the northern coastline of Hamptons Roads, opposite the port area.

Wetland habitats within Port Canaveral are limited primarily to the western perimeter adjacent to the Banana River, away from Port operations. Treeless hydric savannah habitat occurs south of the Port facilities. No SAV has been identified within the harbor or entrance channel, and it is unlikely that it occurs. The water depths and sediment conditions within the Harbor are not conducive for SAV growth (Port Canaveral 2011).

According to the USFWS National Wetlands Inventory Wetlands Mapper, several areas of wetlands and coastal beaches are present along the Main shoreline and coastal islands in the vicinity of the Port of Portland. The wetlands along the Maine shoreline terminate at the Fort Road Pier south of the port and Fort Allen Park to the north of the Port. The port are itself has a hardened shoreline devoid of any wetland areas.

Floodplains

Port communities may experience some degree of flooding because they are located at low elevations. The East Coast representative port pairs have 100- and 500-year floodplains associated with the ports according to FEMA floodplain mapping (FEMA Map Panels 3604970192F, 5101040010F, 12009C0311E and 2300510013B) (FEMA 2012).

8.10.2 Environmental Consequences

8.10.2.1 Proposed Action

Water Quality

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the identified conceptual Gulf Coast services would be expected to have minimal impacts to water quality. Marine Highway Corridors are within U.S. territorial waters where Federal regulations prohibit vessels from dumping untreated sewage (NOAA 2008). Ships traveling beyond 24 nm offshore can discharge black water (sewage) and gray water (non-sewage wastewater), however discharge in open-ocean would have minimal impact on nutrient levels of the major surface waters of the port pairs and would be short-term as effluent dilutes and disperses once discharged (NOAA 2008).

Any impacts to water quality due to accidental release or vessel collision would be limited to the area of discharge and would be short-term in nature because of rapid dilution and dispersion.

There would not be an increase in vessel-to-vessel collisions or accidental oil spills because current Marine Highway Corridors are wide enough to allow vessels to avoid one another, as concluded by a USCG navigational safety analysis (USCG 2011).

Discharge of bilge and ballast water may include residual oil, lubricants, and fuel. There is also potential for pollutants from marine engines to be released into the water. However, compliance with CWA would eliminate and minimize any occurrences.

At the time this PEA was written, there was no highway service connecting terminal facilities at the Port of NY/NJ to Norfolk, VA or Portland, ME, or from Norfolk, VA to Port Canaveral, FL. Although these are major ports with consistent vessel traffic, by connecting ports previously not connected there is potential for an increase of ship traffic within these ports. Additional vessel traffic in existing ports may increase the potential for additional concentrated discharges of pollutants within port areas. Adherence to rules and regulations of the various port management plans would further minimize the likelihood of adverse impacts to water quality stemming from accidental releases of pollutants. Impacts to surface waters within port areas would be minimized through adherence to the CWA and the regulations of Annex IV of MARPOL.

Groundwater

Based on the type of services that would be implemented under the Proposed Action, a large consumption of groundwater would not be required nor would they involve activities that would result in contamination of groundwater. Therefore, no impacts to groundwater are expected to occur.

Wetlands

Increased ship traffic has the potential to increase erosion of sensitive wetland areas from increased wave action produced by ship wakes. However, because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have minimal impacts to

wetlands. Potential impacts to wetlands could be minimized by the practice of reducing vessel speeds in areas containing sensitive wetlands.

For future site-specific projects wetland identification and impact determination may be necessary. In these cases, consultations with USACE and appropriate State agencies would be conducted and the necessary permits obtained.

Floodplains

The ports selected for the conceptual Marine Highway services in the East Coast region have existing infrastructure and land use associated with port functions and already have flood control at these locations. It is not likely that there would be any increase in impacts to floodplains as a result of the Proposed Action. In addition, facility development is not part of the Proposed Action; therefore, no impacts to floodplains would occur.

For future site-specific projects, infrastructure improvements are not anticipated. However, if improvements are determined necessary for the ports to accommodate additional services, additional analysis may be necessary under a project-based NEPA document to analyze impacts to floodplains.

8.10.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services as identified within the East Coast region would not be implemented. Therefore, there would be no impacts to water resources.

8.11 Cultural Resources

8.11.1 Affected Environment

Archaeological Resources

The location of archaeological resources was not divulged on any online databases of SHPOs in the East Coast region.

Architectural Resources

Ten of the ports serviced within the East Coast region (Charleston, SC; Norfolk and Newport News, VA; Philadelphia, PA; New York, NY; Providence, RI; New Bedford and Boston MA; Portland, ME; and Fajardo, Puerto Rico) have NRHP-listed architectural resources within the boundaries of the ports themselves. Seventeen ports have NRHP-listed properties within half a mile of port facilities. These are the ports of Miami and Key West, FL; Savannah, GA; Charleston, SC; Norfolk and Newport News, VA; Baltimore, MD; Wilmington, DE; Philadelphia, PA; Albany, Catskills, Yonkers, and New York, NY; Providence, RI; New Bedford and Boston, MA; and Portland, ME (NPS 2012). Eight ports in Georgia, South Carolina, Delaware, and New York have inventoried properties with undetermined NRHP eligibility status: Savannah, GA; Charleston, SC; Wilmington, DE; and Albany, Catskill, Kingston, Newburgh, and New York, NY (Delaware Department of State, Division of Historical and Cultural Affairs 2012; Georgia Department of Natural Resources 2012; New York Department of Parks, Recreation, and Historic Preservation 2012; South Carolina Department of Archives and History 2012). No previously inventoried

properties were located within ports in Maine (Maine Department of Conservation 2012). Online SHPO databases for the other States in the East Coast region were not available or accessible.

For the representative port pairs in the East Coast region, NRHP-listed architectural resources are within the boundaries of the ports of New York/New Jersey, Norfolk, and Portland. Additional NRHP properties are within the vicinity of these port locations. No NRHP properties are in or near Port Canaveral.

8.11.2 Environmental Consequences

8.11.2.1 Proposed Action

There is currently no Marine Highway service connecting the port terminal facilities of the Port of New York/ New Jersey to Norfolk, VA or Portland, ME, nor is there a service between Norfolk and Port Canaveral, FL. As such, effects as a result of the Program are more likely. However, dredging and landside infrastructure improvements are not a planned aspect of the Proposed Action and are not included in this analysis. Therefore, the range of effects to NRHP-listed or eligible cultural resources by the Proposed Action within the East Coast region is similar to those described for the West Coast region in Section 4.11.2. Effects to NRHP-listed or eligible cultural resources would be evaluated in a project-based NEPA document for a Marine Highway Project proposed to be implemented under the Program.

No known archaeological sites were identified at or near the representative port pair locations. No construction, demolition, or other activities that would require ground disturbance are currently proposed at the port pair locations in the East Coast region. Therefore, there would be no impacts to archaeological resources resulting from the proposed Marine Highway services at the representative port pairs in this region.

No construction, renovations, or demolition is proposed for the representative port pairs in the East Coast region at this time. Therefore, there would be no direct effects to NRHP-listed or eligible cultural resources.

Indirect effects to a NRHP-listed or -eligible property could occur when visual, audible, or atmospheric elements that are out of character with the resource alter its setting or characteristics that qualify it for listing on the NRHP. The introduction of ATB traffic between the representative port pairs in this region could result in an increase in noise levels from increased marine vessel traffic. However, as described in Section 8.1.2, noise impacts associated with the Proposed Action are not anticipated to be significant.

8.11.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. The conceptual Marine Highway services would not be implemented. Therefore, there would be no impacts to cultural resources.

8.12 Hazardous Materials and Waste

8.12.1 Affected Environment

Hazardous materials and wastes may be used and generated during the routine operation and maintenance of marine vessels in port areas. These substances may also be transported as cargo and, as such, may be present anywhere along existing Marine Highway Corridors.

Hazardous Materials Management

Large commercial vessels routinely discharge ballast water, gray and black water, bilge water, and deck runoff consistent with applicable international and national standards. Discharges of sewage (also known as black water) and gray water, which is the effluent generated from wash basins and showers on board ships, are regulated under MARPOL Annex IV. Discharges of black water are prohibited except for specific conditions stipulated under the Annex. In addition to the international standards established under MARPOL Annex IV, the U.S. regulates vessel discharges of gray water, bilge water, and a variety of other vessel discharges through the EPA's VGP (EPA 2008a).

Accidental spills of oil and fuel can also cause significant damage to the environment and extensive standards have been put in place to prevent such accidents and to respond to such incidents when they do occur. Regulations for the prevention of oil pollution are set out in Annex I to MARPOL as well as the CWA.

Some specialized hull coatings that serve to prevent organisms from attaching to a ship's hull also release substances that may be considered to be vessel discharges. All ocean-going commercial vessels utilize hull coatings designed to minimize resistance to movement through the water and the attachment of both soft and hard-shell organisms. These coatings are often referred to as "antifouling" coatings.

Antifouling coatings work by different methods. Some coatings make the hull surface slick, which causes fouling organisms to fall off once the vessel reaches a specific operating speed. Other compounds provide a controlled release of biocides to prevent the attachment of organisms such as barnacles and slime. Standards for the manufacture and use of these biocidal products are established through the CWA. In addition, the AFS Treaty prohibits the use of organotins as an active antifouling agent and sets forth a structure for international restrictions on other antifouling compounds deemed to be harmful to the marine environment. The AFS Treaty eliminated the use of TBT on ships in 2008 due its persistence in the marine environment and its effect on non-target species.

