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## 5. ENVIRONMENTAL CONSEQUENCES OF PREFERRED AND NO ACTION ALTERNATIVES

The purpose of this section is to identify the direct, indirect and cumulative environmental impacts of the alternatives, the significance of these impacts, and the means to mitigate or monitor any adverse environmental impacts from these alternatives. Because the Preferred and No Action Alternatives are quite broad and involve a very large geographic area, the discussion of potential effects on the environment will be general in nature and will concentrate on the environment and species most likely to be impacted.

USCG operations that are most likely to affect endangered and threatened species are vessel and aircraft operations, human presence associated with USCG stations, and USCG conservation efforts. Therefore, the analysis of environmental consequences will focus on these aspects of USCG operations in Atlantic waters. All shore-based USCG operations conducted along the coast comply with environmental laws for point-source and stormwater discharge. Operations that may lead to biologically and ecologically significant alteration of the physical environment include coastal and nearshore engineering projects, such as construction of USCG stations and aids to navigation and, to a lesser extent, routine boat operations in coastal waters. Coastal and nearshore engineering projects may possibly alter habitat for protected species of marine mammals, birds, and turtles, and commercially important fishery resources. Because these engineering activities may affect the marine environment and the biological resources it supports, the USCG, under the National Environmental Policy Act (NEPA), is required to conduct a NEPA analysis for major construction, repair, and maintenance projects performed in areas important to protected or commercially important species. Such an analysis will result in either a categorical exclusion (CE), an environmental assessment (EA) and Finding of No Significant Impact, or an environmental impact statement (EIS) and Record of Decision (ROD). These requirements are described in the USCG document COMDTINST M16475.1B. Because these activities are covered by individual operation-specific NEPA analyses, they will not be considered further here.

### 5.1 Environmental Consequences of No Action Alternative

Under the No Action Alternative (as well as the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives), USCG operations in waters of the U.S. Atlantic Ocean would continue as usual. Measures to protect and enhance endangered and threatened species would be implemented when necessary but without the benefit of a comprehensive plan, which takes an ecosystem approach to species protection and provides conservation measures beyond those necessary for compliance. USCG operations may result in direct or indirect alterations of the coastal and offshore marine environment. Physical, biological, and socioeconomic impacts, both positive and negative, resulting from current USCG missions and operations are discussed in the following sections.

#### 5.1.1 Consequences of No Action Alternative on the Physical Environment

##### Effects of USCG Vessel Activities on the Physical Environment

**Alteration of Coastal Habitat.** Operation of propeller-driven craft in shallow water may resuspend bottom sediments, resulting in increases in turbidity in the water, reducing overall water quality. Boat wakes may erode shorelines, particularly along steep-walled channels that are not protected by breakwaters or riprap. In many coastal waterways, such as the intracoastal waterway, vessel lanes are clearly defined with aids to navigation and speed limits are posted for vessels to minimize sediment resuspension and

shoreline erosion. The USCG, in regulating vessel traffic and enforcing speed limits in coastal waters, assists in minimizing physical damage to the marine environment resulting from routine commercial and recreational boat operations. USCG vessels are expected to remain in designated vessel traffic lanes and obey local speed limits, except when required to do otherwise in emergency operations. Therefore, there is likely to be little or no significant impact to the physical environment through sediment resuspension and shoreline erosion.

**Water Quality Impacts.** All motor vessels are at risk of impacting marine water quality by releasing fuel through operational accidents (groundings and collisions) or during refueling operations. The number of releases of crude and refined petroleum products and the total volume released each year to U.S. territorial waters varies widely. Each year, between 1973 and 1993, 4,841 to 10,644 releases of crude or refined oil to U.S. waters were documented. The total volume of petroleum products released ranged from 1.88 million gal (1992) to 21.52 million gal (1975). Each year, approximately 80% of the releases involved <100 gal of petroleum product. Very few releases were associated with USCG operations between 1973 and 1985 (the years for which USCG data are available). The recorded amount of oil released each year during USCG operations has ranged from 0 gal (1973) to 5092 gal (1979), with an average of 4-74 gal per release.

USCG operations contributed <0.1% to the total volume of petroleum products released to U.S. territorial waters each year. Most releases from USCG operations were small (< 100 gal) and were engine fuel (gasoline or diesel fuel). Small spills of these light fuels are not persistent in the marine environment (Neff 1990). Virtually all the hydrocarbons from small gasoline releases on water and most of the hydrocarbons from small diesel fuel releases on water evaporate quickly (Stiver and Mackay 1984; Edgerton *et al.* 1987). Small releases (< 100 gal) of light fuel oils rarely cause lasting injury to the marine environment or its biological resources (NRC 1985; Volkman *et al.* 1994), and affected resources recover rapidly (Meilke 1990). The USCG impact to the water quality of the marine environment is non-significant.

**Air Quality Impacts.** Another source of contamination of the marine environment from motor vessel operations is from engine exhaust emissions. The chemicals of major environmental concern in engine exhaust are polycyclic aromatic hydrocarbons (PAHs) and related heterocyclic compounds, some of which are procarcinogens (Neff 1979). Concentrations of PAHs in the exhaust emissions of properly tuned gasoline and diesel engines are very low and are derived primarily from traces of unburned fuel (Tancell *et al.* 1995). Most are tightly bound to soot particles and are not bioavailable to marine organisms (Neff 1979). However, two-stroke gasoline engines, the type used in most outboard motors, emit much higher concentrations of hydrocarbons, including PAHs, than more conventional four-stroke gasoline engines or diesel engines (Wachs and Wagner 1990; Wachs *et al.* 1992; Jüttner 1994). This is caused by inefficient combustion of the gasoline/lubricating oil mixture. As discussed in the previous section regarding water quality impacts, spills of gasoline and diesel fuel can also result in air quality impacts from hydrocarbons. This impact will be insignificant due to the minimal number of USCG spills of petroleum products (<0.1% of the total volume of petroleum products released to U.S. territorial waters each year).

The contribution of hydrocarbons from vessel engine exhaust to the total load of hydrocarbons, including PAHs, in coastal marine waters is not known. It is likely to be environmentally significant only in small, enclosed water bodies with little flushing and in which there is intensive outboard motorboat activities (Wachs *et al.* 1992). Relatively few USCG vessels are powered by two-stroke outboard motors, and USCG vessels in general are kept in good running order. Therefore, it is unlikely that routine USCG operations contribute more than a trace amount to the marine environmental load of petroleum hydrocarbons from engine exhaust. Thus, USCG vessel operations do not significantly impact air quality.

**CONCLUSION:** Vessel operation guidelines clearly state speed guidance to prevent sediment resuspension and shoreline erosion in sensitive areas. Fuel releases from USCG vessels, when they occur, are usually small and it is unlikely they will significantly impact water or air quality. Vessel exhaust is unlikely to contribute significantly to the total hydrocarbon load in the environment. Therefore, under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, USCG vessel operations do not significantly impact the physical environment.

### Effects of USCG Aircraft Activities on the Physical Environment

The USCG operates 17 fixed-wing aircraft and 32 helicopters along the U.S. Atlantic coast in performing its multiple search and rescue, law enforcement, and environmental protection missions. The fixed-wing aircraft include HC-130 Hercules and HU-25 Guardian aircraft that are used for medium- and long-range surveillance missions, and small two-seater RG-8 aircraft that are used for short-range patrols. The helicopters are HH-60J Jayhawk and HH-65A Dolphin aircraft and perform medium- and short-range recovery missions.

The 17 fixed-wing aircraft and 32 helicopters operated by the USCG in the Atlantic area performed more than 21,000 sorties in 1993. Most sorties were flown out of the 7th USCG District (12,233), followed by the 1st District (5,303), and the 5th District (3,486). The average number of sorties per day is 14.5 in the 1st District, 9.6 in the 5th district, and 33.5 in the 7th District. The average number of sorties flown by USCG aircraft is small in comparison to the numbers of flights of commercial and private aircraft from airports along the U.S. Atlantic coast.

USCG aircraft operations in the Atlantic area create two types of disturbance to the physical environment, noise and chemical air pollution from engine exhaust emissions. Aircraft of different sizes and types produce intense low-frequency engine sounds during flight; engine sounds are even more intense during take-offs and landings (Table 5-1). Maximum sound intensities of the aircraft engines at a distance of 1,000 ft are in the range of 95 to 130 dB re 1  $\mu$ Pa. Dominant sound frequencies are in the range of 20 to 200 Hz, well within the range of hearing of most terrestrial and marine animals. The noise pollution from USCG aircraft is transitory, usually lasting less than one minute as the aircraft flies by. However, USCG aircraft noise adds to an already noisy environment, especially near human population centers along the coast.

Potential noise pollution from USCG aircraft is minimized by implementation of current operational guidance in the Air Operations Manual, Commandant Instruction 3710.1. USCG aircraft must maintain an altitude of at least 3,000 ft when flying over wildlife habitat. However, during some USCG operations, it may be necessary to fly at altitudes below 3,000 ft, and sometimes below 500 ft. Air operations at low altitude are dangerous for the aircraft and crew and therefore are kept to the shortest duration compatible with the objectives of the particular mission. For these reasons, current USCG aircraft operational practices in the Atlantic area do not represent a significant source of noise pollution to the coastal and marine environment of the U.S. Atlantic coast.

Piston and turbine engines of modern fixed-wing aircraft and helicopters produce exhaust emissions that are released to the atmosphere during aircraft operation. These emissions are a complex mixture of inorganic and organic gases and particles (Spicer *et al.* 1992, 1994; Khalili *et al.* 1995). Aircraft exhaust emissions may contribute to exposure of airport workers and urban residents to toxic chemicals emitted when the engines operate at low power (idle and taxi); reduce visibility due to particulate emissions;

**Table 5-1. Dominant Frequency and Maximum Sound Pressure Level of Sounds from Different Types of Aircraft. Values represent the sound levels received at the water's surface directly below the aircraft flying at 1000 ft (300 m) altitude under "Standard Day" conditions (15°C, 70% relative humidity). From Richardson and Malme (1993).**

Aircraft Type	Dominant Frequency (Hz)	Maximum Sound Pressure (dB re 1 $\mu$ Pa)
Boeing 737 two-engine jet (take off)	125	130
Boeing 737 two-engine jet (cruise)	160	104
DHC-6 two-engine turboprop. (cruise)	160	103
Cessna 172 light one-engine prop. (cruise)	125	96
Bell 212 (UH-1N) turbine helicopter (cruise)	20	104
Bell 222 turbine helicopter (take off)	125	96
Bell 222 turbine helicopter (approach)	160	105
Bell 206B (OH-58) (cruise)	200	95
Sikorsky S61 (HH-3F) (cruise)	40	102

contribute to urban photochemical and ozone air pollution from nitrogen oxides and reactive intermediates emissions during takeoffs, low altitude flight, and landings; and contribute to stratospheric photochemical pollution from carbon, sulfur, and nitrogen oxides and particulate emissions during high-altitude flight (Spicer *et al.* 1994).

During operation of aircraft turbines, emissions of nitrogen oxides (NO<sub>x</sub>) and carbon dioxide (CO<sub>2</sub>) increase as engine speed increases from idle to full speed (Spicer *et al.* 1994). However, emissions of carbon monoxide (CO) and hydrocarbons are highest in idling turbines, and emissions of these air pollutants decrease to very low levels in engines operating a 80 percent or higher power settings. The lower molecular weight hydrocarbons and related organic chemicals (aldehydes, ketones, and alcohols) are emitted in the gas phase of the engine exhaust and are oxidized rapidly by sun light to intermediates that may react with atmospheric oxygen to produce ozone and other photochemical pollutants. The higher molecular weight hydrocarbons, particularly the polycyclic aromatic hydrocarbons (PAHs), are emitted in particulate emissions (soot) that are transported by air currents over great distances and deposited on land and in the ocean. These particulate emissions contribute to the global contamination of the environment with PAHs, some of which are carcinogens.

Because most of the gaseous chemicals in aircraft engine emissions are photooxidized rapidly in the atmosphere, they are not persistent in the environment. PAHs associated with soot particles are more

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persistent but usually are degraded to nontoxic chemicals (CO<sub>2</sub> and water) within a few days to a few weeks while the soot remains airborne (Neff 1979). The particulate emissions settle to and become buried in soils or sediments where PAHs and other contaminants associated with them may persist indefinitely.

**CONCLUSION:** Because the number of USCG aircraft in operation in the Atlantic area is small, and the number of sorties flown from different USCG and commercial air fields is low, the contribution of USCG aircraft operations to noise and air pollution is small and very localized. Therefore, under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, USCG aircraft operations do not significantly affect the physical environment.

### **Effects of USCG Conservation Efforts on the Physical Environment**

Several conservation and environmental protection activities are included in the USCG mission. Activities such as management of responses to marine spills of oil and hazardous substances have a net positive effect on the physical environment. In addition, controlling ship movements in U.S. waters helps prevent accidents and spills. As the Federal On-Scene Coordinator (FOSC) for most marine oil spills, the USCG often is in the position to make decisions about spill response and cleanup methods, some of which may result in inadvertent harm to different marine resources. Often the decisions involve consideration of tradeoffs to protect one habitat or resource with the resulting sacrifice of another. For example, the USCG may have to make decisions about the application of chemical oil dispersants to prevent oil from coming ashore where it might physically harm the shore and threaten invertebrates, birds, and wildlife that use the shore. However, application of dispersants may increase the concentration of petroleum in the water column, increasing the risk of injury to fishery resources. USCG guidelines require that the FOSC develop a response strategy that will minimize overall physical and chemical damage to the affected environment, with emphasis on protection of critical habitats for endangered and important commercial fishery species.

**CONCLUSION:** One of the USCG's primary missions is protection of the marine environment. The specific measures that protect the physical environment include oil and hazardous spill response efforts and controlling ship movements within U.S. waters (to prevent accidents and spills). All of these measures benefit endangered and threatened species and their habitat. Therefore, under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, USCG conservation efforts would have a positive and significant impact on the physical environment.

#### **5.1.2 Consequences of No Action Alternative on the Biological Environment**

##### **Effects of USCG Vessel Activities on Biological Environment**

The USCG operates more than 240 vessels to fulfill its obligations along the Atlantic coastline (Table 5-2). During operation of these vessels, wildlife may be disturbed by the physical presence of these craft and the sounds made by them. The level of this disturbance depends on many factors such as the size and speed of the vessel, the reproductive status of the species, and the distance between the vessel and wildlife. Collisions with wildlife are also possible. Such collisions can place a vessel and crew at risk and can be lethal to many species of marine vertebrates. The species likely to be encountered during routine missions are minke whales, fin whales, humpback whales, and right whales. Of these species, the latter three are Federally listed as endangered species. USCG interactions with blue, sei, and sperm whales and small odontocetes (toothed whales or dolphins and porpoises) are unlikely.

**Table 5-2. USCG Cutter Class (vessels  $\geq$  65 ft. in length) Vessel Distribution Along East Coast of the United States.**

Cutter Class	Vessel Locations and Number			
	D1	D5	D7	Totals
WHEC 378	0	0	2	2
WIX 295	1	0	0	1
WMEC 270	5	6	2	13
WMEC 210	1	1	6	8
WLB 180	2	2	2	6
WLIC 160	0	1	1	2
WLM 157	1	3	0	4
WTGB 140	3	0	0	3
WLM 133	2	0	1	3
WPB 110	6	4	19	29
WLIC 100	0	1	2	3
WPB 82	4	6	6	16
WLIC 75	0	1	1	2
WYTL 65	8	3	0	11
WLI 65	0	1	0	1
<b>TOTALS</b>	<b>33</b>	<b>29</b>	<b>42</b>	<b>104</b>

D1= Maine to New Jersey; D5= Delaware to North Carolina;

D7= South Carolina to Florida

**Collision of USCG Vessels With Wildlife.** In the biological environment, the primary hazard of USCG operations is collisions of USCG vessels with wildlife. The USCG is active in many of the cetacean high-use areas off the U.S. coast because these areas are also used extensively by commercial ships, fishermen, and recreational boaters. Encounters with large vessels are often deadly for whales, manatees, and turtles.

Vessel strikes are a significant source of mortality for inshore species of baleen whales (Kenney and Kraus 1993; Wiley *et al.* 1995; NMFS 1991a,b) and there is some evidence of increased incidents of ship collisions in northeastern U.S. waters (NMFS 1991b; Wiley *et al.* 1995). Major shipping lanes into Massachusetts, New Hampshire, and Maine cross many cetacean high-use areas such as the Great South Channel, Stellwagen Bank, and Jeffreys Ledge (NMFS 1991b).

As previously mentioned, the three species of endangered cetaceans USCG vessels are likely to encounter are fin whales, right whales and humpback whales. There are records of ship strikes of fin whales, and fin whales with propeller scars (Agler *et al.* 1990; Seipt *et al.* 1990; NMFS 1995a). Between 1980 and 1994, there are nine records of collisions of ships with fin whales or evidence of propeller scars on fin whales (NMFS 1995a). However, the fin whale is a faster moving species, and vessel strikes are likely a small source of mortality.

The most common anthropogenic source of mortality for humpback whales in the western North Atlantic is entanglement in commercial fishing gear (Hoffman 1990; NMFS 1991b; Volgenau, Kraus and Lien 1995). Thirty percent (6/20) of humpback whales stranded along the middle and south Atlantic coasts of the United States had evidence of injuries from ship strikes (Wiley *et al.* 1995).

Of special concern are vessel collisions with the critically endangered right whale. Twelve percent of all photographically catalogued right whales have scars from ship propellers (S. Kraus, pers. comm. 1995), and 27% of right whale mortalities documented between 1970 and 1993 were due to collisions with ships (Kenney and Kraus 1993). Lately, research has pointed to ship-whale interactions as a possible barrier to the recovery of this species (Reeves *et al.* 1978; Kraus *et al.* 1988; Kraus 1990). Since 1970, 42 right whale mortalities have been recorded. Of these, 12 were natural calf mortalities, 14 were from ship strikes, 2 from entanglement, and 26 were of unknown cause. Typically, 0-2 right whale mortalities from ship strikes are recorded annually. However, 7 mortalities were documented in the first 3 months of 1996; at least 1 of these was due to a ship strike (NMFS BO 22 July 1996; Appendix F). As has been documented for bowhead whales (George *et al.* 1994), the size and extent of scarring among right whales indicates that collisions are primarily with large vessels such as container ships and tankers. These collisions are fatal to right whales approximately 19% of the time (Kraus 1990).

The endangered right whale and humpback whale are the most likely ESA-listed species to be affected by USCG vessel operations. There are two documented cases of USCG vessels striking and killing right whales. There is one record of a USCG vessel strike of an apparent humpback whale. The strike was described as a “bump” and was not lethal. Because the No Action Alternative lacks extraordinary efforts for avoiding or minimizing the potential for vessel strikes, it is possible that some cetaceans, particularly the right whale, may be subject to significant adverse impacts from USCG vessels.

There is no indication in the published literature that collisions with vessels are a significant source of injury or mortality for pinnipeds (NMFS pers. comm. 1995; MMC pers. comm. 1995). Pinnipeds are not particularly vulnerable to ship collisions because of their relatively small size, high-speed swimming, and maneuverability. There are few reports of collisions between motor vessels of any size and pinnipeds, and there are no reports of collisions of USCG vessels and pinnipeds in U.S. Atlantic waters. It is likely that USCG vessel operations will not affect pinnipeds in any significant manner.

The largest single anthropogenic source of mortality in manatees is collision with boats. Most manatee deaths are due to impact of the vessels, not propeller wounds. Collisions with seaplanes can also be deadly for manatees (Florida DEP, pers. comm. 1995). Again, because of the nearshore distribution of manatees, USCG operations overlap with a significant portion of manatee high-use areas. Although outside the area of this analysis, there is one documented collision of a USCG vessel and a manatee; this collision was fatal. No-wake rules for motor vessels are in place in most manatee high-use habitats, which are intended to keep vessel speeds low enough that collisions are less likely and injuries less serious. The USCG observes these rules in posted areas and maintains a lookout as required on all vessels underway. Although the USCG follows these measures to prevent vessel-manatee collisions, the collision occurred nonetheless. Annual counts of manatees are increasing, but so are annual mortalities, and the status of the population is uncertain (O’Shea and Ackerman 1995). The USCG also reviews permits for marine events in manatee habitat, and must consider the manatee collision hazard that any such event may pose. Under the No Action Alternative, there are no additional measures to prevent such collisions; therefore, USCG vessel operations may have the potential to significantly affect the Florida manatee.

Between 1987 and 1993, up to 17% of all stranded sea turtles had boat-related injuries. Ship strikes appear to be a significant source of mortality for sea turtles, and reports of vessel-related injuries have increased in recent years (Teas 1994a,b). Of the four species of sea turtles that occur along the east coast of the United States, the loggerhead and green turtles appear to be the most susceptible to collisions with boats (see Chapter 4). Sea turtles generally spend greater than 90% of the time submerged (NMFS 1996 BO; Appendix F). USCG high-use areas overlap with areas important for sea turtle nesting and feeding. Although the possibility that sea turtles may be directly taken through collision with USCG vessels exists, the likelihood of such direct takings is minimal. There are no records of USCG vessel collisions with

turtles, although such collisions may have gone unnoticed because turtles are small in size relative to many USCG vessels. NMFS has issued an incidental take statement authorizing the take, by injury or mortality, of one sea turtle. This take level represents the total take per year for all USCG vessel and aircraft activities along the Atlantic coast (NMFS BO 1996; Appendix F). However, even if collisions do occur, it is unlikely that such interactions would significantly affect populations of turtles because the number of turtles directly affected would be small. Therefore, it is likely that vessels operating under the No Action Alternative will not pose a significant, adverse risk to sea turtles as long as no more than one turtle is taken annually.

Marine and coastal birds are not ordinarily vulnerable to collision with USCG and other motor vessels. However, during the seasonal molt or after heavy feeding, individuals or flocks of marine birds may be unable to fly, rendering them vulnerable to collision with fast-moving vessels (S. Katona, College of the Atlantic, pers. comm. 1995). Several species of water birds, such as eider ducks and loons, may congregate in flocks on the water surface during the molt. Until new flight feathers develop, they can not fly. Similarly, some pelagic birds, such as shearwaters and fulmers, may gorge themselves on fish or krill to the point where they are too heavy to fly. Their only means of escaping an approaching motor vessel is by paddling out of the way or diving. Under the No Action Alternative, there are no guidelines for maneuvering USCG vessels when seabirds are encountered. However, even if collisions do occur, it is unlikely that such interactions would significantly affect populations of seabirds because marine birds are not ordinarily vulnerable to collisions, the numbers of birds directly affected would be small, and the seabirds USCG vessels are likely to encounter are not endangered.

There is no indication in the published literature that collisions with vessels are a significant source of injury or mortality for invertebrates and fish. Most invertebrates and fish live sufficiently far below the surface of the water to avoid physical interaction with ships. In addition, the only endangered species of fish in the area, the short-nosed sturgeon, has not been found in marine waters in several years (NOAA 1995a). Therefore, USCG vessel operations will not significantly impact invertebrates and fish.

**Impacts of Noise from Operation of USCG Vessels.** The USCG vessels contribute noise to an already noisy environment resulting from the operation of recreational, military, commercial, and international vessels along the east coast. Vessel size, hull construction, speed, maintenance, and other factors all affect the noise a vessel produces. Generally, as the size, load, and speed of a vessel increase, so does the noise it generates (Richardson *et al.* 1991).

The total ambient noise in the open ocean is about 74-100 dB re 1  $\mu$ Pa (Table 5-3). However, several natural sound sources, such as earthquakes, lightning strikes, and some biological noises, may temporarily increase natural ambient noise above these levels. Vessel noises, caused by the turning of the screws, engine noises, and noises of operating machinery on board, generally fall in the range of 5-2000 Hz, with highest intensities below 100 Hz (Scrimger and Hietmeyer 1991). Sound intensity, particularly at higher frequencies, tends to increase with the size of the vessel. Supertankers and large container ships may have a maximum broad-band sound-source level of 190-200 dB re 1  $\mu$ Pa at 1m (Table 5-4). Small outboard motor vessels produce broad-band sounds of about 150 dB re 1  $\mu$ Pa at 1 m; these sounds are attenuated to the range of 85 to 140 dB re 1  $\mu$ Pa at a distance of 50 m from the source (Richardson *et al.* 1991).

Most USCG vessels are generally less than ~100 ft in length and, therefore, generate sound pressure source levels of 160 dB re 1  $\mu$ Pa at 1 m or less. The larger USCG cutters may generate source pressures of 160-170 dB re 1  $\mu$ Pa at 1 m. A low-frequency, 160 dB re 1  $\mu$ Pa sound attenuates with distance to about 155 dB re 1  $\mu$ Pa at about 100 yards (~100 m) from the source, and to about 120 dB re 1  $\mu$ Pa at about 2 miles from the source.