Hazardous Waste Management

Operation and maintenance of vessels, trains, trucks, cranes, and forklifts used for Marine Highway services activities generates small quantities of hazardous wastes. These wastes include, at a minimum, empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries.

8.12.2 Environmental Consequences

8.12.2.1 Proposed Action

For future site-specific projects, NEPA analysis would be required to quantify volumes of hazardous materials and wastes used, generated, and transported by vessel services within the Marine Highway Corridor on the East Coast region.

Hazardous Materials Management

Operation and maintenance of vessels, trains, trucks, cranes and forklifts used for Marine Highway activities would involve the use of small quantities of hazardous materials (e.g., fuel, oil, solvents, hydraulic fluid, antifreeze, lubricants, and/or paints) and generation of hazardous wastes. Any

differences in the quantities of hazardous materials used over current baseline conditions are anticipated to be negligible and would not be significant. Appropriate procedures for the handling, storage, and transport of hazardous materials would be implemented at each port location and during transport, in accordance with RCRA, all applicable DOT, EPA, OSHA, and Nuclear Regulatory Commission regulations, and other applicable State and local regulations.

Accidental releases of hazardous materials would be reduced or eliminated through compliance with EPA and DOT procedures and through the development and implementation of a SPCC Plan. Both the port facility and the vessel would be responsible for preparing their own spill plans and ensuring their personnel are adequately trained in spill response procedures.

Fuels, such as diesel, needed to power vessels and port machinery would be stored in accordance with EPA regulations and site-specific BMPs for their handling, storage and use, and would include regularly monitoring and inspecting tanks for leaks. A SPCC Plan would also be prepared by the port, as well as the vessel owner/operator, in the event of an accidental release of fuel.

Impacts from antifouling paints are not anticipated to be significant. The hull coating in most general use is biocidal antifouling paint, which leaches copper and a number of other biocides into the water in order to kill off fouling organisms that attach to the ship bottom. These paints gradually release the toxic substances into the water over a period of three to five years, after which time they become depleted and need to be replaced (EPA 1999). The slow release nature of the coating coupled with the transient nature of the vessels would not result in a significant impact to the environment.

Hazardous or toxic materials would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks.

Hazardous Waste Management

All hazardous wastes associated with the Program would be managed and disposed of in accordance with all applicable DOT, EPA, and OSHA regulations. Appropriate procedures for the handling, storage, transport and disposal of hazardous wastes would be identified in site-specific Hazardous Waste Management Plans implemented at each port location and during transport in accordance with RCRA, all applicable DOT, EPA, and OSHA regulations, and other applicable State and local regulations. Compliance with applicable regulations, plans, policies and procedures would minimize potential impacts to hazardous wastes and hazardous waste management and impacts would not be significant.

8.12.2.2 No Action Alternative

Under the No Action Alternative, the Program would not be developed further and MARAD would not be in compliance with the Energy Act. Implementation of conceptual Marine Highway services as identified for the East Coast region would not occur. No impacts associated with hazardous materials or waste management would occur under the No Action Alternative.

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9.0 CUMULATIVE IMPACTS

Cumulative impacts are defined by the CEQ in 40 CFR 1508.7 as:

> *Impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.*

The CEQ regulations further require that NEPA environmental analyses address connected, cumulative, and similar actions in the same document (40 CFR 1508.25). Additionally, the CEQ further explained in Considering Cumulative Effects Under the NEPA that "each resource, ecosystem and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters." Therefore, a cumulative effects analysis normally encompasses geographic boundaries beyond the immediate area of the Proposed Action, and a time frame, including past, present, and reasonably foreseeable future actions, in order to capture these additional effects.

Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time within the same geographical area. A cumulative impact typically occurs when effects of several actions occur in the same locale, effects on a specific resource are similar in nature, and effects are long-term in nature.

This PEA identifies several conceptual Marine Highway services that could be implemented in selected port pair areas nationwide. As the Program progresses, services other than the conceptual Marine Highway services could be developed throughout the U.S. Future site-specific projects may require preparation of project-based NEPA documentation, and cumulative impacts of those projects would be analyzed in their project-based NEPA documents.

This section outlines the types of projects and analyses that would need to be conducted to assess cumulative impacts by region.

9.1 Past, Present, and Reasonably Foreseeable Future Actions by Region

Representative examples of projects that may result in cumulative impacts with the Proposed Action are listed in Table 9.1-1. Note that this list does not contain a comprehensive assessment of all the projects that have the potential to occur within the geographic region. Project-based NEPA analysis that may need to be completed for future Program projects would include a comprehensive review of past, present, and reasonably foreseeable future projects specific to the port(s) for which the NEPA analysis is being conducted. As needed, individual ports and municipal planning organizations would be contacted to determine projects that would need to be included in cumulative impact analyses.

The types of past, present and reasonable foreseeable future projects listed in the table that are relevant to cumulative impacts of the Proposed Action are: port expansion, commercial shipping, commercial and industrial development, marine research, and air quality plans. Other types of actions that may affect the same aspects of the environment as the Proposed Action are: oil and gas exploration and production, aircraft flights, military operations, commercial fishing, and recreational activities.

Table 9.1-1. Representative Examples of Past, Present, and Reasonably Foreseeable Future Actions Relevant to Cumulative Impacts

Region	Action	Environmental Analysis
West Coast	**Past Actions**	
	Port of Los Angeles "Pier 300" Container Terminal Expansion	Final Environmental Impact Report (EIR) completed June 2012, construction to begin in late 2012
	Present Actions	
	Gerald Desmond Bridge Replacement Project (Port of Long Beach/Caltrans)	Final EIR/EA July 2010
	Port of Los Angeles' Main Channel Deepening Project	Port of Los Angeles Channel Deepening Project Final State EIS (SEIS)/State EIR
	Reasonably Foreseeable Future Actions	
	Southern California International Gateway (SCIG) Project	Draft EIR analyzing the construction and operation of a rail yard on outer Port property (Port of Los Angeles)
	Master Plan for retail and commercial development along the Los Angeles Water Front (Port of Los Angeles)	No environmental document has been completed
	Sacramento River Deep Water Channel Deepening (Port of Sacramento)	Draft SEIS
	Port of Long Beach Green Port Gateway Project	No environmental document has been completed
	Lincoln Avenue Grade Separation (Port of Tacoma)	No environmental document has been completed
	Washington United Terminals berth extension (Port of Tacoma)	No environmental document has been completed
	Future Saltchuck Habitat Restoration (Port of Tacoma)	No environmental document has been completed
	Northwest Ports Clean Air Strategy (Port of Seattle)	No environmental document has been completed
	Puget Sound Maritime Air Emissions Inventory (Port of Seattle)	No environmental document has been completed
	Green Trade Corridor (Ports of Oakland-Stockton-West Sacramento)	No environmental document has been completed
	Oakland Army Base Port Development Program (Port of Oakland)	No environmental document has been completed
	Marine Highway-Barge Container Service (Port of Sacramento)	No environmental document has been completed

Table 9.1-1. Representative Examples of Past, Present, and Reasonably Foreseeable Future Actions Relevant to Cumulative Impacts

Region	Action	Environmental Analysis
Great Lakes	**Past Actions**	
	Port of Toledo Waterfront Transient Dock Project	Environmental review document not found
	Reasonably Foreseeable Future Actions	
	East Terminal Connector Project, Port of Oswego	Categorical Exclusion March 2012
	Deep Water Harbor Study, Port of Sault Ste. Marie	No environmental document has been completed
Inland Waterways/ Mississippi	**Present Actions**	
	American Can Building, Port of Cincinnati	No environmental document has been completed
	Harrison Terminal Building, Port of Cincinnati	No environmental document has been completed
	Reasonably Foreseeable Future Actions	
	Julia Street Cruise Terminal Improvements, Port of New Orleans	No environmental document has been completed
Gulf Coast	**Reasonably Foreseeable Future Actions**	
	Gulf Marine Highway Intermodal Infrastructure Development Project: Phase II, Port of Brownsville, TX	No environmental document has been completed
	Port Manatee Connector Study, Port Manatee	Environmental review document is in progress
East Coast	**Reasonably Foreseeable Future Actions**	
	Port Miami Rail Intermodal Yard Project, Port of Miami	No environmental document has been completed
	Container Yard and Wharf Improvements, Port of Miami	No environmental document has been completed
	Port Parking and Roadway Assessment, Port of Miami	No environmental document has been completed
	Craney Island Eastward Expansion, Port of VA/Norfolk	No environmental document has been completed

9.2 Potential Cumulative Impacts

The conceptual Marine Highway services under the Proposed Action of this PEA would use existing port infrastructure and established Marine Highway Corridors. This would greatly reduce the impacts to natural areas and wildlife resources because of the previously disturbed nature of the ports and existing activity occurring in waterways that are already traversed by marine vessels. BMPs would be implemented and avoidance and minimization measures would be integrated into Marine Highway Projects to further reduce the already limited impacts. The cumulative impact analysis for this PEA identifies what should be analyzed in future project-based NEPA documents.