**Table 5-3. Maximum Broad-Band (20-1000 Hz) Sound Pressure Source Levels for Different Types of Natural Ambient Noise in the Marine Environment.**  
**From Richardson *et al.* (1991), McCauley (1994), and**  
**Advanced Research Projects Agency (1995).**

Noise Source	Maximum Source Level (dB re 1 $\mu$ Pa @ 1 m)	Remarks
Undersea Earthquake	272	Magnitude 4.0 on Richter scale (energy integrated over 50-Hz band width)
Seafloor Volcanic Eruption	255+	Massive steam explosions
Lightning Strike on Water Surface	250	Random events during storm at sea
Baleen Whales	to 188	<2000 Hz simple and complex calls, clicks, pulses, knocks, grunts, moans
Swimbladder Sounds of Fish	~140	Marked spectral peaks in 50-3000 Hz range
Dugong	<90	2000-5000 Hz simple chirps and squeaks
Total Open-Ocean Ambient Noise	74-100	Estimate for offshore central California, sea state 3-5; expected to be higher ( $\geq$ 120 dB) when vessels are present
Rain Storm	80	Heavy rain shower, flat frequency spectrum
Wind	66	Force 3 wind over water

**Table 5-4. Estimated Peak 1/3-Octave Sound Pressure Source Levels for Vessels of Different Sizes and Speeds.**

Vessel	Speed (knots)	Sound Pressure Level (dB re 1 $\mu$ Pa @ 1 m)	Reference
>250-m Large Oil Tanker	16	203	Cybulski 1977
274-m Container Ship (23 Hz)	--	198	Richardson <i>et al.</i> 1991
340-m Supertanker	20	190	Buck and Chalfant 1972
WWII Battleship	20	183	Urick 1983
337-m Tanker (20 Hz)	16	177	Cybulski 1977
Icebreaker	10	174	Malme <i>et al.</i> 1989
135-m Freighter	--	172	Richardson <i>et al.</i> 1991
Large Ferry	16	171	Malme <i>et al.</i> 1989
Tug and Loaded Barge	--	170	Miles <i>et al.</i> 1987
210-m Container Ship	19	169	Jennette <i>et al.</i> 1987
Cruise Ship	19	168	Malme <i>et al.</i> 1989
20-m Tug and Empty Barge	--	166	Buck and Chalfant 1972
200-m Roll On/Off	15	165	Jennette <i>et al.</i> 1987
190-m Car Carrier	16	162	Jennette <i>et al.</i> 1987
Tug and Barge	10	162	Malme <i>et al.</i> 1989
34-m Twin-Diesel Tour Boat	10	159	Malme <i>et al.</i> 1989
Fishing Trawler (transit)	10	158	Malme <i>et al.</i> 1989
Fishing Trawler (trawling)	5	147	Malme <i>et al.</i> 1989
16-m Crew Boat	--	156	Greene 1985
7-m Boat with 2 x 80-hp outdrive	20	156	Malme <i>et al.</i> 1982
8-m Boat with 260-hp outdrive	10	156	Malme <i>et al.</i> 1982
4-m Boston Whaler/20-hp outboard	20	153	Malme <i>et al.</i> 1982
5-m Zodiac with 20-hp outboard	20	152	Malme <i>et al.</i> 1982
4-m Boat with 25-hp outboard	20	152	Malme <i>et al.</i> 1982
20-m Tour Boat	10	150	Malme <i>et al.</i> 1989
Small Boat with 18-hp outboard	5	150	Evans 1982

Most marine animals can perceive underwater sounds over a broad range of frequencies from about 10 Hz to more than 10,000 Hz. Peak acoustic sensitivity of most invertebrates, fish, sea turtles, and baleen whales is below about 1000 Hz; for most toothed cetaceans, pinnipeds, manatees, and seabirds, hearing is best at frequencies >1000 Hz (McCauley 1994).

Most baleen whales respond to constant, low-frequency sounds with broad-band intensities of more than about 120 dB re 1  $\mu$ Pa (Advanced Research Projects Agency 1995). Marine fish and pinnipeds appear to have similar sound thresholds (Myrberg 1990). However, actual thresholds for behavioral responses to sounds in the natural environment depend on the level of natural ambient noise. Whales and other marine mammals apparently are able to distinguish sounds in their optimum frequency range that are 10-20 dB re 1  $\mu$ Pa above ambient noise at the same frequency (Richardson *et al.* 1991). Sounds of USCG vessels will be readily audible to baleen whales, pinnipeds, fish, and possibly sea turtles over a large area of the ocean. The threshold intensity of constant or impulsive sounds for injury to the hearing apparatus of marine mammals and turtles is about 200-220 dB re 1  $\mu$ Pa. Strong startle responses have been observed in fish at sound pressure levels of 200-205 dB re 1  $\mu$ Pa (McCauley 1994). Thus, USCG vessel noises are well below sound intensities associated with severe disturbance or injury to whales, and it is unlikely that the vessel noise will cause significant adverse impacts to whales.

Numerous studies have attempted to document the physical and acoustic effects of ships on cetaceans (Richardson *et al.* 1991, 1986, 1985). It is likely that whales react not to the physical presence of the ship but to the noise generated by it. There are conflicting reports of the short-term effects of ship engine noise on marine mammals (*i.e.*, some species of whales react to noise at great distances, some do not). There is some limited evidence that abrupt changes in vessel rpms may disturb whales (Watkins 1986); however, it appears that whales readily acclimate to the noise in their environment. Overall, reactions to human-generated noise vary not only between species, but also within species (Richardson *et al.* 1991). Some studies indicate that whales may react to short-term acoustic disturbances by moving away from the sound source, changing breathing and diving patterns, or through possible agonistic displays (NMFS 1991b). Reactions have been documented as far as 4 km from the vessel (Ljungblad *et al.* 1988; MMS 1992). Studies off the California and Alaska coastlines have shown that most species of cetaceans adjust to the presence of noisy drilling equipment (Geraci and St. Aubin 1987). However, studies of bowhead whales in the Arctic indicate that individuals will often change course and behavior when exposed to the sounds of active rigs and seismic vessels (Ljungblad *et al.* 1988; Richardson *et al.* 1985, 1986). Bowhead whales in the Beaufort Sea react, at least briefly, to aircraft, ships, seismic exploration, marine construction and offshore drill sites (Richardson and Malme 1993). To date, there is no conclusive evidence that this short-term disturbance leads to long-term effects on individuals or populations (Richardson *et al.* 1991). Disturbance from USCG vessels is likely to be short-term and therefore will not significantly impact cetaceans.

Baleen whales produce a wide variety of sounds, some of them of considerable intensity. They are thought to use sound for intraspecific communication, and possibly also for echolocation and to aid in prey capture. Sounds often are frequency modulated, and range from short chirps and clicks to complex songs. Most baleen whale sounds fall in the frequency range of 12-8000 Hz (Richardson *et al.* 1991; McCauley 1994). The high-frequency clicks (up to 31 kHz) sometimes recorded in the vicinity of fin, blue, minke, and gray whales have not been attributed with certainty to the whales themselves. If produced by the whales, these clicks could be used for echolocation, as high-frequency sound is used by toothed cetaceans. The low-frequency moans, grunts, rumbles, and pulsive sounds produced by many baleen whales are in the frequency range of the highest intensity sounds produced by motor vessels, particularly large vessels such as tankers and container ships (Table 5-4). Low-frequency vocalizations in the 10-40 Hz range may be used by baleen whales for long-range communication (Payne and Webb 1971). Right whales (Clark 1983), humpback whales (Thompson *et al.* 1986), fin whales (Edds 1988), and blue whales (Edds 1988)

all produce low-frequency moans, tonal, pulsive and grunting sounds in the 10-40 Hz range. These low-frequency sounds travel great distances with little attenuation in ocean waters, making them ideal for long-distance communication. The loud low-frequency sounds produced by motor vessels may interfere with this long-range communication. USCG vessels that would produce such sounds are few in number. It is unlikely that these vessels, in and of themselves, interfere with whale communications in a significant manner.

**Physical Disturbances Resulting from Operation of USCG Vessels.** Intensive vessel traffic may cause physical disturbance to marine animals, birds, and wildlife through the noises the vessels produce and from perceived threats from vessel and human presence in the vicinity of wild animals. Effects of vessel noise and collisions on the biological environment were discussed in earlier subsections of this FEIS. Vessel traffic may physically displace some species of marine animals, birds, and wildlife from preferred feeding areas and may interfere with breeding and other social activities if the vessels make repeated close approaches. There is some evidence that some populations of cetaceans have been displaced from traditional feeding and wintering areas by increased vessel traffic (Baker *et al.* 1982; Forestell 1986). Ironically, some individuals of several species of protected whales have become habituated to frequent encounters with motor vessels and may even be attracted to small vessels (Watkins 1986). This recently learned behavior may make the whales more vulnerable to collisions with vessels. USCG vessels do not ordinarily intentionally approach whales and routinely post a watch while underway to help identify and avoid cetaceans and other marine animals at the sea surface. Therefore, USCG vessel operations do not contribute significantly to the physical disturbance of protected whales along the U.S. Atlantic coast.

Pinnipeds and marine birds that occupy coastal rookeries and nesting areas on a seasonal basis may also be disturbed by close approaches of motor vessels and people. Seals in rookeries along the northeast coast of the U.S. may return to the water when approached too closely. Similarly, nesting birds may fly up from their nests when disturbed. Both seals and birds appear to habituate readily to intrusions of motor vessels and people, if the intrusions are not too frequent or intense. Along most of the U.S. Atlantic coast, total small vessel traffic and other human activity is high and growing. Most shore and marine birds and seals are used to the presence of humans and their motor vessels and are not readily disturbed by such encounters. Therefore, motor vessel traffic near nesting beaches and seal rookeries, most of which are on offshore islands along the U.S. Atlantic coast, appears to cause relatively little disturbance to marine birds and pinnipeds. Only a small fraction of the motor vessels operating along the U.S. Atlantic coast are operated by the USCG. USCG operational guidelines require that USCG vessels give a wide berth to wildlife nesting and rookery areas, particularly when birds and wildlife are present. Therefore, USCG vessel activities in the Atlantic area do not significantly contribute to physical disturbance of populations of marine birds and pinnipeds.

Sea turtles appear to be relatively insensitive to physical disturbance from motor vessels of the sizes and types operated by the USCG. When approached too closely by a motor vessel, sea turtles often dive. They are able to remain submerged for long periods of time and resurface after the vessel has left the area. Adult male and female sea turtles congregate off nesting beaches along the U.S. south Atlantic coast for a short period of time before the females come ashore to deposit their eggs. It is not known if the turtles are sensitive to human disturbance from motor vessels during this pre-nesting period. There is no evidence that near-shore vessel activities have interfered with nesting activity or decreased the numbers or frequency of visits of female turtles to the shore. It is uncertain if sea turtles become habituated to the presence of motor vessels. However, they tend to seek out and congregate around shrimp trawls along the south Atlantic coast where they feed on the discarded by-catch. This behavior increases the likelihood that they will be caught in the shrimp nets, a major source of mortality for loggerhead, Kemp's ridley, and green turtles. Routine USCG vessel operations rarely bring USCG vessels to shallow waters close to shore where most turtle

feeding takes place. Therefore, the contribution of USCG vessels to the limited physical disturbance of protected marine turtles from vessel activities is low and not significant.

**CONCLUSION:** Because most USCG missions are vessel-based, the USCG has the potential to significantly impact wildlife, primarily via collisions, under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives. The collision potential is highest for sea turtles and the endangered fin whale, humpback whale, right whale and the manatee. Of these species, vessel operations may have significant adverse effects on the critically endangered right whale and manatee, primarily due to the behavior and status of these species. The noise and physical presence associated with USCG vessels are unlikely to have a significant impact on the biological environment.

### Effects of USCG Aircraft Activities on the Biological Environment

The USCG operates more than 50 aircraft in fulfilling its obligations along the Atlantic coastline. During these operations, wildlife may be disturbed by the physical presence of the craft or by the sounds that they produce. The altitude, speed, type of aircraft, and the shadow they cast all affect the reactions of wildlife to aircraft. Collisions between aircraft and some wildlife species are also possible. When collisions occur, they may put the aircraft and crew at a higher risk than collisions with vessels. Specific details of the impact of USCG aircraft operations on wildlife are discussed below.

**Collision of USCG Aircraft With Wildlife.** Collisions between cetaceans, pinnipeds, turtles and most wildlife and USCG aircraft are unlikely. However, marine and coastal birds are vulnerable to collisions with low-flying aircraft. Low-flying aircraft can startle many species of birds, flushing them from their nests, which may result in collisions with the aircraft. Bird strike potential is greatest in areas used by birds for foraging or resting, such as wetlands, or in migration corridors and at low altitudes (<3000 ft; USAF 1988 cited in GAANG 1995). Of particular concern, due to their habits of nesting or feeding in large groups, are colonial waterbirds and waterfowl. If startled, collisions with these species can be lethal not only to the birds but also to those operating the aircraft. Low-flying fixed-wing aircraft are much more likely than helicopters to collide with birds. Encounters are more likely during aircraft take-offs and landings than when the aircraft is in level, low-altitude flight, as may occur during a SAR patrol and vessel surveillance and identification. The USCG operates only 17 fixed-wing aircraft along the U.S. Atlantic coast. Most missions of the larger aircraft are flown at altitudes above 500 ft, usually >3000 ft. The number of USCG fixed-wing aircraft and total sortie time is small in comparison to the total numbers of private and commercial fixed-wing aircraft operating along the Atlantic coast. In addition, there are no records of collisions of marine birds with USCG aircraft. Another factor to consider is that most low altitude flight occurs during take off, landing, or over water, as opposed to flights over nesting areas. It should be noted that each air station operations center maintains charts depicting the local flying area. These charts are updated on a continuous basis as changes in sensitive nesting areas occur. Despite these factors, the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives have some slight potential for collisions. However, it is unlikely that these collisions would significantly affect populations of birds because the numbers of birds directly affected would be small, and the birds USCG aircraft are likely to encounter are not endangered.

**Acoustic and Physical Effects of Aircraft Operations.** The presence of USCG aircraft and the noise generated by it may disturb wildlife. Sound spectra of aircraft in water are in the general range of natural ambient noises. Small helicopters and fixed-wing aircraft have maximum source levels in the range of 156-186 dB re 1  $\mu$ Pa at 1 m in air. At or just below the sea surface under the aircraft, the received sound levels usually are about 160 dB re 1  $\mu$ Pa or less, with peak intensity near 100 Hz (Table 5-1).

Cetacean reactions to aircraft are inconsistent and appear to depend on the behavior of individuals at the time, weather conditions, and the loudness and speed of the aircraft. Feeding and socializing whales appear less disturbed by aircraft than whales engaged in other activities (Richardson *et al.* 1991). NMFS guidelines recommend maintaining an altitude of at least 305 m (1000 ft) to minimize the impact of aircraft on marine mammals. For especially sensitive species, guidelines may be more conservative so that harassment of all types is avoided. During some USCG operations, particularly SAR missions, it may be necessary to fly lower than 1000 ft, and often lower than 500 ft, to drop rescue equipment, to search for missing persons in the water, to recover persons from the water, or to identify vessels. Such operations have the potential to disturb cetaceans. Aircraft disturbance usually is short-lived in nature and, therefore, the long-term effects are likely to be non-significant in all but extreme circumstances.

The effects of aircraft on the behavior of pinnipeds has not been well studied. Individuals appear to be most sensitive to low-flying aircraft when they are already stressed (*i.e.*, when hauled out for pupping or molting). Disturbed individuals may rush into the water, crushing pups as they go. Mothers may abandon their pups if disturbed during the first three weeks of nursing. Seals and sea lions may abandon traditional haul-out sites and breeding areas when frequently disturbed (Johnson 1977). In addition, the regrowth of hair and skin may be slow if molting individuals are repeatedly disturbed (Geraci and St. Aubin 1980). Under the No Action Alternative, USCG aircraft operations are unlikely to significantly disturb pinnipeds because low-altitude operations are usually performed offshore and well away from sensitive haul-out sites and rookeries.

Although manatees can react to low-flying aircraft, this disturbance is not considered a significant threat to the overall health of manatee populations (K. Frohlich, pers. comm. 1995). Therefore, USCG aircraft operations are not significant source of disturbance for the Florida manatee.

**CONCLUSION:** USCG aircraft operations have the potential to collide with wildlife or harass wildlife due to the noise produced by the aircraft or the physical presence of the aircraft. Under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, aircraft operations do not significantly impact the biological environment because low altitude operations are usually performed well away from sensitive species and habitats.

### **Effects of USCG-Associated Human Presence and Activities on the Biological Environment**

USCG stations are located primarily along the shoreline, and human activity associated with the stations may affect wildlife in an area. Such effects are usually temporary (Ellis *et al.* 1991). However, one of the primary sources of anthropogenic mortality for marine turtles is disturbance or destruction of nesting habitat (NMFS 1994). The five species of sea turtles found along the coast of the eastern United States nest on sandy beaches, habitat that is also heavily used by humans. Construction of seawalls, beach erosion and artificial nourishment, artificial lighting, and vehicular traffic are a few of the obstacles faced by nesting sea turtles. Some USCG activities involve construction on sandy beaches; those actions are addressed in separate NEPA documents. All vehicular traffic on sandy beaches could destroy valuable nesting habitat. Artificial lighting, associated with USCG stations and docks, may cause a significant adverse effect on the nesting success of adult females and the survival of newly hatched turtles (Witherington 1990; NMFS and USFWS 1991). To date, the following sites have been identified as having nesting turtles in the vicinity: Hillsborough Lighthouse Property, Florida; Hobe Sound Old LORAN "A" Station, Florida; Station Ponce De Leon Inlet, Florida; ANT Jacksonville, St. Johns Light and Radio Beacon, Florida; Amelia Light, Florida; and Georgetown Light, South Carolina. No data are currently available to determine if these stations and the presence of associated personnel are adversely

affecting nesting turtles and hatchlings. However, under the No Action Alternative, there are no specific measures identified to address adverse interactions with turtles if they exist. Therefore, the human presence associated with USCG stations and the stations themselves have the potential for significant adverse effects on sea turtles.

Currently, the USCG adheres to local Florida lighting ordinances for marine turtle protection, which implement section 161.163 of the Florida Statutes. Also, lighting is currently evaluated at USCG sites during Environmental Compliance Evaluations which are conducted on a three year rotating basis. This effort, as well as working closely with the USFWS to prioritize lighting changes where needed and to identify resources requiring protection from off-road activities, would be expanded under the Preferred Alternative leading to a potential significant positive impact on protected turtle species.

**CONCLUSION:** Human presence associated with USCG stations may significantly affect nesting turtles. However, data on the effects of lighting associated with the USCG stations are not available. There are no plans under the No Action Alternative to alter lighting at these facilities. Although USCG station lightings complies with local regulations, there is a potential to adversely impact endangered and threatened nesting sea turtles. It is uncertain if this impact to the biological environment is significant.

### **Effects of USCG Conservation Efforts on the Biological Environment**

One of the USCG's missions is protection of the marine environment. Therefore, under the No Action Alternative, USCG efforts to enhance threatened and endangered species will remain *status quo* and would include revising Area Contingency Plans (ACPs) as needed, maintaining the USCG Marine Environmental Protection Program, enforcing fisheries regulations and Turtle Exclusion Devices (TED) regulations, and controlling ship movements within U.S. waters.

**Marine Environmental Protection Program.** The USCG marine environmental protection program includes the following components:

- Marine Safety Offices.
- National Strike Force (NSF), composed of three teams of experts that have been trained and equipped to respond to a wide variety of environmental emergencies.
- Multi-mission USCG cutters and aircraft that provide a variety of platforms for surveillance, detection, and response.
- National Response Center (NRC) that functions as a link between reports of pollution and the USCG or EPA Federal on-scene coordinator (FOSC). The FOSC is responsible for evaluating and responding to pollution incidents.
- Area Contingency Plans are prepared to describe the methods and resources that will be used to combat spills of oil and hazardous materials in coastal waters and to protect sensitive habitats from harm. They identify environmental sensitivities within each area and establish priorities and strategies for response based on those sensitivities. Each Area Committee identifies sensitive habitats requiring protection.

In 1993, the USCG marine environmental protection program responded to 2,541 oil-spill incidents and 113 spills of hazardous chemicals along the Atlantic coast of the United States. Spilled oil and chemicals

can adversely impact areas used as wildlife and fisheries habitat, and often results in large scale mortality of plants and animals.

**Enforcement.** The USCG provides law enforcement support that ensures compliance with laws and regulations intended to conserve and manage the living marine resources of the United States. The USCG shares enforcement responsibility in this area with the National Marine Fisheries Service (NMFS). The USCG has authority to conduct law enforcement activities on the high seas and in waters subject to U.S. jurisdiction for the prevention, detection, and suppression of violations of U.S. law, as well as to provide support to NMFS to meet its management goals for protected marine mammals and sea turtles. The USCG and NMFS are equally responsible for enforcing legal requirements of the Endangered Species Act. Enforcement activities performed by the USCG include the following:

- Patrolling the perimeter of the U.S. EEZ to prevent encroachment and harvesting of U.S. marine resources, including endangered species and products made from them, by foreign commercial fishing vessels.
- Patrolling within the EEZ to ensure that U.S. fishing vessels comply with fishery resource management regulations, such as the use of turtle exclusion devices (TEDs) in shrimp trawls.
- Protecting anadromous fish (*e.g.*, salmon) originating in U.S. territory throughout their migratory range, including areas of the high seas outside the EEZ.
- Patrolling areas of the high seas beyond the EEZ to monitor compliance of U.S. and foreign fishing vessels with international agreements (*e.g.*, the UN moratorium on large-scale high-seas pelagic driftnet fishing).

As part of its enforcement authority, the USCG is expected to participate in the enforcement of provisions of several Federal statutes, including

- The Marine Mammal Protection Act (16 USC 1361, *et seq.*)
- The Endangered Species Act (16 USC 1536, *et seq.*)
- The Whaling Convention Act (16 USC, 916, *et seq.*)
- The Magnuson Fishery Conservation and Management Act of 1986, as amended (16 USC 1801, *et seq.*)

The USCG actively participates in enforcement of other Federal and international regulations that deal with protection of threatened or endangered species of marine animals and their critical habitats. The USCG also is responsible for enforcing the resolutions of MARPOL 73/78 Annex V concerning dumping of garbage from vessels and platforms at sea. Floating trash, and plastic debris in particular, is known to harm marine wildlife (turtles, seabirds, whales, pinnipeds), either through ingestion or entanglement with abandoned fishing gear and other large debris (EPA 1994; Shomura and Godfrey 1990; NOAA 1996). Additional effects of debris include risks to vessels (navigation hazards and entanglement) and human health and safety (beach wash-ups or swimming hazards) (EPA 1994). To promote compliance with MARPOL 73/78 Annex V, which is an international treaty, the USCG has developed a strategy of progressive education and aggressive enforcement. Continued enforcement of these regulations results in numerous benefits for living marine resources.

The major cause of human-induced mortality among sea turtles in coastal waters of the U.S. Atlantic Ocean is entanglement or entrapment in fishing gear, particularly shrimp trawls. Many thousands of turtles

die each year through entanglement. It is likely that USCG enforcement of TED regulations in the Atlantic Ocean significantly reduces the injury and mortality of sea turtles. Under the No Action Alternative, USCG enforcement of such regulations would not change.

**Controlling Ship Movements Within U.S. Waters.** In consultation with the International Maritime Organization (IMO), the USCG is responsible for the vessel routing and traffic separation scheme (TSS) in U.S. waters. TSSs are used to improve the safety of navigation in converging areas and in areas where the density of traffic is great or where freedom of movement of shipping is inhibited by restricted searoom, by obstructions to navigation, by limited depths, or by unfavorable meteorological conditions.

The Vessel Traffic Services (VTS), operated by the USCG are the “electronic eyes and ears” of the port. VTS is usually the first to hear about or detect anything out of the ordinary. It then uses its suite of communications equipment to report the incident to the responsible authority or to the mariner for trip planning. It also has the sensors to monitor or manage appropriate responses to the incident. The Vessel Traffic Program does not actively operate vessels of any type. It does, however, advise mariners on hazards to navigation. On the east coast of the United States, the USCG operates one VTS, located for vessel traffic in New York Harbor and its approaches from the sea. TSSs and VTS help prevent or reduce the risk of pollution, harm to endangered species, or other damage to the marine environment from ship collisions or groundings in coastal areas and critical marine habitats.

The USCG will continue to consider permit applications for marine events on a case-by-case basis to determine if there are unavoidable impacts to a protected species or its habitat; and to provide information to sponsors to assist them in modifying permit applications to take any impacts into account by considering changes to the event location, date, or schedule, and to incorporate measures to avoid or reduce impacts. The USCG will also consider whether enforcement measures may be necessary to deter or minimize potential harm from events that may affect protected species and their habitats. Permits for marine events that could result in harm to endangered species (*i.e.*, power boat races where speeds exceed 20 knots) will not be granted until a Section 7 consultation is completed. These USCG efforts would result in significant benefits to protected species, their habitats, and the environment in general.

**CONCLUSION:** One of the USCG’s primary missions is protection of the marine environment. This is accomplished through conservation efforts that include oil spill and hazardous waste spill response, enforcing fisheries regulations and Turtle Excluder Devices (TEDs) regulations, and controlling ship movements within U.S. waters (to prevent accidents and thus spills). All of these measures benefit endangered and threatened species and their habitat. Therefore, under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, USCG conservation efforts would have a positive and significant impact on the biological environment.

### 5.1.3 Consequences of No Action Alternative on the Socioeconomic Environment

The USCG has a significant positive impact on the socioeconomic environment. The various operations performed by the USCG are essential for the protection of human health, property, and the marine environment; for enforcement of state, Federal, and international laws; and for ensuring the security of the United States. In 1993, SAR operations saved 4,689 lives nationwide. The USCG develops, establishes, maintains, and operates aids to maritime navigation, ice-breaking facilities, education programs for safe boat handling, and rescue facilities. In addition, the USCG participates in enforcement and regulation of the billion-dollar commercial and recreational fishing industry.

**CONCLUSION:** Under the No Action Alternative and the licensing alternative, USCG operations would continue to significantly benefit the socioeconomic environment. The non-USCG vessel speed and minimum approach and/or distance regulation alternatives would result in non-USCG vessels traveling at slower speeds and result in increased costs to the operators of non-USCG vessels.