The geographic area for the assessment of cumulative impacts includes the ports areas and Marine Highway Corridors within the five regions potential affected by the Proposed Action: West Coast, Great Lakes, Inland Waterways/Mississippi, Gulf Coast, and East Coast. The following is an overview of the potential impacts that could occur and that may contribute to cumulative impacts to the environment.

Noise

The Proposed Action would result in a nominal increase in new vessel trips and operation of equipment at ports compared with existing levels along existing shipping routes and at the ports. Therefore, the associated increase in land based and underwater noise would be minimal, and impacts from noise on port communities and aquatic species would be negligible.

There are several types of past, present, and reasonably foreseeable future projects with noise producing activities that may affect port communities and/or aquatic species. These are: port expansion, commercial shipping, oil and gas exploration and production, aircraft flights, military operations, marine research, commercial fishing, and recreational activities. The minimal noise impact associated with the Proposed Action in conjunction with noise associated with these types of past, present, and reasonably foreseeable future actions within the geographic study area may have the potential to result in cumulative noise impacts.

As site-specific projects are developed for the Program, cumulative noise impacts should be addressed in a project-based NEPA.

Air Quality

Based on the limited quantitative analysis, the use of a Marine Highway service to move cargo demonstrates an overall reduction in emissions as compared to truck movement of the same volume of cargo for most of the Marine Highway Corridors. Marine vessels can carry a substantially larger amount of cargo as compared to trucks. Marine vessel emissions of criteria pollutants are a function of engine size, operating cycle, and fuel burned. As older vessels become replaced with new vessels, energy efficiency in engines increase and thus results in emission reductions. In addition, as new technology and regulatory requirements are instituted for marine and surface transportation, greater fuel efficiency is achieved and emissions are reduced. These reductions in air emissions would be expected to have a beneficial impact on air quality in a given region. The implementation of Marine Highway Corridors to transit goods would be expected to further enhance these beneficial impacts based on the analysis in this PEA demonstrating that cargo movements by OGV or ATB consistently result in lower overall emissions as compared to moving the same volume of cargo by truck transport.

The marine highway system would be responsible for a nominal increase in vessel traffic. That increase, when offset with the regional emissions benefits is not expected to result in a significant impact. Future, project-specfic NEPA documents may need to be completed to determine actual cumulative impacts.

Land Use

The Proposed Action would utilize existing ports and improvements to the infrastructure are not anticipated; therefore, there would be no impact on land use at the ports or in the surrounding communities and cumulative impacts with other actions would not be expected.

Types of past, present, and reasonably foreseeable future projects with potential to have land use impacts in port communities are: port development, intermodal facility development, commercial and/or industrial development in the area of the port.

As site-specific projects are developed for the Program, cumulative land use impacts should be addressed in a project-based NEPA.

Infrastructure and Utilities

In most cases, the port pairs identified for this PEA handle millions of tons of cargo each year. The additional cargo handling requirements resulting from the implementation of the Proposed Action would be negligible or minimal at many of these ports. Therefore, cumulative impacts with other actions would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on infrastructure and utilities are: port expansion, commercial and industrial development, and commercial shipping. As site-specific projects are developed for the Program, cumulative infrastructure and utilites impacts should be addressed in a project-based NEPA.

Socioeconomics

The estimated results of transitioning from long-haul truck service to the conceptual Marine Highway service indicate that while there may be a loss of jobs and income, there would also be increases in both the overall number of jobs created and personal income. Therefore, the Proposed Action would not adversely affect employment or income.

Types of past, present, and reasonably foreseeable future projects with potential to have socioeconomic impacts in port communities or associated industries are: port development, intermodal facility development, and commercial or industrial development in the area of the port. Cumulative socioeconomic impacts of the Proposed Action when considered with these types of projects may potentially be additive and beneficial or offsetting and neutral overall.

As site-specific projects are developed for the Program, cumulative socioeconomic impacts should be addressed in a project-based NEPA.

Recreation

Given the nominal increase in vessel trips of the conceptual Marine Highway services and that the vessels would transit along existing shipping routes between existing ports, negligible impacts to recreation are anticipated. Therefore, cumulative impacts with other actions would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on recreation are: port expansion, commercial and industrial development, and commercial shipping. As site-specific projects are developed for the Program, cumulative recreation impacts should be addressed in a project-based NEPA.

Traffic and Transportation

There is the potential for the Proposed Action to result in impacts to both truck and vessel traffic. The impacts to truck traffic would generally be positive, as the implementation of the Proposed Action

would reduce long haul truck trips and alleviate some traffic congestion on highway corridors. Conversely, by removing trucks from the highway corridors, vessel trips would be expected to increase by an estimated range of two to six vessel trips (one to three trips each way) for each of the conceptual Marine Highway services.

Types of other actions that would result in either positive or negative impacts to traffic and transportation include increases in commercial shipping and industrial operations, as well as increases or decreases in vehicular traffic. Cumulative impacts to traffic and transportation of the Proposed Action when considered with these types of projects may potentially be additive or offsetting depending on whether they would result in increased vessel trips or increased truck trips.

Future project-based NEPA document may need to analyze traffic impacts with those of other projects.

Biological Resources

Vegetation and Wildlife

Because the Proposed Action would utilize existing ports where there is not expected to be much upland vegetation or wildlife in the affected area, and improvement to infrastructure is not anticipated, there is minimal potential for impacts to upland vegetation, SAV, or wildlife. Therefore, cumulative impacts with other actions would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on vegetation and wildlife are: port expansion, commercial and industrial development, commercial shipping, commercial fishing, and recreational activities. As site-specific projects are developed for the Program, cumulative impacts to vegetation and wildlife should be addressed in a project-based NEPA.

Migratory Birds

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel trips, operation of the conceptual Marine Highway services would not be expected to impact migratory birds, or result in takes as defined by the MBTA. Therefore, cumulative impacts with other actions would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on migratory birds are: port expansion, commercial and industrial development, commercial shipping, oil and gas exploration and production, aircraft flights, military operations, marine research, commercial fishing, and recreational activities. As site-specific projects are developed for the Program, cumulative impacts to migratory birds should be addressed in a project-based NEPA.

Marine Mammals

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have minimal impacts to marine mammals and would not be expected to result in takes or harassment as defined by the MMPA.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on marine mammals are: port expansion, commercial and industrial development, commercial shipping,

oil and gas exploration and production, military operations, marine research, commercial fishing, and recreational activities. As site-specific projects are developed for the Program, cumulative impacts to marine mammals should be addressed in a project-based NEPA.

Invasive Species

The Proposed Action would not be expected to result in invasive species impacts. The nominal increase in vessel traffic with operation of the conceptual Marine Highway services, as identified for the West Coast region, in conjunction with compliance with the USCG Final Ballast Water Rule and the EPA draft VGP would result in minimal potential for the introduction of invasive species. Therefore, cumulative impacts with other actions would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts with regard to invasive species are: commercial shipping, oil and gas exploration and production, military operations, commercial fishing, and recreational boating. Cumulative invasive species impacts would be minimized through compliance with the USCG Final Ballast Water Rule and the EPA draft VGP. As site-specific projects are developed for the Program, cumulative impacts from invasive species should be addressed in a project-based NEPA.

Threatened and Endangered Species and Critical Habitat

Because the Proposed Action would use existing Marine Highway Corridors and ports, and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway services would be expected to have no effect on, or may affect but would not be likely to adversely affect, threatened and endangered species. Therefore, the Proposed Action may contribute minimally to cumulative impacts to threatened or endangered species. The Proposed Action would not be expected to impact critical habitat as designated by the ESA; therefore, cumulative impacts to critical habitat would not be expected.

Types of other past, present, and reasonably foreseeable future actions with potential to have impacts on threatened and endangered species are: port expansion, commercial and industrial development, commercial shipping, oil and gas exploration and production, military operations, marine research, commercial fishing, and recreational activities. As site-specific projects are developed for the Program, cumulative impacts to threatened and endangered species should be addressed in a project-based NEPA.

<u>Geological Resources</u>

The operation of the conceptual Marine Highway services would utilize existing shipping routes and port facilities and no upgrades involving construction, or dredging or other activities that would affect geology and soils are anticipated. Therefore, there would be no direct, indirect or cumulative impacts to geology and soils.

<u>Water Resources</u>

Because the Proposed Action would use existing Marine Highway Corridors and ports and would be expected to result in a nominal increase in vessel traffic, operation of the conceptual Marine Highway

services would be expected to have minimal impacts to water quality. Therefore, cumulative impacts with other actions would not be expected.

As site-specific projects are developed for the Program, cumulative impacts to water resources should be addressed in a project-based NEPA.

Cultural Resources

There is no construction, renovation, or demolition proposed for the Proposed Action. Therefore, there would be no direct, indirect, or cumulative effects to NRHP-listed or eligible cultural resources.

Hazardous Materials and Waste

All hazardous materials and wastes associated with the Marine Highway Program would be managed and disposed of in accordance with all applicable DOT, EPA, and OSHA regulations; therefore no direct, indirect or cumulative impacts would be expected under the Proposed Action. Future NEPA analysis would require review of projects within the geographic region that may have the potential to result in production or discharge of hazardous substances into the environment to determine if there would be the potential for cumulative impacts.

10.0 OTHER NEPA CONSIDERATIONS

10.1 Relationships Between Short-Term Uses of the Environment and Enhancement of Long-Term Productivity

NEPA (Section 102(2)(C)(iv)) requires a detailed statement be prepared on the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity for planned Federal actions. Short-term uses of the environment associated with the Proposed Action would include changes to the physical environment and energy use while the conceptual Marine Highway services are in operation. Operational activities would involve negligible increases in underwater noise. The Proposed Action would involve long-term commitments of human labor and financial resources. Nonrenewable resources that would be consumed during operational activities include fuel and oil.

The Proposed Action would further develop the America's Marine Highway Program in order to relieve landside congestion, provide redundancy to nearby surface transportation facilities and maximize the efficiency of the U.S. Marine Transportation System by increasing use of the existing capacity within the nation's navigable waters. The operation of the conceptual Marine Highway services would fully comply with Congress' legislative requirements for short sea shipping. Implementation of the Proposed Action is not anticipated to result in any environmental impacts that would significantly affect the maintenance and enhancement or long-term productivity of the potentially affected environment. For most of the Marine Highway Corridors, based on the limited quantitative analysis, the use of a Marine Highway service to move cargo generally demonstrates a reduction in overall emissions of air quality pollutants when compared to truck movement of the same volume of cargo.

10.2 Irreversible and Irretrievable Commitments of Resources

NEPA (Section 102 (2)(C)(v)) requires a detailed statement on any irreversible and irretrievable commitments of resources that would be involved if the Proposed Action were implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of those resources have on future generations. Irreversible commitments of resources are those that cannot be reversed except over an extremely long period of time. These irreversible effects primarily result from destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

Fuel and labor would be expended during operation of the conceptual Marine Highway services as described under the Proposed Action. Commitment of these resources and financial resources would be considered minor. Moreover, the Proposed Action would not result in destruction of environmental resources such that the range of potential uses of the environment would be limited, nor impact the biodiversity of the regions in which the services would occur.

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APPENDIX A
CORRESPONDENCE

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U.S. Department
of Transportation

Maritime Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

February 24, 2012

RE: America's Marine Highway Program, Programmatic Environmental Assessment

Dear Agency/Organization Representative:

The U.S. Department of Transportation (DOT), Maritime Administration (MARAD) is preparing a Programmatic Environmental Assessment (PEA) for the America's Marine Highway Program (Program). The Program is a short sea transportation program designed to enhance the seamlessness and efficiency of the transportation system through the expanded use of the Great Lakes Saint Lawrence Seaway System, inland, intracoastal, and coastal waterways. The Marine Highways serve as a key component of the U.S. surface transportation system for the movement of people and cargo. The Program supports capacity and efficiency improvements to enhance the national waterway system and maximize the efficiency of the broader U.S. transportation system by incorporating a maritime component in the planning for the transport of passengers and cargo.

The need for the Program results from the requirements of the Energy Independence and Security Act of 2007, Sections 1121, 1122, and 1123 of Public Law 110-140, which calls for the Secretary of Transportation to designate short sea transportation routes as extensions of the surface transportation system to focus public and private efforts to use the waterways to relieve landside congestion along coastal corridors. Implementation of the Program enables more goods and people to travel by water, striking a fairer balance between the demand and available capacity on highways, rail, and marine highway surface routes.

On August 11, 2010, the Secretary of Transportation identified 18 Marine Highway Corridors (including 11 corridors, 4 connectors, and 3 crossings), 8 Marine Highway Projects, and 6 initiatives that will develop within five regions (see Figure 1, America's Marine Highway). However, it is anticipated that the number and locations of Marine Highway Corridors and Marine Highway Projects will expand over time as the Program progresses.

The PEA will focus on national-scale and will be used to examine the wide variety of project types that could be implemented under the Program. The PEA will serve as a guidance document and provide an outline on how to address particular resource areas and to determine the significance of impacts based on criteria that are defined in the PEA. Site-specific projects that are funded under the Program will require a detailed NEPA analysis that can be tiered off of the PEA. This approach allows agencies to focus on the

larger scale, known issues associated with the Program rather than the smaller scale, unknown issues that may be associated with future, site-specific projects. The PEA will identify the regulatory agencies, regulatory requirements, and project-specific studies that would be needed to comply with the implementation of marine highway services. The PEA will be prepared in accordance with NEPA; the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); DOT Order 5610.1C, Procedures for Considering Environmental Impacts; and MARAD Order 600-1.

MARAD is currently identifying what should be analyzed and studied in the PEA. Public scoping meetings have been scheduled at nine different locations nationwide (Table 1).

Table 1: Regional Scoping Meetings Date, Time, and Location

City/State	Date	Location	Time
East Coast/Gulf Coast			
Charleston, South Carolina (SC)	Tuesday, March 6, 2012	North Charleston High School: 1087 East Montague Avenue, North Charleston, SC 29405	6-8pm
New Orleans, Louisiana (LA)	Thursday, March 8, 2012	De La Salle High School 5300 Saint Charles Ave, New Orleans, LA 70115	6-8pm
Miami, Florida (FL)	Tuesday, March 13, 2012	Florida Department of Transportation: District Six, 1000 NW 111 Avenue, Miami, FL 33172	6-8pm
Boston, Massachusetts (MA)	Thursday, March 15, 2012	Charlestown High School: 240 Medford Street, Charlestown, MA 02129	6-8pm
West Coast/Great Lakes/Mississippi			
San Diego, California (CA)	Tuesday, March 20, 2012	Coronado Public Library: 640 Orange Avenue, Coronado, CA 92118	6-8pm
Portland, Oregon (OR)	Thursday, March 22, 2012	Roosevelt High School: 6941 N Central Street, Portland, OR 97203	6-8pm
Chicago, Illinois (IL)	Monday, March 26, 2012	Jones College Prep School: 606 South State Street, Chicago, IL 60605	6-8pm
Cleveland, Ohio (OH)	Wednesday, March 28, 2012	Horizon Science Academy Cleveland High School: 6000 South Marginal Road, Cleveland, OH 44103	6-8pm
St. Louis, Missouri (MO)	Thursday, March 29, 2012	Jennings Junior High School: 8831 Cozens Avenue, St. Louis, MO 63136	6-8pm

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MARAD welcomes your attendance at the public scoping meeting(s). Representatives of MARAD will be available at the meeting to answer questions and written comments on environmental concerns that should be addressed in the PEA. Further, MARAD requests that your agency or organization please provide any information you have on environmental concerns that should be addressed in the PEA on or before April 16, 2011.

Should you have any questions or comments, please contact me by e-mail at daniel.yuska@dot.gov, or by phone at (202) 366-0714.

Sincerely,

Daniel Yuska
Environmental Protection Specialist

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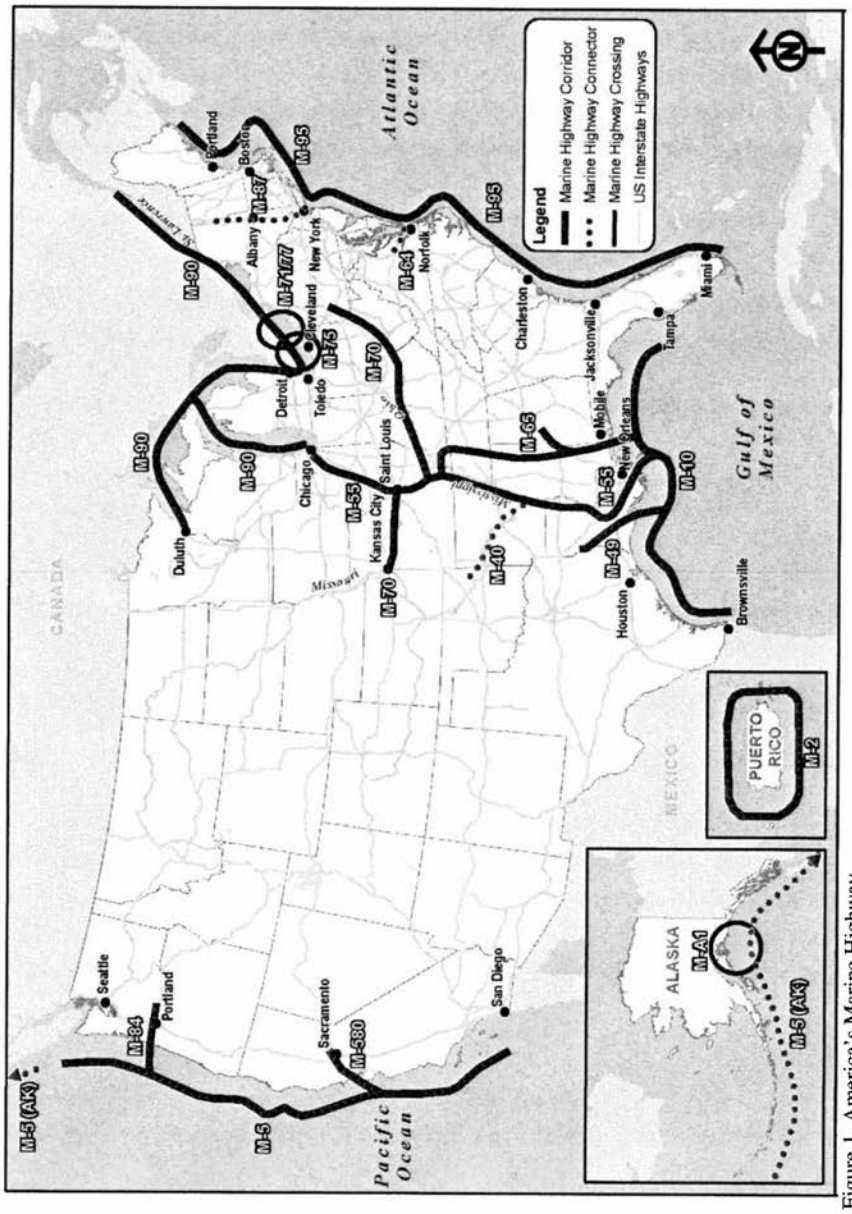

Figure 1. America's Marine Highway

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

APR 24 2012

Daniel Yuska
U.S. Department of Transportation
Maritime Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Mr. Yuska,

Thank you for contacting NOAA's National Marine Fisheries Service (NMFS) regarding the Programmatic Environmental Assessment being prepared for the America's Marine Highway Program. We understand that the program is a short sea transportation program designed to enhance the transportation system across the country, including the U.S. West Coast, from California to Washington.