#### **5.1.4 Cumulative Effects of No Action Alternative on the Physical, Biological, and Socioeconomic Environment**

For the purposes of a NEPA analysis, “cumulative impact” is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

USCG activities along the U.S. Atlantic coast, which may result in harm or disturbance to the marine environment and the biological resources it supports, are primarily vessel and aircraft operations in support of the various missions of the USCG as mandated in many U.S. laws and regulations. In addition, numerous state, Federal, commercial and private vessels and aircraft also impact the marine environment in which endangered and threatened species of marine animals live.

In this section, we will describe the impact and level of significance of USCG operations when they are compared and added to the effects of other users of the marine environment. Combined with information on the status of the species, these factors form the baseline on which to evaluate the impact of USCG operations and the cumulative impact of USCG and non-USCG operations on the physical, biological, and socioeconomic environment.

**Physical Environment.** Vessels and aircraft adversely affect the physical environment. There are more than three million registered vessels in the western North Atlantic. This includes more than 40,000 fishing vessels, 426 Federal vessels, and over 50,000 large merchant vessels. These vessels contribute to water and air quality impacts from exhaust emissions and fuel spillage. In addition, the wakes of these vessels may contribute to shoreline erosion. There are numerous private and commercial aircraft operating along the Atlantic coast. Adverse impacts from aircraft include noise and chemical air pollution.

USCG operates approximately 240 vessels and 49 aircraft in the western North Atlantic. This represents less than 1% of all vessels operating along the Atlantic coastline. Therefore, USCG vessel operations have a negligible impact on the physical environment. With or without USCG vessels, these impacts will occur. In fact, USCG vessels are more strictly maintained than the average recreational vessel; they regularly undergo scheduled maintenance which improves fuel efficiency and minimizes emissions. There are no regulated inspections of recreational vessels to ensure that they are operating efficiently.

Other USCG actions, such as responding to pollution events, will also help mitigate environmental harm from other human activities such as commercial and recreational boating. Thus, the No Action Alternative is beneficial in reducing or eliminating significant environmental (*e.g.*, physical) impacts.

**CONCLUSION:** It is not likely that the adverse impacts from private and commercial aircraft significantly affect the physical environment. Under the No Action Alternative, the licensing alternative, and the non-USCG vessel speed and minimum approach and/or distance regulation alternatives, it is unlikely that USCG vessels and aircraft contribute significantly to the cumulative adverse impacts to the physical environment. In fact, these operations may mitigate adverse cumulative effects on the physical environment.

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**Biological Environment.** The major interactions between whales and human populations that may lead to injury or death of the whales include collisions with vessels and entanglement in fishing gear.

*Cumulative effects of all vessels on the biological environment:* Commercial, Federal, and recreational vessels have the potential to threaten the health of aquatic protected species, such as right whales, humpback whales, manatees, and turtles. Major shipping lanes into Massachusetts, New Hampshire, and Maine cross many cetacean high-use areas such as the Great South Channel, Stellwagen Bank, and Jeffreys Ledge (NMFS 1991b). There are no estimates of the cumulative use of the Atlantic coastline by vessels. However, it has been estimated that in Massachusetts Bay, for instance, there are more than 1200 ship crossings per year, more than 280 commercial vessels fish on Stellwagen Bank, and more than 20 sportfishing vessels use the area on a daily basis from May to September. In addition, about 20 whale watching companies operate 40-50 boats, and run several thousand trips from April to September. An unknown number of private recreational boaters use these waters as well. The western North Atlantic is heavily used by commercial vessels (passenger, dry cargo, tug, and barge). The number of commercial vessels using the area has doubled since 1960. However, during the same period, the level of port traffic has actually decreased possibly because of increases in vessels sizes and loads. More than 50,000 large merchant vessel visited Atlantic ports and channels in 1989.

The potential effects of USCG vessel activities are superimposed on the aforementioned commercial and recreational activities and U.S. coastal waters that, taken together, adversely affect certain marine and coastal animals and their habitats. USCG vessels of all sizes on the U.S. Atlantic coast represent <0.01% of total small craft and <0.5% of the large vessels that operate in U.S. Atlantic coastal waters each year.

During the operation of vessels, wildlife may be disturbed by the physical presence or sound of these craft. Deterrence of marine animals from preferred habitats by the physical presence of vessels currently does not appear to be a serious problem. Most wildlife are tolerant of limited physical and acoustic disturbance; however, if this disturbance is chronic, the cumulative impact could be a decrease in breeding success or abandonment of prime habitat.

Collisions with wildlife are also possible and can be deadly for whales, manatees, and turtles. Of special concern are the endangered fin whale, humpback whale, right whale, and manatee. It is likely that collisions are a minor source of mortality for fin whales, and so they will not be discussed in detail here.

Collisions with ships are a source of mortality for humpback whales and are second only to deaths due to entanglement in fishing gear. The minimum population estimate for the western North Atlantic population of humpback whales is 4,865 whales and the PBR (Potential Biological Removal) for this population is 10 individuals per year. Under the No Action Alternative, there are no proposed changes to vessel operations in the western North Atlantic. Therefore, this alternative has the potential to adversely impact the endangered humpback whale because the threat of vessel collisions is not significantly reduced. However, given the status of this population, the adverse impact from USCG vessels in and of itself would not be significant to the population. It is possible that when the cumulative impacts from all vessels are examined the PBR of 10 animals would be exceeded either because of ship strikes from other vessels or due to entanglement in fishing gear. At the time this document was prepared the estimate of the average annual mortality rate for humpbacks was not available. Therefore, it is difficult to estimate cumulative impacts of USCG vessel operations in conjunction with all other vessel operations on the western North Atlantic population of humpback whales.

Also of special concern are vessel collisions with the critically endangered right whale. There have been three collisions of USCG vessels with whales in the last five years; two of these collisions resulted in the death of a right whale. The current estimate of the minimum size of the right whale population is 295

animals. The PBR for this species is set at 0.4 whales which was exceeded in 1995 and already exceeded for 1996. In addition, in contrast to previous analyses (*e.g.*, NMFS 1995 BO), current analysis of raw data indicates an overall declining trend in this population (NMFS 1996 BO; Appendix F). Due to the extremely small population size, the lengthy calving interval, and other factors affecting population growth, such as inbreeding depression, it is expected that each right whale mortality will further inhibit recovery of this species. Given these factors, any take of a right whale by a vessel is significant.

Commercial and Federal ships, recreational boats, and fishing vessels all have the potential to collide with right whales. Impacts of other vessels have a significant cumulative impact on the right whale. Although U.S. citizens are subject to the takings prohibition of Section 9 of the ESA, it is difficult to provide measures to prevent these interactions. Under the No Action Alternative, there are no proposed changes to vessel operations in the western North Atlantic. Therefore, this alternative has the potential to adversely impact the critically endangered northern right whale, and this impact, in and of itself, would be significant. When USCG vessel impacts are combined with the cumulative impacts of all vessels, the USCG adds to the already significant cumulative adverse impacts on the northern right whale population.

The largest single anthropogenic source of mortality in manatees is collision with boats. Annual counts of manatees are increasing, but so are annual mortalities, and the status of the population is uncertain (O'Shea and Ackerman 1995). On average, 200 manatees die per year from natural and human-induced causes. In 1995, there were more than 260 manatee deaths; 158 of these were due to a red tide event. The PBR for this species is three animals per year. Any take exceeding the PBR is considered significant. The cumulative impact of all other vessel traffic is significant with or without USCG vessel impacts. It is not possible to completely eliminate the risk of collisions between manatees and all types and sizes of vessels. Therefore, there is always the potential for significant impacts.

Although outside the area of this analysis, there is one documented collision of a USCG vessel and a manatee; this collision was fatal. In terms of cumulative impacts, the incremental impacts from USCG vessels do not, in and of themselves, cause cumulative impacts of all vessels to be significant. However, USCG impacts add to a situation where cumulative impacts are already significant. Under the No Action Alternative, there are no additional measures to prevent such collisions; therefore, USCG vessel operations may have the potential to significantly affect the Florida manatee.

Commercial and Federal ships, recreational boats, and fishing vessel activities may also affect turtles. Magnuson *et al.* (1990) estimated from Sea Turtle Stranding and Salvage Network data that 400 turtles are killed each year by boat collisions outside of coastal beaches. There is no estimate available for mortality rates in inshore waters (NMFS 1996 BO; Appendix F). Ship strikes appear to be a major source of mortality for sea turtles, and reports of vessel-related injuries have increased in recent years (Teas 1994a,b). As long as the take set by NMFS for all vessels is not exceeded, cumulative vessel operations will not significantly affect the health of the sea turtle population:

There are no records of USCG vessel collisions with turtles. NMFS has issued an incidental take statement to the USCG authorizing the take, by injury or mortality, of one sea turtle. This take level represents the total take per year for all USCG vessel and aircraft activities along the Atlantic coast (NMFS BO 1996; Appendix F). Therefore, it is likely that USCG vessels operating under the No Action Alternative will not contribute significantly to the cumulative adverse impacts on sea turtles if no more than one turtle is taken by the USCG annually.

There is no danger of physical contact or collision of USCG vessels and aircraft with marine plankton, invertebrates, and fish. Human-induced injury to these marine biological resources results from overfishing, pollution, and habitat alteration. USCG operations do not contribute to cumulative impacts of

human activities on these biological resources. The USCG provides a significant beneficial impact to humans through several marine safety and environmental law-enforcement activities that are performed to mitigate environmental harm caused by detrimental human activities.

NMFS is preparing a proposed rule that is designed to reduce vessel interactions and behavioral disturbances to right whales in the Atlantic Ocean by prohibiting close approaches by vessels, aircraft and other objects. This proposed rule encompasses the non-USCG vessel approach and/or distance regulation alternative. It is expected to be similar to the rule promulgated in 1987 by NMFS for approaching humpback whales in Hawaiian waters which NMFS believes has been successful in preventing serious injury and mortality to humpback whales in those waters. It is expected that this rule would benefit the northern right whale, and reduce adverse cumulative impacts from vessels. The level of this reduction is yet to be determined.

*Effect of fisheries on the biological environment:* Entanglement or entrapment in fishing gear is also a threat to the future of protected species, especially cetaceans, pinnipeds and sea turtles. While ship strikes account for 14 of the 42 observed right whale mortalities since 1970, entanglement in fishing gear also contributes to the injury and mortality (Knowlton, pers. comm. in NMFS 1996 BO). Although the cause of death may be attributed to other factors, many of the right whale carcasses examined showed evidence of present or past entanglement in fixed gear including pot and trap fisheries and gillnets. The observed entanglement rate for the right whale catalogue was 57 percent in 1990. At this time, three entanglements were considered mortalities, but Knowlton's updated summary removed one incident and included it in the serious injury category. While this reduces Kraus' estimated 4.3 percent fatality figure, the impact on the estimate is minimal because many observed serious injuries from entanglement have probably resulted in mortalities that have not yet been confirmed.

There is an average of four to six entanglements of humpback whales per year in waters of the southern Gulf of Maine, in addition to reports of ship collisions and scars (NMFS 1996 BO; Appendix F). The outcome of many observed entanglements where a disentanglement effort may have been unsuccessful, or the whale was spotted by a private vessel, is unknown and may further add to the number of mortalities. Therefore, the true impact of entanglement on cetacean and turtle populations is unknown.

Fishery management councils are increasingly aware of the need to protect endangered and threatened species and participate in the Recovery Plan Implementation Teams. The New England Fishery Management Council, NMFS, and the New England Recovery Plan Implementation Team are working together to implement measures aimed at fixed gear to protect right whales through framework adjustments to the appropriate fishery management plan in the Great South Channel and Cape Cod Bay critical habitat.

However, at this time, entanglement in fishing gear is a significant threat to humpback and right whale populations along the Atlantic coast. The USCG does not contribute significantly to this threat, but instead helps to minimize this adverse impact by providing vessels, aircraft, staff and technical support for disentanglement and other efforts (*e.g.*, stranding) in all the Atlantic coast Districts. The USCG is an important component in the network aimed at reducing the impacts of fishing gear entanglements. In addition, USCG efforts to enforce fishing regulations, particularly TED regulations, will benefit the future of protected species affected by these regulations.

*Cumulative effects of all aircraft on the biological environment:* Aircraft operations have the potential to significantly affect marine life and coastal birds through direct collision, resulting in injury and death, from physical and noise disturbance, possibly resulting in altered feeding and social behaviors through displacement from favored habitats, or by chronic sublethal injury. There are many commercial and private airports and aircraft located along the Atlantic coastline, and numerous commercial and private

aircraft operating in the area. The cumulative impact of aircraft on the biological environment is not likely to be significant because FAA guidelines require aircraft to avoid sensitive areas through routing or altitude restrictions. The number of aircraft operated by the USCG is small in comparison to all aircraft operating along the Atlantic coast. Therefore, USCG aircraft operations do not significantly contribute to any existing adverse impacts to the biological environment.