NMFS is responsible for implementing the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) within marine waters. NMFS has jurisdiction to protect threatened and endangered marine species and their habitats under the ESA. The United States Fish and Wildlife Service (USFWS) has jurisdiction for species on land and some marine species. All marine mammal species are protected under the MMPA and NMFS and USFWS have responsibility for different species. A number of ESA and MMPA protected species occur within the waters off the U.S. West Coast. We have provided a species list of all ESA listed species and designated critical habitats under NMFS' jurisdiction that occur in the U.S. West Coast marine waters. We have also provided a list of all marine mammals that are found in the area.

The proposed project would establish a marine highway within the West Coast Exclusive Economic Zone (EEZ) along with associated connectors and/or crossings. This would result in vessels traveling through the areas of known distribution of animals protected under the ESA and/or the MMPA and could result in effects to these species. If the project would result in an increase in the number of ships or change in the locations of ship traffic, we would have concerns about an increase in the risk of ship strikes to marine mammals and sea turtles. There would likely be increased noise (if the number of ships is increased) which could have an impact

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on species, particularly sensitive whale species. Additionally, pollution generated by vessels could have an impact on species and their critical habitats. It is recommended that all of these impacts be considered in the Programmatic Environmental Assessment currently being scoped.

The NMFS' Southwest Regional Protected Resources Division can provide additional information on the species under our jurisdiction, including reference material on the status of species and reference material on possible effects that can be used as part of the environmental analysis of the proposed marine highway. For additional information or if you have any questions, please contact Elizabeth Petras at Elizabeth.petras@noaa.gov or (562) 980-3238. Thank you for the opportunity to comment.

Sincerely,

Penny Ruvelas
Southern California Office Supervisor
for Protected Resources Division

Enclosures

Marine mammals within the U.S. West Coast EEZ

Odontocetes (toothed porpoises, dolphins, and whales)

Dall's porpoise (*Phocoenoides dalli*)
Harbor porpoise (*Phocoena phocoena*)
Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)
Risso's dolphin (*Grampus griseus*)
Common dolphin, short-beaked. *Delphinus delphis delphis)*
Common dolphin, long-beaked (*Delphinus capensis capensis*)
Northern right whale dolphin (*Lissodelphis borealis*)
Striped dolphin (*Stenella coeruleoalba*)
Bottlenose dolphin (*Tursiops truncatus*)
Sperm whale (*Physeter macrocephalus*)*
Dwarf sperm whale (*Kogia sima*)
Pygmy sperm whale (*Kogia breviceps*)
Killer whale (*Orcinus orca*)* Two stocks, one is listed on the ESA, one is not listed.
Short-finned pilot whale (*Globicephala macrorhynchus*)
Baird's beaked whale (*Berardius bairdii*)
Cuvier's beaked whale (*Ziphius cavirostris*)
Hubbs' beaked whale (*Mesoplodon carlhubbsi*)
Pygmy beaked whale or lesser beaked whale (*Mesoplodon peruvianus*)
Gingko-toothed beaked whale (*Mesoplodon gingkodens*)
Blainville's beaked whale (*Mesoplodon densirostris*)
Perrin's beaked whale (*Mesoplodon perrini*)
Stejneger's beaked whale (*Mesoplodon stejnegeri*)

Mysticetes (baleen whales)

Gray whale (*Eschrichtius robustus*)
Blue whale (*Balaenoptera musculus*)*
Fin whale (*Balaenoptera physalus*)*
Humpback whale (*Megaptera novaeangliae*)*
Minke whale (*Balaenoptera acutorostrata*)
Sei whale (*Balaenoptera borealis)**
North pacific right whale (*Eubalaena japonica*)*

Pinnipeds (sea lions and seals)
California sea lion (*Zalophus californianus californianus*
Harbor seal (*Phoca vitulina richardsi*)
Steller sea lion (*Eumetopias jubatus*)*
Guadalupe fur seal (*Arctocephalus townsendi*)*
Northern elephant seal (*Mirounga angustirostris*)
Northern fur seal (*Callorhinus ursinus*)

*Species or stock also listed under the Endangered Species Act.

Endangered Species Act (ESA) listed endangered and threatened species and designated critical habitats under the jurisdiction of the National Marine Fisheries Service that occur off the U.S. West Coast. This list is current as of April 2012.

Species	**Status**
Marine Mammals	
Blue whale (*Balaenoptera musculus*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Killer whales - southern resident DPS (*Orcinus orca*)	Endangered
North Pacific right whale (*Eubalaena japonica*)	Endangered
Steller sea lion (*Eumetopias jubatus*), eastern distinct population segment (DPS)*	Threatened
Guadalupe fur seal (*Arctocephalus townsendi*)	Threatened
Sea turtles	
Leatherback turtle (*Dermochelys coriacea*)*	Endangered
Loggerhead turtle (*Caretta caretta*), North Pacific Ocean distinct population segment (DPS)	Endangered
Olive ridley (*Lepidochelys olivacea*)	Endangered/Threatened
Green turtle (*Chelonia mydas*)	Endangered/Threatened
Marine fish	
Green Sturgeon, southern DPS (*Acipenser medirostris*)*	Threatened
Pacific eulachon, southern DPS (*Thaleichthys pacificus*)	Threatened
Marine invertebrates	
White abalone (*Haliotis sorenseni*)	Endangered
Black abalone (*Haliotis cracherodii*)*	Endangered

Salmonids	ESU or DPS	Status
Chinook (*Oncorhynchus tshawytscha*)	Sacramento River winter, evolutionarily significant unit (ESU)	Endangered
	Central Valley Spring run ESU	Threatened
	California Coastal ESU	Threatened
	Upper Columbia River spring run ESA	Endangered
	Snake River spring/summer run ESU	Threatened
	Puget Sound ESU	Threatened
	Lower Columbia River ESU	Threatened
	Upper Williamette River ESU	Threatened
Coho (*Oncorhynchus kistuch*)	Central California Coastal ESU	Endangered
	S. Oregon/N. CA Coastal ESU	Threatened
Steelhead (*Oncorhynchus mykiss*)	Southern California DPS	Endangered
	South-Central California DPS	Threatened
	Central California Coast DPS	Threatened
	California Central Valley DPS	Threatened
	Northern California DPS	Threatened

*Species with designated critical habitat within the marine waters of the U.S. West Coast.

Critical Habitats designated by NMFS. Current as of April 2012.		
Steller sea lion (58 FR 45269)	Año Nuevo Island Southeast Farrallon Island Sugarloaf Island and Cape Mendocino in CA. Rogue Reef: Pyramid Rock and Orford Reef: Long Brown Rock and Seal Rock in OR.	Associated aquatic zones 3,000 feet seaward in State and Federally managed waters from the baseline of each rookery
Green sturgeon, southern DPS (74 FR 52300)	US coastal marine waters within 60 fathoms from Monterey Bay, CA, to Cape Flattery, WA.	
Black abalone (76 FR 66806)	Rocky intertidal and subtidal habitats to the 6 meter depth bathymetry line (relative to MLLW) around specific offshore island (the Farallon Islands, Año Nuevo Island, the Channel Islands) and along the coast in specific areas between Del Mar Landing Ecological Reserve in Sonoma County and just south of Government Point in Santa Barbara County as well as along the Palos Verde Peninsula.	
Leatherback sea turtle (77 FR 4170)	Marine waters from Point Arena, CA to Point Arguello, CA from the nearshore to the 3,000 meter isobath. Marine waters from Cape Blanco, OR to Cape Flattery, WA from the nearshore to the 2,000 meter isobath.	

See http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm for Federal Register notices and maps of critical habitats.

From: Timothy Timmermann [mailto:Timmermann.Timothy@epamail.epa.gov]
Sent: Tuesday, May 01, 2012 9:41 AM
To: Yuska, Daniel (MARAD)
Cc: Mel Cote
Subject: Marine Highway Program Programmatic Environmental Assessment

Daniel:

thanks for taking my call the other day. As promised, this email responds to the MARAD scoping notice and it provides you with a few issues we believe should be addressed in the Programmatic Environmental Assessment (PEA).

Endangered Species (especially whales and other marine mammals):

Greater ship traffic along the designated "highways" may mean increased potential for impacts to marine organisms, including endangered species. The PEA should describe how potential impacts will be addressed and whether the "highways" can be located to avoid/minimize impacts.