*Affects of other conservation measures on the biological environment:* In addition to the USCG conservation measures described previously, the activities of other Federal agencies contribute to the conservation and recovery of endangered and threatened species. The Army Corps of Engineers also participates in Recovery Plan Implementation teams and coordinates vessel operations (including speed restrictions) during the calving season in the southeast. In the northeast, EPA has provided vessel support and also participates on the implementation team (NMFS 1996 BO; Appendix F). These actions significantly benefit the biological environment. The USCG contribution (*e.g.*, oil spill response, fisheries enforcement, etc.) to this benefit is significant.

**CONCLUSION:** When added to other adverse effects, such as habitat degradation, strikes from other vessels, and entanglement in fishing gear, the No Action Alternative significantly impacts right whales and other listed species. Under current operations standards, the USCG is constantly modifying its procedures to avoid whale strikes and other harmful marine environmental impacts. However, under the No Action Alternative, there is no comprehensive program designed to protect and enhance endangered species. This could result in future “takes” of endangered species such as right whales, and would have a significant, detrimental effect on the biological environment.

**Socioeconomic Environment.** The socioeconomic environment of the U.S. Atlantic coast includes commercial and recreational fishing, recreational boating, and commercial, recreational, and military vessel operations. The cumulative economic impact of these activities is difficult to estimate, but likely amounts to billions of dollars per year. The marine commercial fishery catch in the eastern U.S. in 1994 was more than 860 thousand tons, worth \$1.1 billion. A total of 8,342 vessels (>5 net registered tons) and 35,235 boats (<5 net registered tons) participated in this commercial fishery in 1993. Approximately 72,000 people are employed in this industry as harvesters. An additional 22,000 people are employed as processors and wholesalers of fishery products. An estimated 184 million fish were caught during more than 50,400 recreational fishing trips to coastal and offshore waters of the U.S. Atlantic coast in 1993. Most of the fish caught in the recreational fishery were caught within 3 miles of shore.

Whale watching is an economically important industry at several locations along the U.S. Atlantic coast. Most whale watching is from motor vessels carrying 20 to 300 passengers. The heaviest concentration of whale watching activity occurs in the Gulf of Maine from several harbors in Maine, New Hampshire, and Massachusetts.

Under the No Action Alternative, the USCG significantly decreases potential adverse impacts on the fishing industry by enforcing regulations designed to protect fish stocks. The USCG maintains aids to navigation and traffic separation schemes, ensuring safe passage of commercial vessels in coastal waters. This is a significant benefit to the socioeconomic environment. It is unlikely that the No Action Alternative will significantly affect the whale watching industry. USCG operations result in a cumulative positive impact on the socioeconomic environment.

Under this alternative, there are no changes to the current operations of the USCG that would affect the socioeconomic environment. The USCG provides humanitarian, safety, and law enforcement services for the people of the United States. These services, in and of themselves, all have a positive impact on the socioeconomic environment.

**CONCLUSION:** When the cumulative effects of the fishing industry and whale watching industry and commercial shipping industries are considered, USCG operations under the No Action Alternative and the licensing alternative would significantly benefit the socioeconomic environment. The non-USCG vessel speed and minimum approach and/or distance regulation alternatives would result in non-USCG vessels traveling at slower speeds and result in increased costs to the operators of non-USCG vessels.

## 5.2 Environmental Consequences of the Preferred Alternative

Under the Preferred Alternative, the USCG would formalize measures to more effectively protect and conserve living marine resources by adopting the Atlantic Protected Living Marine Resources Initiative (the Initiative). This alternative has two main components: the Internal Program and the Conservation Program.

The **Internal Program** consists of operational directives and operating procedures that include: updating district plans; training lookouts aboard USCG vessels; providing speed guidance for USCG vessels when in sensitive areas or when near endangered whales; providing approach guidance for USCG vessels and aircraft when in sensitive areas or when near endangered whales; enhanced enforcement of ESA and MMPA regulations; endangered species education for USCG personnel; seasonal “notice to mariners” broadcasts describing endangered species in the area; and plotting critical habitat and sensitive areas boundaries on all navigational and aeronautical charts.

The **Conservation Program** consists of procedures to promote the conservation of protected living marine resources. These procedures include coordinating and cooperating with other Federal and state entities and integrating endangered species education information into current USCG materials designed for public use.

As previously stated, the USCG operations that are most likely to affect endangered and threatened species are vessel and aircraft operations, human presence associated with USCG stations, and USCG conservation efforts. Therefore, the analysis of environmental consequences of the Preferred Alternative will focus on these aspects of USCG operations in Atlantic waters.

All USCG vessels have the potential to interact with protected species, although the vessels involved in emergency operations have the least operational options for performing their missions and are, consequently, the most likely operational component to injure or kill marine animals (NMFS 1995 BO; Appendix C). Under the Preferred Alternative, impacts associated with emergency operations would be similar to those described under the No Action Alternative. Although trained lookouts will be stationed on all USCG vessels transiting through high-use areas, during emergency operations (when speed is consistent with the mission) there may be insufficient time to change vessel course to avoid collisions, which will result in significant impacts to wildlife. However, under the Preferred Alternative, look-outs will be trained to identify and maneuver around endangered whales.

Under the Preferred Alternative, collisions with vessels, and physical and acoustic disturbance from vessels, aircraft, or human presence may still occur during emergency situations. These interactions have a significant negative effect on both the species and the mission. However, <25% of USCG operations are emergent in nature, and vessel speed and aircraft altitude restrictions, in areas where wildlife are most likely to occur, will greatly reduce adverse effects in most non-emergency situations. Typically, physical and acoustic disturbance must be persistent or dramatic to produce any lasting effects (Ellis *et al.* 1991). Such impact from USCG operations is likely to be of short duration and have an insignificant effect on the environment.

## 5.2.1 Consequences of Preferred Alternative on the Physical Environment

### Effects of Changes to USCG Vessel Activities on the Physical Environment

**Alteration of Coastal Habitat.** In the Preferred Alternative, USCG vessels will be required to adjust vessel speed in important habitats for protected marine species when the animals may be present (*i.e.*, seasonally). This will have the effect of further reducing sediment resuspension and erosion of shorelines. It is unlikely that, under the Preferred Alternative, USCG vessels will cause a significant adverse impact to the coastal habitat.

**Water Quality Impacts.** The Preferred Alternative requires a decrease in speed in high-use habitats for protected and valued resource species of marine animals when the animals are present. Therefore, the risk of accidental releases of fuels attributable to accidents such as groundings and collisions is minimal, and the impacts to the physical environment by USCG vessels conducting non-emergency operations in high-use habitats is not significant. Such accidents usually are more serious and fuel release is greater if they occur during high-speed vessel operations than if they occur during lower-speed operations.

**Air Quality Impacts.** The relationship of engine speed to the rates and amounts of hydrocarbon emissions in exhaust is not always clear. Most engines operate less efficiently at low or idling engine speeds, resulting in greater hydrocarbon emissions per unit volume of fuel consumed. However, under these operating conditions, the fuel consumption rate is reduced. Overall, the amount of hydrocarbons released in exhaust emissions from USCG vessels is unlikely to change substantially as a result of adjusting vessel speed in high-use areas for protected and valued resource species. Therefore, adjusting vessel speed, as proposed under the Preferred Alternative, probably will have little or no significant effect on the rate or amount of hydrocarbon emissions in the exhaust of USCG vessels.

**CONCLUSION:** Under the Preferred Alternative, the primary change in USCG vessel operations that will affect the physical environment is the interim speed protocol developed jointly by NMFS and the USCG. This protocol results in a reduction in vessel speed in critical habitat or sensitive areas, or when a whale is sighted. This reduction in speed will result in a minor reduction in sediment resuspension and erosion of shorelines and accidental releases of fuels attributable to accidents such as groundings and collisions. Air quality impacts are similar to those described under the No Action Alternative. Therefore, under the Preferred Alternative, USCG vessel operations will not significantly affect the physical environment.

### Effects of Changes to USCG Aircraft Activities on the Physical Environment

The USCG operates 17 fixed-wing aircraft and 32 helicopters along the U.S. Atlantic coast in performing its multiple search and rescue, law enforcement, and environmental protection missions. Under the Preferred Alternative, the USCG will modify the Air Operations Manual to bring it in line with current Federal Aviation Regulations which advise aircraft to fly no lower than for 2000 ft over wildlife habitat. The USCG will, during non-emergency operations, maintain an altitude of 2000 ft when over wildlife habitat, particularly critical habitat for the right whale and other sensitive areas. Although this will have no effect on the total noise added to the environment from USCG aircraft, aircraft noise will be less audible at ground or sea level. In addition, this altitude guidance will have no effect on aircraft emissions (*i.e.*, they will be the same as those described under the No Action Alternative).

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**CONCLUSION:** Because the number of USCG aircraft in operation in the Atlantic area is small and the number of sorties flown from different USCG and commercial air fields is low, the contribution of USCG aircraft operations to air pollution is small and very localized. Under the Preferred Alternative, the USCG will not contribute significantly to the degradation of air quality along the U.S. Atlantic coast as a result of its aircraft operations.

### **Effects of Changes to USCG Conservation Efforts on the Physical Environment**

As previously stated, the USCG is an essential component of oil spill and hazardous waste response efforts. The educational components of the Internal and Conservation Programs should increase USCG general knowledge of endangered species and their environs. The expansion of conservation efforts should also heighten public awareness of sensitive environments. However, oil and hazardous waste response time may increase if vessels must avoid critical habitat and decrease vessel speed. This may result in adverse effects to air and water quality and coastal habitat. Currently, data are not available to determine if response time will increase. These data will be gathered in the proposed monitoring program.

**CONCLUSION:** Under the Preferred Alternative, changes in USCG conservation efforts should significantly benefit the physical environment.

### **5.2.2 Consequences of the Preferred Alternative on the Biological Environment**

Under this alternative, the USCG will use procedures and guidance for operations in habitats important to marine animals, especially endangered and threatened species. These procedures include updating district plans; training lookouts aboard USCG vessels to identify marine mammals and turtles; providing speed guidance for USCG vessels when in sensitive areas or when near endangered whales; providing approach guidance for USCG vessels and aircraft when in sensitive areas or when near endangered whales; continued enforcement of ESA and MMPA regulations; providing endangered species education for VTS personnel; producing seasonal “notice to mariners” broadcasts describing endangered species in the area; and plotting critical habitat and sensitive areas boundaries on all navigational and aeronautical charts. In addition, a Conservation Program to facilitate public education programs and cooperation with other Federal agencies would be established. The Preferred Alternative is specifically designed to minimize any adverse impacts USCG operations might have on the biological environment, and to enhance conservation efforts.

### **Effect of Changes to USCG Vessel Activities on the Biological Environment**

**Collision of USCG Vessels with Wildlife.** Minimizing collisions of any kind is a high priority for the USCG. Vessel strikes are a significant source of mortality for inshore species of whales as well as for manatees and sea turtles. Vessel-wildlife collisions often occur because a submerged animal is not seen by the lookout on duty, or because adverse weather conditions make spotting the animal difficult.

Under the Preferred Alternative, USCG vessels will be required to adjust vessel speed in important habitats for protected marine species when the animals may be present. In addition, if a whale is spotted, USCG vessels would avoid approaching the whale, and would utilize a speed and course necessary to permit the vessel to open the distance from the whale or to allow the whale to successfully evade the vessel. USCG vessels would maintain a safe minimum distance of 500 yards from right whales; the minimum safe distance for other whale species is 100 yards. Adjustments to these distances would be made if the USCG is assisting in the rescue of an endangered whale, including right whales, or performing its duties to

enforce the ESA and MMPA. Adjusting USCG vessel speed and avoiding close approaches when transiting endangered and threatened species high-use areas will give personnel additional time to identify wildlife and avoid potential collisions.

Ship strikes have usually occurred in the vicinity of critical habitats in the north and south, or in the mid-Atlantic near shipping lanes (NMFS 1996 BO; Appendix F). Avoiding important habitat for endangered and threatened species, when practical, should minimize the risk of collisions with wildlife. However, avoiding such areas may also result in a decrease in USCG opportunistic marine mammal sightings. Although these data are important to NMFS and other agencies, the benefits to endangered species (*i.e.*, decreased collision hazard) are likely to outweigh the benefits garnered from collection of opportunistic data.

Plotting the boundaries of critical habitat, marine sanctuaries, or high-use areas on all USCG locally held navigational, aeronautical, and law-enforcement working charts will alert personnel to areas warranting extreme caution. USCG vessels would be instructed to avoid, if possible, flocks of marine birds resting on the sea surface or, if approach is necessary, adjust speed to avoid impacts. In addition, education of USCG personnel is likely to be a very effective means of greatly reducing the chance of vessel-wildlife collisions during all operations. The USCG's Marine Mammal and Endangered Species Protection Programs focus on educating USCG personnel about animals that are susceptible to collisions (*i.e.*, whales, turtles, and manatees). District 1 has incorporated a marine mammal training component into the Northeast Regional Fisheries Training Curriculum. Similar curricula would be developed for Districts 5 and 7. A field component of the training course would be developed with the cooperation and expertise of NMFS and regional marine mammal researchers. By working closely with regional NMFS and USFWS offices, it is expected that USCG personnel will improve their marine animal sighting skills, they will learn the most effective means of identifying and maneuvering around vulnerable species, and the chance of USCG vessel collisions with wildlife will be minimized. Improvement in sighting skills will further reduce the potential for collisions with wildlife and will have an overall significant beneficial impact to wildlife.

**Impacts of Noise and Physical Disturbances Resulting from Altered Operation of USCG Vessels.** Recommending that USCG vessels avoid high-use areas and marine sanctuaries when practical would result in a decrease in the noise exposure and physical disturbance to marine animals in those areas. Speed reductions and approach restrictions within these also areas would result in a slight reduction in the overall noise to which marine animals would be exposed. Furthermore, potential harassment from the physical presence of vessels would be reduced.

**CONCLUSION:** As previously stated, the primary hazard of USCG operations in the biological environment is collisions of USCG vessels with wildlife. Encounters with large vessels are often deadly for whales, manatees, and turtles. The USCG is active in many of the cetacean high-use areas off the U.S. coast because these areas are also used extensively by commercial ships, fishermen, and recreational boaters. Adjusting vessel speed, avoiding intentional approaches to whales, avoiding important habitats, and educating lookouts may significantly reduce the potential for USCG vessel collisions and harassment of cetaceans, manatees, pinnipeds and turtles.

Simultaneously, these vessel protocols will affect fisheries law enforcement activities and may result in a significant, adverse impact on populations of fish and turtles that are presently under management (see Conservation Efforts).

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## Effect of Changes to USCG Altered Aircraft Activities on the Biological Environment

**Collision of USCG Aircraft With Wildlife.** As previously mentioned, the wildlife most likely to collide with USCG aircraft are marine, coastal or migratory birds. Under the Preferred Alternative, this hazard will decrease because of increased liaison with local authorities regarding the locations of nesting and foraging sites, and information on sensitive species and habitat will be centrally located and easily accessed by aircraft operators. The result would be a small but beneficial impact to wildlife, aircraft and crew. However, flying above 2000 ft above sensitive areas hinder identification of vessels fishing in restricted fishing areas.

**Impacts of Noise and Physical Disturbances Resulting from Operation of USCG Aircraft.** USCG aircraft flying at low altitude through high-use nesting and rookery habitats of marine and coastal birds and seals along the U.S. Atlantic coast during emergency operations may disturb the animals. This disturbance, particularly if it is in an area where there are normally few low-flying aircraft, could result in harm to bird eggs and nestlings, and newborn seal pups if the parents panic, or the disturbance could even lead to abandonment of preferred habitats. The contribution of USCG aircraft to the total number of low-flying ( $\leq 500$  ft) aircraft in the immediate coastal zone (*e.g.*, over or near nesting sites and rookeries) of the U.S. Atlantic coast is uncertain. Most emergency SAR operations involving aircraft are conducted sufficiently distant from shore that disturbance of shore nesting sites and rookeries would be minimal. The overall contribution of low-altitude emergency USCG aircraft operations on the nesting marine/coastal birds and pupping seals is very small. Consultation and coordination with other agencies (*i.e.*, NMFS, USFWS, marine sanctuaries, etc.) will help to identify sensitive areas where additional changes in operations might be warranted to reduce any physical and acoustic disturbance from USCG operations.

**CONCLUSION:** Under the Preferred Alternative, the USCG will modify the Air Operations Manual to bring it in line with current Federal Aviation Regulations which call for 2000 ft over wildlife habitat. At this altitude, harassment of marine mammals, turtles, and birds is expected to be negligible. The overall contribution of low-altitude emergency USCG aircraft operations on the species most likely to be impacted (*i.e.*, nesting marine/coastal birds and pupping seals) is minor and insignificant.

## Effects of Changes to USCG-Associated Human Presence and Activities on the Biological Environment

Currently, the USCG adheres to local Florida lighting ordinances for marine turtle protection, which implement section 161.163 of the Florida Statutes. Also, lighting is currently evaluated at USCG sites during Environmental Compliance Evaluations which are conducted on a three year rotating basis. This effort, as well as working closely with the USFWS to prioritize lighting changes where needed, and to identify resources requiring protection from off-road activities, would be expanded under the Preferred Alternative, leading to a potential significant positive impact on protected turtle species.

**CONCLUSION:** Changes to lighting at USCG facilities and focusing on areas requiring protection from off-road activities may benefit nesting sea turtles. However, the level of significance can not be determined because data are unavailable. Data will be gathered on the nesting areas that will benefit from these changes during the monitoring program.

## Effects of Changes to USCG Conservation Efforts on the Biological Environment

In addition to the conservation measures described under the No Action Alternative, the Preferred Alternative outlines additional conservation measures to reduce significant impacts from public and commercial users of Atlantic waters.

**Other Vessels.** Additional measures included in the Preferred Alternative would decrease the risk of non-USCG vessel collisions with wildlife. Recent clarification of MMPA and ESA law-enforcement procedures direct USCG personnel to target vessel operators that act in a manner that may result in injury or harassment of protected species. Including protected species awareness information in the *Coast Pilot*, *Sailing Directions*, public boat safety classes, and Sea Partners curricula would alert mariners of approach restrictions and proper boat handling techniques around marine mammals and turtles. As described under the No Action Alternative, the USCG will continue to consider permit applications for marine events on a case-by-case basis to determine if there are impacts to a protected species or its habitat.

**Notice to Mariners.** The USCG, in cooperation with the State of Georgia Department of Natural Resources (DNR), publishes and broadcasts a local notice to mariners about right whale calving grounds in the southeast United States from December through March. In New England waters, USCG Group Woods Hole and Group Boston broadcast a right whale safety notice twice a day from 1 March through 31 September and when right whales are reported in the Group's area of operation. In these notices, vessel operators are reminded to use caution around right whales and that intentional close approaches to right whales are prohibited and may result in a violation of State or Federal law. The NAVTEX system, as mentioned, must be expanded (*e.g.*, increased use by non-USCG vessels such as U.S. Navy vessels) or replaced by some other notification system to be truly effective in preventing vessel collisions with right whales. Under the Preferred Alternative, the USCG will investigate the feasibility of such expansion or replacement. By publishing and broadcasting a seasonal notice to mariners advising caution in right whale critical habitat, and through NAVTEX postings of right whale locations, the USCG will increase public awareness of this severely endangered species. All of the above-mentioned measures would result in a decrease in commercial and recreational vessel collisions with right whales and with other marine vertebrates and, in general, would increase public awareness of these species. Overall, this will have a beneficial impact on endangered and threatened species.

**Public Education.** Public education is an important component of the Preferred Alternative Conservation Program. Incorporation of information on protected species in boat safety and Sea Partners curricula would increase public awareness of the marine environment. The increase in public awareness will reduce significant impacts to endangered and threatened species. The USCG would work with NMFS and NOAA to incorporate pertinent protected species information in *Sailing Directions* and the *Coast Pilot*. Because of the widespread use of these publications by U.S. and international mariners, information on endangered and threatened species, their high-use areas or critical habitat, and laws protecting these species can be communicated directly to mariners and used to test mariners seeking vessel operator licenses. This information would be updated when necessary. This transfer of information to the public may result in decreased collisions with or harassment of marine animals and may provide an opportunity to clarify what constitutes a violation of protected species regulations. Thus, public education will have a significant beneficial impact on protected species.

**Right Whale Early Warning Surveys.** In the last two years, the USCG has contributed \$80,000 to SEUS Early Warning Surveys. Under the Preferred Alternative, the USCG's contributions would continue. These daily aerial surveys are conducted by the New England Aquarium from December through March in the area between Brunswick, Georgia and Jacksonville, Florida. The purpose of the surveys is to prevent ship collisions with right whales by relaying the location of whales to all user groups

in the area. These groups include the USCG, the U.S. Navy, the U.S. Army Corps of Engineers (USACE), port authorities, and harbor pilots. When a whale is sighted, vessels in the vicinity are notified by Marine Radiotelephone (VHF), and later by telephone or FAX transmission. In the winter of 1993-1994, whales were sighted on 32 days, and 112 contacts with the above-mentioned user groups were made. On six occasions, vessels were diverted from courses dangerously close to right whales. This early-warning program has been quite successful in raising the endangered species awareness of user groups in the area. Because the program would not be possible without the financial assistance of the USCG, the USCG contribution to this conservation measure significantly benefits the critically endangered right whale.

**Interagency Cooperation.** The Preferred Alternative facilitates the cooperation of USCG offices with local, state, and Federal agencies, and may result in improved communication regarding unusual events such as mass strandings, oil spills, etc. A USCG officer would attend the scheduled meetings of the Humpback and Right Whale Recovery Plan Implementation Teams, and the USCG would work cooperatively with NMFS and other appropriate groups to develop a Mid-Atlantic Implementation Team. As previously mentioned, recent data indicate a rise in humpback whale-ship strikes and entanglement incidents along the mid-Atlantic coast, and an implementation team will be an important step in a comprehensive investigation of this phenomenon. In addition, these teams promote communication and coordination between the USCG and the numerous state and Federal agencies working to enhance the recovery of endangered species. The teams also alert the USCG to areas where they can be of assistance to researchers and inform them of materials available for educational efforts. Such cooperation will inevitably lead to further education of USCG personnel and may result in an improved understanding of the biological environment in which they operate.

Under the Preferred Alternative, helicopters, fixed-wing aircraft, and surface vessels are able to serve as observation platforms when requested, as long as their primary mission requirements can be met. The USCG would provide aircraft and vessel support for Stellwagen Bank National Marine Sanctuary staff and/or NMFS officials to conduct surveys to facilitate research within sanctuary limits and other threatened or endangered species high-use areas (Appendix O).

**Stranding and Entanglement.** The USCG, under the Preferred Alternative, would take a more proactive role in the protection and enhancement of living marine resources that occur within the Atlantic Area and Districts 1, 5, and 7. One of the primary sources of anthropogenic mortality for whales and marine turtles is entanglement in fishing gear or marine debris. Because the USCG provides extensive coverage of whale and turtle habitat, it is the perfect liaison for the volunteer stranding networks along the east coast. The USCG Marine Mammal and Endangered Species Protection Programs have clarified procedures if an entangled whale or turtle is spotted. Notification of the proper authorities in a timely manner would be the result of this clarification. This, in turn, may provide valuable time for disentanglement efforts. Many times stranding units do not have vessels at their disposal, and the USCG can provide a crew and vessel support, often on short notice, for disentanglement attempts. Between 1970 and 1990, more than 70 whales have been reported as entangled in fishing gear in coastal waters of the northeastern United States. Most of these were humpback whales. Although most entanglements cause minor injury to the whales, 3% of right whales, 10.6% of humpback whales, and 22% of fin whales, recorded as entangled in fishing gear in U.S. Atlantic coastal waters, died as a direct or indirect result of entanglement. The USCG is also directing its units to assist in disentanglement efforts when resources are available.

**Opportunistic Sightings.** As previously stated, the USCG has recently begun gathering opportunistic data on whales sighted during aircraft and vessel operations. It is particularly important that any sightings of endangered right whales, especially those in distress, be reported immediately. This information is often not available to researchers until well after the event, when it is too late to respond. Such opportunistic

data may help clarify lingering questions about right whale movements and habitat use. However, this sighting program would be modified because of the implementation of the 500 - 100 yard (vessels) and 2000 ft (aircraft altitude) approach restrictions required under the Preferred Alternative. Currently, it is unclear what effect this will have on the quality of the data gathered. The degree of impact and significance of this modification will be assessed during the monitoring program.

Enforcement of fishery regulations by the USCG is intended to protect depleted and important fishery species and their habitat. However, the vessel speed reductions and avoidance of critical habitat may decrease fisheries and TEDs enforcement efforts resulting in an adverse impact to fish and turtles.

**CONCLUSION:** The Preferred Alternative is designed to protect and enhance endangered and threatened species and their habitat. This alternative may result in a significant positive effect on the biological environment if public education efforts significantly decrease the potential for collision between non-USCG vessels and endangered species, particularly right whales and manatees. However, some aspects of the Preferred Alternative, such as vessel speed reduction, may directly impact TEDs and fishery enforcement activities. The level of this impact is yet to be determined.

### **5.2.3 Consequences of the Preferred Alternative on the Socioeconomic Environment**

The Preferred Alternative may have positive effects on the socioeconomic environment. This action would ensure compliance of the USCG with state and Federal laws protecting marine mammals and other endangered and threatened species. It would facilitate the cooperation among state and Federal agencies, which could save valuable public resources. The transfer of endangered species information to the public may result in decreased collisions with or harassment of marine animals, and may make prosecution of violators more successful and cost-effective by publicly clarifying what constitutes a violation of protected species regulations. Educating the public about critical habitat and endangered and threatened species, and their responsible stewardship, is a major focus of the Preferred Alternative, and would result in positive impact on the socioeconomic environment.