Dredging and Dredged Material Disposal:

The PEA should explain whether or not the project will catalyze the need for dredging and dredged material disposal along the marine highway route. In addition, the PEA should explain whether adequate disposal capacity exists for dredging necessary along the proposed highway alignment or at ports/terminals that are expected to become "hubs" serving the highway.

Vessel Discharges:

As you may know, most of New England, from Long Island Sound to Casco Bay, is designated as "no discharge" for vessel sewage discharges including both sewage and graywater, including bilgewater. The PEA should explain how operations on the marine highway will comply with this designation and should discuss whether adequate pumpout facilities to service vessels will be available.

Thanks again for the opportunity to comment. Please feel free to contact me with any questions.

Timothy L. Timmermann
Associate Director
Office of Environmental Review

EPA New England, Region 1
5 Post Office Square, Suite 100
Mail Code ORA 17-1
Boston, Massachusetts 02109-3912

Telephone: 617-918-1025
E-Fax: 617-918-0025
timmermann.timothy@epa.gov

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Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

March 23, 2012

Public Docket MARAD-2012-0015
United States Maritime Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

To Whom It May Concern:

This letter is regarding the United States Department of Transportation, Maritime Administration's (MARAD) Notice of Intent of Preparation of a Programmatic Environmental Assessment (PEA) for the America's Marine Highway Program. We understand that the PEA will identify and assess potential environmental impacts from the proposed actions and a range of reasonable alternatives so MARAD can determine what, if any, additional analyses may be required.

We congratulate MARAD on the adoption of America's Marine Highway Program. We believe there can be many advantages to the transportation of cargo over Marine Highway Corridors ("short sea shipping"), including reductions in traffic congestion, energy use, and air emissions. However, we want to emphasize that short sea shipping may not always result in air quality benefits compared to landside transportation alternatives. There are many reasons for this. For example, marine diesel engine standards are less stringent than those for on-road diesel trucks, especially in California with the Air Resources Board's (ARB) requirements for accelerated turnover to cleaner trucks. Also, short sea shipping often results in more "intermodal" shifts with associated emissions from cargo handling equipment. We believe that in many cases, short sea shipping will provide an air quality benefit only if the most advanced engine and emission control technologies are used, along with the cleanest available fuels.

We encourage MARAD to conduct a robust analysis of the air quality impacts of short sea shipping over the Marine Highway Corridors in California. For corridors where adverse impacts are possible, we encourage MARAD to identify steps to fully mitigate these potential emissions to ensure that there are no adverse air quality impacts compared to traditional on-road transportation of cargo. Further, given the significant public investments to support marine highways, we believe these projects should be designed to ensure air quality benefits – from localized health risk reduction, to improved regional air quality, to lower greenhouse gas emissions.

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March 23, 2011
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In closing, ARB staff urges MARAD to pursue America's Marine Highway Program (and the environmental analysis of that program) such that it provides air quality benefits, as well as congestion relief and other transportation benefits. If you have any questions, please contact me at (916) 324-0062.

Sincerely,

Cynthia Marvin, Chief
Stationary Source Division

cc: Elizabeth Adams
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APPENDIX B
AIR QUALITY

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Tab A. Summary of Annual Emissions Calculations

Table 1. Region 1 Annual Emissions in Total Tons by Transport Type

Region 1 - West Coast Los Angeles/Long Beach, CA to Tacoma, WA	VOCs Tons/Yr	NOx Tons/Yr	CO Tons/Yr	SO2 Tons/Yr	PM10 Tons/Yr	PM2.5 Tons/Yr
ATB	25.46	397.93	59.41	0.06	19.10	17.57
Truck	15.74	187.09	67.59	0.36	89.11	15.09
OGV	53.19	997.58	117.02	0.58	50.00	46.00
Truck	78.71	935.46	337.97	1.80	445.56	75.47
Oakland, CA to Stockton, CA						
Towboat/Barge	0.37	20.58	5.55	0.00	0.89	0.82
Truck	2.44	28.97	10.47	0.06	13.80	2.34

Table 2. Region 1 Single Trip Emissions per TEU by Transport Type

Region 1 - West Coast Los Angeles/Long Beach, CA to Tacoma, WA	VOCs Tons/TEU	NOx Tons/TEU	CO Tons/TEU	SO2 Tons/TEU	PM10 Tons/TEU	PM2.5 Tons/TEU
ATB	0.00082	0.01433	0.00190	0.00000	0.00061	0.00056
Truck	0.00050	0.00600	0.00217	0.00001	0.00286	0.00048
OGV	0.00034	0.00719	0.00075	0.00000	0.00032	0.00029
Truck	0.00050	0.00600	0.00217	0.00001	0.00286	0.00048
Oakland, CA to Stockton, CA						
Towboat/Barge	0.00001	0.00032	0.00008	0.00000	0.00001	0.00001
Truck	0.00003	0.00040	0.00014	0.00000	0.00019	0.00003

Table 3. Region 2 Annual Emissions in Total Tons by Transport Type

Region 2 - Great Lakes Oswego, NY to Toledo, OH	VOCs Tons/Yr	NOx Tons/Yr	CO Tons/Yr	SO2 Tons/Yr	PM10 Tons/Yr	PM2.5 Tons/Yr
ATB	7.67	119.80	17.89	0.02	5.75	5.29
Truck	5.34	126.61	28.23	0.06	5.28	5.12
Duluth, MN to Sault Ste Marie, ONT						
ATB	7.46	116.55	17.40	0.02	5.59	5.15
Truck	4.98	118.17	26.35	0.06	4.93	4.78
Toledo, OH to Montreal, QUEBEC						
ATB	22.94	358.51	53.52	0.05	17.20	15.83
Truck	14.73	349.43	77.91	0.17	14.57	14.12

Table 4. Region 2 Single Trip Emissions per TEU by Transport Type

Region 2 - Great Lakes Oswego, NY to Toledo, OH	VOCs Tons/TEU	NOx Tons/TEU	CO Tons/TEU	SO2 Tons/TEU	PM10 Tons/TEU	PM2.5 Tons/TEU
ATB	0.00025	0.00431	0.00057	0.00000	0.00018	0.00017
Truck	0.00017	0.00406	0.00090	0.00000	0.00017	0.00016
Duluth, MN to Sault Ste Marie, ONT						
ATB	0.00024	0.00420	0.00056	0.00000	0.00018	0.00016
Truck	0.00016	0.00379	0.00084	0.00000	0.00016	0.00015
Toledo, OH to Montreal, QUEBEC						
ATB	0.00037	0.00646	0.00086	0.00000	0.00028	0.00025
Truck	0.00024	0.00560	0.00125	0.00000	0.00023	0.00023

Table 5. Region 3 Annual Emissions in Total Tons by Transport Type

Region 3 - Inland Waterways/Mississippi Peoria, IL to New Orleans, LA	VOCs Tons/Yr	NOx Tons/Yr	CO Tons/Yr	SO2 Tons/Yr	PM10 Tons/Yr	PM2.5 Tons/Yr
Towboat/Barge	5.12	283.14	76.38	0.05	12.22	11.24
Truck	6.70	158.87	35.42	0.08	6.63	6.42

Table 6. Region 3 Single Trip Emissions per TEU by Transport Type

Region 3 - Inland Waterways/Mississippi Peoria, IL to New Orleans, LA	VOCs Tons/TEU	NOx Tons/TEU	CO Tons/TEU	SO2 Tons/TEU	PM10 Tons/TEU	PM2.5 Tons/TEU
Towboat/Barge	0.00025	0.01529	0.00367	0.00000	0.00059	0.00054
Truck	0.00032	0.00764	0.00170	0.00000	0.00032	0.00031

Table 7. Region 4 Annual Emissions in Total Tons by Transport Type

Region 4 - Gulf Coast Brownsville, TX to Manatee, FL via Mobile, AL	VOCs Tons/Yr	NOx Tons/Yr	CO Tons/Yr	SO2 Tons/Yr	PM10 Tons/Yr	PM2.5 Tons/Yr
ATB	22.48	351.29	52.45	0.05	16.86	15.51
Truck	16.43	389.66	86.88	0.19	16.25	15.75
Fulton, MS to Mobile, AL						
Towboat/Barge	0.97	53.56	14.45	0.01	2.31	2.13
Truck	2.25	53.46	11.92	0.03	2.23	2.16

Table 8. Region 4 Single Trip Emissions per TEU by Transport Type

Region 4 - Gulf Coast Brownsville, TX to Manatee, FL via Mobile, AL	VOCs Tons/TEU	NOx Tons/TEU	CO Tons/TEU	SO2 Tons/TEU	PM10 Tons/TEU	PM2.5 Tons/TEU
ATB	0.00072	0.01265	0.00168	0.00000	0.00054	0.00050
Truck	0.00053	0.01249	0.00278	0.00001	0.00052	0.00050
Fulton, MS to Mobile, AL						
Towboat/Barge	0.00005	0.00289	0.00069	0.00000	0.00011	0.00010
Truck	0.00011	0.00257	0.00057	0.00000	0.00011	0.00010