The Preferred Alternative would not result in any changes affecting the ability of the USCG to conduct emergency operations, most often conducted as SAR operations. However, the Preferred Alternative may result in an increased law enforcement burden on state and local resources because the area covered by USCG vessels and aircraft during patrols would be reduced. The Preferred Alternative may ultimately result in an increase in the total time that all vessels and aircraft travel in endangered and threatened species habitat as state and local agencies increase their patrols. If this alternative causes a decrease in fishing and shipping law enforcement efforts, natural resource protection may decrease and local economies could be adversely affected. Both increased education and a renewed emphasis on ESA and MMPA enforcement would offset potential decreases in law enforcement patrol hours.

The cost of lighting options would not affect the socioeconomic environment because internal USCG assets will be used to investigate and develop lighting options. Once lighting changes are implemented the costs are estimated to have an insignificant, positive impact on the local economies. Additional monies may be needed if lighting modifications are needed at USCG facilities that are near turtle nesting habitat. These costs may be absorbed into the current USCG budget.

The economic impacts of this alternative relative to the USCG's ability to accomplish the mission are described in Appendix W. Many of the suggested programs will require additional personnel, training, and resources, all of which are potentially expensive.

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**CONCLUSION:** The Preferred Alternative will benefit the socioeconomic environment due to improved communication among agencies, which will result in an efficient use of limited monies. However, this alternative may also adversely affect the socioeconomic environment due to a decrease in USCG enforcement effort, and an increase in USCG operating costs. The socioeconomic impact of changes in operations can not be determined at this time. These data will be gathered during the monitoring program.

#### **5.2.4 Cumulative Effects of the Preferred Alternative on the Physical, Biological, and Socioeconomic Environment**

As previously stated, “cumulative impact” is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impacts of non-USCG activities are described in detail in section 5.1.4. Combined with information on the status of the species, these factors form the baseline on which to evaluate the impact of USCG operations, and the cumulative impact of these operations on the physical, chemical and biological environment.

USCG activities along the U.S. Atlantic coast which may result in harm or disturbance to the marine environment and the biological resources it supports are primarily vessel and aircraft operations in support of the various missions of the USCG as mandated in many U.S. laws and regulations. In addition, numerous state, Federal, commercial, and private vessels and aircraft also impact the marine environment in which endangered and threatened species of marine animals live.

Overall, the effects of the Preferred Alternative would significantly benefit the physical, biological, and socioeconomic environments. These positive effects are the result of changes in USCG operations and increased education programs (through cross-agency training) that are not part of the USCG No Action Alternative.

**Physical Environment.** Vessels and aircraft adversely affect the physical environment. There are more than three million registered vessels in the western North Atlantic. These vessels contribute to water and air quality impacts from exhaust emissions and fuel spillage. In addition, the wakes of these vessels may contribute to shoreline erosion. There are numerous private and commercial aircraft operating along the Atlantic coast. Adverse impacts from aircraft include noise and chemical air pollution.

In terms of cumulative impacts of vessels on the physical environment, the incremental impacts from USCG vessels are small. Nevertheless, the Preferred Alternative would reduce these impacts. Adjusting vessel speed would contribute to long-term efforts to reduce shoreline erosion, even though the USCG contribution to this problem is minimal. The adjustment in vessel speed would also contribute to improved water quality in shallow-water areas. In the Preferred Alternative, the adjustment in vessel speed would result in a lower risk of collisions and groundings. However, these effects, in and of themselves and when superimposed on the cumulative effects on the physical environment, would not be significant because the total number of vessels and aircraft operated by the USCG is small.

**CONCLUSION:** It is not likely that the adverse impacts from private and commercial aircraft significantly affect the physical environment. Under the Preferred Alternative, it is unlikely that USCG vessels and aircraft will contribute significantly to the cumulative adverse impacts to the physical environment. In fact, these operations may mitigate adverse cumulative effects on the physical environment, but the effects are not likely to be significant.

**Biological Environment.** Commercial, Federal, and recreational vessels have the potential to threaten the health of aquatic protected species, such as right whales, humpback whales, manatees, and turtles. During the operation of vessels, wildlife may be disturbed by the physical presence or sound of these craft. Most wildlife are tolerant of limited physical and acoustic disturbance; however, if this disturbance is chronic, the cumulative impact could be a decrease in breeding success or abandonment of prime habitat. Collisions with wildlife are also possible and can be deadly for whales, manatees, and turtles. Of special concern are activities that affect the endangered fin whale, humpback whale, right whale, and manatee.

There have been three collisions between USCG vessels and whales in the Atlantic Ocean within the past five years. Any collisions of USCG vessels with right whales and manatees, in and of themselves, are considered significant due to the uncertain status of the species and high cumulative take from other vessels, entanglement in fishing gear, and natural sources of mortality (*i.e.*, red tide events). The proposed changes in vessel and aircraft operations are designed to significantly decrease or eliminate the chance for USCG collisions with wildlife. Formally implementing the actions proposed for this alternative should prevent any additional collisions with whales and, in fact, contribute to recovery of the species by eliminating a source of adverse impacts. The speed adjustments would also reduce the deterrence of marine animals from preferred habitats by the physical presence of the USCG vessels. Adjusting vessel speed, avoiding intentional approaches to whales, avoiding important habitats, and educating lookouts may significantly reduce the potential for USCG vessel collisions and harassment of cetaceans, manatees, pinnipeds and turtles. These efforts, when combined with the efforts of numerous state, Federal, and private agencies, may provide the resources needed to successfully facilitate the recovery of endangered species such as the right whale.

The cumulative effects of the Preferred Alternative on marine plankton, fish, and invertebrates are similar to those for the No Action Alternative because the USCG does not contribute to the adverse cumulative impacts of human activities on these biological resources. Instead, several marine safety and environmental law enforcement activities performed by the USCG contribute to reducing environmental harm from other human activities. However, under the Preferred Alternative, these vessel protocols may reduce the effectiveness of fisheries law enforcement activities, and may therefore adversely affect populations of fish and turtles that are presently under management (see Conservation Efforts). The level and significance of this impact will be determined during the monitoring program.

Through education, the increase in USCG knowledge of the marine environment and marine biota would generally benefit all biological resources. The USCG would become more sensitive to the effects of its operations on the marine environment. Specifically, improved knowledge would provide the USCG with vessel operation skills for maneuvering in the vicinity of endangered species in a manner that would decrease the risk of harm to the species. This knowledge base would be useful when interacting with other Federal agencies in efforts to preserve and protect biological resources. Because more USCG staff would have an improved knowledge of the environment, they would be better equipped to educate the public during boating safety courses and educate colleagues from other countries during international training assignments. Such additional education may lead to a future increase in public awareness of the plight of protected species and their habitat. With an increased number of USCG staff trained in the marine environment and its resources, the USCG would be able to provide valuable assistance to NMFS and USFWS. USCG staff on vessels would have the expertise to assist in sighting whales, sea turtles, manatees and protected birds, and in collecting data and specimens. Updating and improving the Marine Mammal and Endangered Species Protection Programs for LANTAREA and Districts 1, 5, and 7, and increased enforcement of the MMPA and ESA may result in future benefits to protected species, such as whales, turtles, and manatees. Because the USCG frequently interacts with the public when fulfilling their obligations along the Atlantic coastline, they can have a significant effect on public awareness of endangered and threatened species.

**CONCLUSION:** When added to other adverse effects, such as habitat degradation, strikes from other vessels, and entanglement in fishing gear, the Preferred Alternative may significantly benefit right whales and other listed species. The comprehensive APLMR Initiative is designed to protect and enhance endangered species. Adjusting vessel speed, avoiding intentional approaches to whales, avoiding important habitats, and educating lookouts may significantly reduce the potential for USCG vessel collisions and harassment of cetaceans, manatees, pinnipeds and turtles. Public education may decrease the potential for collisions of private and commercial vessels and endangered species. These efforts, when combined with the efforts of numerous state, Federal, and private agencies, may provide the resources needed to successfully facilitate the recovery of endangered species such as the right whale.

There are concerns, however, that the vessel speed and approach protocols will adversely affect fisheries law enforcement activities, and may result in a significant, adverse impact on populations of fish and turtles that are presently under management (see Conservation Efforts). The impact on the effectiveness of enforcement efforts will be carefully monitored to ensure that the benefits of the Preferred Alternative outweigh any negative impacts.

**Socioeconomic Environment.** The proposed adjustments in vessel speed during operations and within special areas would not have any negative impact on human health or on the ability of the USCG to effectively conduct operations. The Preferred Alternative would result in an increase in the time required to conduct non-emergency operations. However, the extra time required to conduct operations would be offset by the benefit (reduced chance for collision, reduced resuspension of sediment, reduced noise) to marine resources. If an Area To Be Avoided (ATBA) is designated, there could be economic repercussions if commercial vessel transit times increase significantly, just as there could be increased transit times under the non-USCG vessel speed and minimum approach distance alternatives.

If the Preferred Alternative results in significant impacts to fisheries law enforcement efforts, commercially important fish stocks could be depleted. This would result in significant, adverse effects on the socioeconomic environment because the fishing industry is a significant component of the socioeconomic environment.

### 5.3 Mitigating Measures and Monitoring Program

The USCG has made a qualitative determination (based on quantitative estimates) that implementing the Initiative will have an overall negative impact on USCG operations. Actual quantification of the Initiative's impacts will require establishing and implementing a program to monitor the internal and external impacts. The monitoring program will require at least two years to conduct - the development and implementation phase taking up to six months, the monitoring phase taking at least one year, and the analysis phase taking approximately six months. The monitoring program would measure the impact on the use of USCG resources (*e.g.*, measurements would include the resource hours currently measured in the abstract of operations reporting system that will indicate the amount of time various USCG assets perform their missions) as well as the impact on environmental resources (*e.g.*, the USCG would continue to provide NMFS with data and obtain NMFS assessment of the impacts on marine resources based on their stock assessments and takings data). The analysis phase will provide the USCG the opportunity to reassess the effectiveness and necessity of the various protective measures and determine if adjustments are necessary, whether those adjustments require reinitiation of consultation, and whether the monitoring period should be extended.

## **5.4 Unavoidable Adverse Environmental Impacts**

Unavoidable adverse effects on marine mammals may occur during emergency operations (such as search and rescue and drug interdiction operations) performed under the Preferred Alternative. The operational protocols for vessel speed and marine mammal approaches will not be in place during emergency operations. Therefore, there is a risk of collisions between USCG vessels and cetaceans. A lookout, who has successfully completed marine mammal training, will be posted during all emergency USCG transits within 20 nautical miles of shore. It is expected that the posting of this trained lookout will minimize risk of collisions of any type, including those with marine mammals.

Implementation of the Preferred Alternative may result in major impacts on the USCG's ability to perform its missions. For example, limiting vessel speeds and approaches to large marine mammals will likely detract from the USCG's ability to conduct fisheries enforcement, particularly in areas such as the northwest Atlantic where the closed fisheries areas overlap with the designated critical habitat. The potential rise in violations could place fisheries resources at risk. Similarly, requiring USCG vessels to travel more slowly would increase the time needed to perform all missions. One negative consequence of implementing the Initiative, internal to the USCG, will be the need to extend the time existing personnel and equipment are employed and the resultant decrease in the effectiveness of overtaxed personnel and equipment (e.g., increasing the average work week of USCG personnel). In fact, it would frustrate the USCG's recent effort to decrease the average work week for USCG stations from an average of 90 hours to an average of 68 hours by internally reorganizing and reassigning 500 personnel. In short, it will prove difficult if not impossible to maintain a reasonable average work week if additional hours are needed to implement the Initiative.

Presently, the USCG has made a qualitative determination (based on quantitative estimates) that implementing the Initiative will have an overall negative impact on USCG operations. Actual quantification of the Initiative's impacts will require establishing and implementing a program to monitor the impacts on USCG resources and operations and on environmental resources. This monitoring program will provide the USCG the opportunity to reassess the effectiveness and necessity of the various protective measures and determine if adjustments are necessary, whether those adjustments require reinitiation of consultation, and whether the monitoring period should be extended.

## **5.5 Energy Requirements And Conservation Potential**

Implementing the Atlantic Protected Living Marine Resources (APLMR) Initiative will require expenditure of energy in the form of fuel for USCG vessels and aircraft.

## **5.6 Irreversible And Irretrievable Commitments Of Resources**

Implementation of the Preferred Alternative will require a commitment of labor, capital resources, and non-renewable resources such as fuel.

## **5.7 Relationship Between Short-term Use Of The Environment And Maintenance And Enhancement Of Long-term Productivity**

The Preferred Alternative involves long-term changes in USCG policies and operations and long term use and productivity of the environment.