Table 9. Region 5 Annual Emissions in Total Tons by Transport Type

Region 5 - East Coast NY/NJ to Norfolk, VA	VOCs Tons/Yr	NOx Tons/Yr	CO Tons/Yr	SO2 Tons/Yr	PM10 Tons/Yr	PM2.5 Tons/Yr
ATB	6.40	100.08	14.94	0.01	4.80	4.42
Truck	3.24	76.90	17.15	0.04	3.21	3.11
OGV	13.38	250.89	29.43	10.62	12.57	11.57
Truck	19.46	461.41	102.87	0.23	19.25	18.65
Norfolk, VA to Canaveral, FL						
ATB	13.92	217.52	32.47	0.03	10.44	9.60
Truck	5.46	129.42	28.85	0.06	5.40	5.23
OGV	29.08	545.30	63.97	23.09	27.33	25.14
Truck	32.74	776.51	173.13	0.39	32.39	31.39
NY/NJ to Portland, ME						
ATB	9.28	145.01	21.65	0.02	6.96	6.40
Truck	2.61	61.90	13.80	0.03	2.58	2.50
OGV	19.38	363.53	42.64	15.39	18.22	16.76
Truck	20.88	495.17	110.40	0.25	20.65	20.02

Table 10. Region 5 Single Trip Emissions per TEU by Transport Type

Region 5 - East Coast NY/NJ to Norfolk, VA	VOCs Tons/TEU	NOx Tons/TEU	CO Tons/TEU	SO2 Tons/TEU	PM10 Tons/TEU	PM2.5 Tons/TEU
ATB	0.00031	0.00541	0.00072	0.00000	0.00023	0.00021
Truck	0.00016	0.00370	0.00082	0.00000	0.00015	0.00015
OGV	0.00011	0.00226	0.00024	0.00009	0.00010	0.00009
Truck	0.00016	0.00370	0.00082	0.00000	0.00015	0.00015
Norfolk, VA to Canaveral, FL						
ATB	0.00067	0.01175	0.00156	0.00000	0.00050	0.00046
Truck	0.00026	0.00622	0.00139	0.00000	0.00026	0.00025
OGV	0.00023	0.00491	0.00051	0.00018	0.00022	0.00020
Truck	0.00026	0.00622	0.00139	0.00000	0.00026	0.00025
NY/NJ to Portland, ME						
ATB	0.00045	0.00783	0.00104	0.00000	0.00033	0.00031
Truck	0.00013	0.00298	0.00066	0.00000	0.00012	0.00012
OGV	0.00012	0.00245	0.00026	0.00009	0.00011	0.00010
Truck	0.00013	0.00298	0.00066	0.00000	0.00012	0.00012

TAB B. [1]CONCEPTUAL SERVICE DESCRIPTIONS

REGION	[2]PORT PAIRS (illustrative only)	[3]VESSEL TYPE (all single TIER 2 engine)	[4]VOLUME (TEU's)	[5]FREQUENCY (round trips/week)
East Coast	NY/NJ - NORFOLK, VA	Tug/Barge (Articulated)	200	Once
		OGV	600	Twice
	NORFOLK, VA - CANAVERAL, FL	Tug/Barge (Articulated)	200	Once
		OGV	600	Twice
	NY/NJ - PORTLAND, ME	Tug/Barge (Articulated)	200	Once
		OGV	600	Twice
West Coast	LA/LB, CA - TACOMA, WA	Tug/Barge (Articulated)	300	Once
		OGV	750	Twice
	OAKLAND, CA - STOCKTON, CA	Tug/Barge (Articulated)	350	Twice
Gulf Coast	BROWNSVILLE, TX - MANATEE, FL VIA MOBILE, AL	Tug/Barge (Articulated)	300	Once
	FULTON, MS - MOBILE, AL	Towboat/Barges	100	Twice
Inland Waterways/Mississippi	PEORIA, IL - NEW ORLEANS, LA	Towboat/Barges	100	Twice
Great Lakes	OSWEGO, NY - TOLEDO, OH	Tug/Barge (Articulated)	300	Once
	DULUTH, MN - SAULT STE. MARIE, ONT	Tug/Barge (Articulated)	300	Once
	TOLEDO, OH - MONTREAL, QUEBEC	Tug/Barge (Articulated)	300	Twice

[1]This tab contains the information in PortPairs.xls, provided by the U.S. Maritime Administration, April & July, 2012.

[2]Port Pairs — These port pairings are the best estimates of possible services. Information was derived from market studies, industry conversations, and/or professional expertise. Actual marine highway service may vary based on market analyses and business practice.

[3]Vessel Type — Four kinds of vessels are anticipated. Ocean going ships of mid to small size (750 TEU capacity), ocean going tug/barge (350 TEU capacity), inland towboat/barges (100 TEU capacity), and a vehicle/truck ferry capable of carrying approximately 20 tractor trailers (40 TEU). All vessel engines are assumed to be single engine, TIER 2, and operate on diesel fuel.

[4]Volume — Volumes are assumed for environmental analysis. Actual volumes may be greater or lesser, depending upon market and business factors. Two TEU's equal to one truckload.

[5]Frequency — As with volume, frequency of service is estimated only for programmatic NEPA evaluation. Service frequency may require more than one vessel. Actual service will be evaluated per NEPA prior to public investment.

General Notes — Several of these service pairings include more than one type of vessel/volume. It is expected that this will generate a high/low estimate of activity.

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TAB C. MARINE AND INLAND VESSEL EMISSIONS

Region	Origin	Destination	Type of Vessel	Engine Type	[1]MCR (kW)	[2]Load Factors	[3]One Way Distance (nautical miles)	Volume (TEUs)	[4]Number of One Way Transits Weekly	Annual Distance (nautical miles)	[5]Average Speed (knots)	Single Trip Activity (hrs)	[6]Activity (annual hours)	[7,8,9,10]Emissions Factors (g/KWhr) VOCs	NOx	CO	SOx	PM10	PM2.5	CO2	Annual Emissions (tons, CO2 in metric tons) VOCs	NOx	CO	SOx	PM10	PM2.5	CO2
East Coast	Port of New York	Norfolk, VA	OGV	Main	9,564	0.83	294	600	4	61,152	20.0	15	3,058	0.50	10.54	1.10	0.397	0.47	0.43	646.08	13.38	250.89	29.43	10.62	12.57	11.57	15681
			Tug/Barge	Main	4,578	0.83	294	200	2	30,576	12.0	25	2,548	0.60	10.54	1.40	0.001	0.45	0.41	588.79	6.40	100.08	14.94	0.01	4.80	4.42	5701
	Norfolk, VA	Canaveral, FL	OGV	Main	9,564	0.83	639	600	4	132,912	20.0	32	6,646	0.50	10.54	1.10	0.397	0.47	0.43	646.08	29.08	545.30	63.97	23.09	27.33	25.14	34083
			Tug/Barge	Main	4,578	0.83	639	200	2	66,456	12.0	53	5,538	0.60	10.54	1.40	0.001	0.45	0.41	588.79	13.92	217.52	32.47	0.03	10.44	9.60	12390
	Port of New York	Portland, ME	OGV	Main	9,564	0.83	426	800	4	88,608	20.0	21	4,430	0.50	10.54	1.10	0.397	0.47	0.43	646.08	19.38	363.53	42.64	15.39	18.22	16.76	22722
			Tug/Barge	Main	4,578	0.83	426	200	2	44,304	12.0	36	3,692	0.60	10.54	1.40	0.001	0.45	0.41	588.79	9.28	145.01	21.65	0.02	6.96	6.40	8260
Gulf Coast	Brownsville, TX	Mobile, AL	Tug/Barge	Main	4,578	0.83	643	300	2	66,872	12.0	54	5,573	0.60	10.54	1.40	0.001	0.45	0.41	588.79	14.00	218.88	32.68	0.03	10.50	9.66	12467
	Mobile, AL	Manatee, FL	Tug/Barge	Main	4,578	0.83	389	300	2	40,456	12.0	32	3,371	0.60	10.54	1.40	0.001	0.45	0.41	588.79	8.47	132.42	19.77	0.02	6.35	5.85	7543
	Fulton, MS	Mobile, AL	Towboat/Barge	Main	1,496	0.83	203	100	4	42,224	8.0	25	5,278	0.134	8.33	2.00	0.001	0.32	0.29	690.00	0.97	53.56	14.45	0.01	2.31	2.13	4522
Inland Waterways/Mississippi	Peoria, IL	New Orleans, LA	Towboat/Barge	Main	1,496	0.83	1,073	100	4	223,223	8.0	134	27,903	0.134	8.33	2.00	0.001	0.32	0.29	690.00	5.12	283.14	76.38	0.05	12.22	11.24	23906
Great Lakes	Oswego, NY	Toledo, OH	Tug/Barge	Main	4,578	0.83	352	300	2	36,601	12.0	29	3,050	0.60	10.54	1.40	0.001	0.45	0.41	588.79	7.67	119.80	17.89	0.02	5.75	5.29	6824
	Duluth, MN	Sault Ste Marie, ONT	Tug/Barge	Main	4,578	0.83	342	300	2	35,607	12.0	29	2,967	0.60	10.54	1.40	0.001	0.45	0.41	588.79	7.46	116.55	17.40	0.02	5.59	5.15	6639
	Toledo, OH	Montreal, QUEBEC	Tug/Barge	Main	4,578	0.83	527	300	4	109,533	12.0	44	9,128	0.60	10.54	1.40	0.001	0.45	0.41	588.79	22.94	358.51	53.52	0.05	17.20	15.83	20421
West Coast	LA/Long Beach, CA	Tacoma, WA	OGV	Main	9,564	0.83	1,169	750	4	243,152	20.0	58	12,158	0.50	10.54	1.10	0.005	0.47	0.43	646.08	53.19	997.58	117.02	0.58	50.00	46.00	62352
			Tug/Barge	Main	4,578	0.83	1,169	300	2	121,576	12.0	97	10,131	0.60	10.54	1.40	0.001	0.45	0.41	588.79	25.46	397.93	59.41	0.06	19.10	17.57	22666
	Oakland, CA	Stockton, CA	Towboat/Barge	Main	1,496	0.83	78	350	4	16,224	8.0	10	2,028	0.134	8.33	2.00	0.001	0.32	0.29	690.000	0.37	20.58	5.55	0.00	0.89	0.82	1738

The equation from Section 2.1, page 2-1 of the April 2009 USEPA Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories has been used to calculate emissions: MCR x Load Factor x Activity x Emissions Factor

[1]MCR = Maximum continuous rating power. Numbers for MCR are averages from data obtained from the 2007 Port of Long Beach Emissions Inventory (see Engine Sizes worksheet for details and assumptions)
Waterborne Transportation Lines of the United States, Calendar Year 2009, Volume 1, National Summaries, compiled for the Institute for Water Resources U.S. Army Corps of Engineers shows an average engine size for towboats in the United States of 2005.7 horsepower.
This translates to 1496 kilowatts for the average towboat engine MCR.
ATB horsepower from Bouchard Transportation Company, average ATB engine size. http://www.bouchardtransport.com/tugs.php

[2]According to April 2009 USEPA Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories, page 2-11,
"At service or cruise speed, the propulsion load factor is 83 percent." A load factor of 0.83 has therefore been used for all vessels when calculating emissions between ports.

[3]Information on distances can be found in Tab E.

[4]Weekly transits from Port Pairs worksheet (Tab B).

[5]Average speeds for ATBs and OGVs were obtained from MARAD (October 2012).

[6]Activity in hours is the amount of time that the main engines are used in transit (distance in miles divided by miles per hour) on an annual basis.

[7]Emission Factors for VOCs, PM10, PM2.5, CO and CO2 from Table 2-9 of April 2009 USEPA Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories for ships. NOx for ships calculated from IMO Annex VI standard (see Table 2-10 of same reference)
using engine RPM of 500 for all vessels but towboats, which were assumed to operate at 650 RPM. Sulfur for all OGV fuel was assumed at 1000 ppm (0.1%) and so SOX emission factors in Table 2-9 were reduced by one order of magnitude. For ATBs, Sulfur is set at 15 ppm or 0.0015%.

[8]Based on assumptions from the Port Pairs Worksheet, only the emissions factors for marine diesel oil have been used (assumptions state the vessels will be using diesel fuel, which eliminates residual oil and marine gas oil from consideration).

[9]Medium-speed diesel numbers have been used for the ships in the table above, and slow-speed diesel numbers have been used for the tug/barge vessels.

[10]Emissions factors for inland towboats come from Table 3-5, page 3-8 of the April 2009 EPA Port-Related Emission Inventories document.

General Note: According to www.onlineconversion.com, 1 horsepower = 0.74569987 kilowatt

TAB D. TRUCK EMISSIONS

Region	Origin	Destination	[1]One-Way Driving Distance (miles)	Vessel That Trucks Replace	Total Weekly Volume (TEUs)	[2]Total Weekly Truck Trips	Total Annual Truck Miles	[3]Emissions Factors (lb/mile) VOCs	NOx	CO	SOx	PM10	PM2.5	CO2	Annual Emissions (tons, CO2 in metric tons) VOCs	NOx	CO	SOx	PM10	PM2.5	CO2
East Coast	Port of New York	Norfolk, VA	410	OGV	2,400	1,200	25,584,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	19.46	461.41	102.87	0.23	19.25	18.65	39903
			410	Tug/Barge	400	200	4,264,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	3.24	76.90	17.15	0.04	3.21	3.11	6651
	Norfolk, VA	Canaveral, FL	690	OGV	2,400	1,200	43,056,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	32.74	776.51	173.13	0.39	32.39	31.39	67154
			690	Tug/Barge	400	200	7,176,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	5.46	129.42	28.85	0.06	5.40	5.23	11192
	Port of New York	Portland, ME	330	OGV	3,200	1,600	27,456,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	20.88	495.17	110.40	0.25	20.65	20.02	42823
			330	Tug/Barge	400	200	3,432,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	2.61	61.90	13.80	0.03	2.58	2.50	5353
Gulf Coast	Brownsville, TX	Mobile, AL	825	Tug/Barge	600	300	12,870,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	9.79	232.11	51.75	0.12	9.68	9.38	20073
	Mobile, AL	Manatee, FL	560	Tug/Barge	600	300	8,736,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	6.64	157.55	35.13	0.08	6.57	6.37	13626
	Fulton, MS	Mobile, AL	285	Towboat/Barge	400	200	2,964,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	2.25	53.46	11.92	0.03	2.23	2.16	4623
Inland Waterways/Mississippi	Peoria, IL	New Orleans, LA	847	Towboat/Barge	400	200	8,808,800	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	6.70	158.87	35.42	0.08	6.63	6.42	13739
Great Lakes	Oswego, NY	Toledo, OH	450	Tug/Barge	600	300	7,020,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	5.34	126.61	28.23	0.06	5.28	5.12	10949
	Duluth, MN	Sault Ste Marie, ONT	420	Tug/Barge	600	300	6,552,000	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	4.98	118.17	26.35	0.06	4.93	4.78	10219
	Toledo, OH	Montreal, QUEBEC	621	Tug/Barge	1,200	600	19,375,200	0.0015210	0.036070	0.008042	0.000018	0.001504	0.001458	3.438541	14.73	349.43	77.91	0.17	14.57	14.12	30219
West Coast	LA/Long Beach, CA	Tacoma, WA	1130	OGV	3,000	1,500	88,140,000	0.0017861	0.021227	0.007669	0.000041	0.010110	0.001713	4.209022	78.71	935.46	337.97	1.80	445.56	75.47	168275
			1130	Tug/Barge	600	300	17,628,000	0.0017861	0.021227	0.007669	0.000041	0.010110	0.001713	4.209022	15.74	187.09	67.59	0.36	89.11	15.09	33655
	Oakland, CA	Stockton, CA	75	Tug/Barge	1,400	700	2,730,000	0.0017861	0.021227	0.007669	0.000041	0.010110	0.001713	4.209022	2.44	28.97	10.47	0.06	13.80	2.34	5745

1 metric ton =	2204.62262	pounds
1 pound =	453.59237	grams
1 gram =	1.10231E-06	ton [short, US]
1 gram =	0.000001	ton [metric]

[1]Distances as shown in Tab E.

[2]The assumption from the Port Pairs Info Worksheet that 2 TEUs = 1 truckload has been used to determine the total weekly number of trucks, and that each truck can only move one FEU per week.

[3]Emissions factors in pounds per mile were calculated for national scale using MOVES, except those in California. For California, the EMFAC emissions factors were used.
In all cases, Year 2015 data were used for the calculations.

General Note: The equation used in these calculations comes from the April 2009 USEPA Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories.
Page 5-13 has an equation for Heavy Duty Truck Emissions, Emissions (grams) = Activity (miles) x Emission factor (grams/mile)

TAB E. CALCULATED DISTANCES

Region	Origin	Destination	[1]Driving Distance (miles)	[3]Maritime (nautical miles)	Maritime (miles)	
East Coast	Port of New York	Norfolk, VA	410	294	338	1 mile = 0.868978 nautical miles 1 nautical mile = 1.150777 statute miles
	Norfolk, VA	Canaveral, FL	690	639	735	587 nautical miles from Norfolk to Jacksonville, 160 road miles (139 nautical miles) from Jacksonville to Port Canaveral
	Port of New York	Portland, ME	330	426	490	
Gulf Coast	Brownsville, TX	Mobile, AL	825	643	740	
	Mobile, AL	Manatee, FL	560	389	448	
	Fulton, MS	Mobile, AL	285	203	234	
Inland Waterways/Mississippi	Peoria, IL	New Orleans, LA	847	1073	1235	
Great Lakes	Oswego, NY	Toledo, OH	450	352	405	
	Duluth, MN	Sault Ste Marie, ONT	420	342	394	
	Toledo, OH	Montreal, QUEBEC	621	527	606	
West Coast	LA/Long Beach, CA	Tacoma, WA	1130	1169	1345	Nautical distance from LA to Seattle + Seattle to Tacoma
	Oakland, CA	Stockton, CA	75	78	90	

[1]Driving distances calcuated from Google Maps or taken directly from the June 2012 Draft MARAD Programmatic EA.
Where distances were not available from these sources (e.g., Fulton to Mobile), the highway miles were used.
[3]Nautical miles come from Distances Between U.S. Ports, 2009 (10th Edition), US Department of Commerce, except for the distance between Fulton, MS and Mobile, AL, which comes from the Wikipedia entry for the Tennesse-Tombigbee Waterway.
General Notes: Conversion factors from www.onlineconversion.com