3.0 AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental characteristics that may be affected by the Proposed and Alternative Actions. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from construction and operation required for the GMD ETR program. To provide a baseline point of reference for understanding any potential impacts, the affected environment is briefly described; any components of greater concern are described in greater detail.

Available reference materials, including EAs, EISs, environmental baselines, monitoring reports, and base master plans, were reviewed. To fill data gaps (questions that could not be answered from the literature) and to verify and update available information, installation and facility personnel; federal, state, and local regulatory agencies; and private individuals were contacted.

Environmental Resources

The affected environment is discussed in terms of 14 resource areas: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, visual and aesthetic resources, and water resources. In addition, subsistence resources are discussed for potential Alaska sites. Each resource area is discussed at each location as applicable. Environmental justice is discussed separately in section 3.12.

Existing Related Environmental Documentation

The FAA prepared an EA in 1996 for the construction and operation of KLC, which supported the licensing of the complex for commercial operations (Federal Aviation Administration, 1996). The U.S. Air Force prepared an EA in 1997 that proposed launching two sub-orbital test vehicles (the atmospheric interceptor technology [ait] program) on a southeasterly course from KLC (U.S. Department of the Air Force, 1997a). The U.S. Air Force also prepared an EA in 2001 that proposed launching one Quick Reaction Launch Vehicle (QRLV) per year beginning in 2001 and ending in 2008 (U.S. Department of the Air Force, 2001). The U.S. Army Space and Missile Defense Command prepared an EA in 2001 that proposed launching the Strategic Target System from KLC and PMRF (U.S. Army Space and Missile Defense Command, 2001b). These documents discuss the existing affected environment on Kodiak Island in detail and are incorporated into this document by reference.

Several NEPA documents have been prepared for activities on Midway, including the EA for the *Proposed Refuge Logistics and Operations Support and Public Use Program at Midway Atoll National Wildlife Refuge*, 1996, and the 1997 Public Use Plan for Midway Atoll National Wildlife Refuge. These documents discuss the affected environment in detail and are incorporated by reference.

The existing environment at RTS was described in the *Final Supplemental EIS for Proposed Actions at USAKA* (U.S. Army Space and Strategic Defense Command, 1993a). This document discusses the affected environment in detail and is incorporated by reference.

The existing environment at PMRF was described in the *Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement* (Pacific Missile Range Facility, Barking Sands, 1998) and the *North Pacific Targets Program Environmental Assessment* (U.S. Army Space and Missile Defense Command, 2001b). These documents discuss the affected environment in detail and are incorporated by reference.

The existing environment at Vandenberg AFB was described in the *Theater Ballistic Missile Targets Environmental Assessment* (U.S. Department of the Air Force, 1997b), *Booster Verification Tests Environmental Assessment* (U.S. Department of the Air Force, 1999), the *Evolved Expendable Launch Vehicle Program Supplemental Environmental Impact Statement* (U.S. Department of the Air Force, 2000), and the *Alternate Boost Vehicle Verification Test Environmental Assessment* (U.S. Army Space and Missile Defense Command, 2002c). These documents discuss the affected environment in detail and are incorporated by reference.

The documents mentioned above, and other related environmental documents, are summarized in appendix A. The following sections summarize applicable data from the documents mentioned above. Information from other sources of data is specifically referenced.

3.1 KODIAK LAUNCH COMPLEX

The existing environment at KLC was described in the *Environmental Assessment of the Kodiak Launch Complex* (Federal Aviation Administration, 1996), the *Final Environmental Assessment for U.S. Air Force Quick Reaction Launch Vehicle Program* (U.S. Department of the Air Force, 2001), the *Final Environmental Assessment for the North Pacific Targets Program* (U.S. Army Space and Missile Defense Command, 2001b), and the *Environmental Assessment for the U.S. Air Force Atmospheric Interceptor Technology Program* (U.S. Department of the Air Force, 1997a). For the most part, those descriptions are still accurate and are not repeated in this document. Rather, for resources that may be affected by ETR activities at KLC, the pertinent resource discussions are summarized and any differences in existing environmental conditions, including new facilities or infrastructure, are noted. The more detailed discussion in the Final EAs are incorporated by reference and will be made available for review by those who wish for more information concerning the existing environment at KLC.

3.1.1 AIR QUALITY—KODIAK LAUNCH COMPLEX

Appendix B includes a definition of air quality and the main regulations and laws that govern its protection.

3.1.1.1 Region of Influence

Identifying the region of influence (ROI) for air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending no more than a few kilometers downwind from the source. The prevailing wind direction is from the northwest. The ROI for ozone may extend much further

downwind than the ROI for inert pollutants; however, as the project area has no heavy industry and very few automobiles, tropospheric ozone and its precursors are not of concern.

The ROI for project operational activities is a circular area with a 5-kilometer (3.1-mile) radius centered on the site of activity. This ROI distance was chosen due to previous analysis in the KLC EA (Federal Aviation Administration, 1996). In that EA the highest concentration of launch emissions was predicted on an uninhabited mountain 5 kilometers (3.1 miles) from the existing launch site. Most activities would be centered at KLC. However, one or two remote telemetry sites would be chosen in Alaska from the sites listed in section 2.1.5.3.

3.1.1.2 Affected Environment

Climate

The climate of Kodiak is characterized as maritime, including short, cool summers and long mild winters. Winter weather tends to last from November to March, with an average daily temperature of -1˚ Celsius (C) (30˚ Fahrenheit [F]). Average wind speeds reach 19 kilometers (12 miles) per hour during these winter months. The months of September and October are considered fall, with temperatures between 4˚C and 10˚C (40˚F and 50˚F) and winds averaging 16 kilometers (10 miles) per hour. The summer months, June to August, are characterized by average daily highs of 15.6˚C (60˚F). April and May are regarded as spring months, in which the average monthly temperatures are from 1˚C to about 4˚C (34˚F to about 40˚F), and the windspeeds are approximately 19 kilometers (12 miles) per hour.

Surface winds along the coast are much stronger and more persistent than at inland areas. While winds tend to be from the northwest at about 19 kilometers (12 miles) per hour, high winds occur throughout the year. Peak gusts range from 56 kilometers (35 miles) per hour in June to 134 kilometers (83 miles) per hour in December. Typically 1 day of heavy fog occurs per month, with visibility of 0.4 kilometer (0.25 mile) or less. During July, fog averages 3 days per month. (Federal Aviation Administration, 1996) The largest monthly snowfall occurs during December and January, with the maximum snowfalls ranging from 100 to 110 centimeters (40 to 45 inches) per month.

Regional Air Quality

Kodiak Island is classified as a Class II attainment area. It is part of a larger area that is in attainment with the National Ambient Air Quality Standards (NAAQS) (Alaska Legislature, 2002). The island's climatology includes periods of high winds and overcast skies, which make the island's atmosphere optimal for dispersion of air pollutants. The atmosphere is classified as neutral (D stability) for this dispersion capability. (Federal Aviation Administration, 1996)

Existing Emission Sources

Wind-blown volcanic dust is the primary air contaminant on the island. Human activities in the vicinity of KLC that would affect background air quality are ranching, occasional vehicular traffic, the occasional operation of two standby generators at the U.S. Coast Guard Loran-C Station, and the periodic use of KLC for vehicle launches.

Backup power at KLC is provided by diesel-driven standby generators located at the Launch Control Center, Payload Processing Facility, and Integration and Processing Facility. All

generators at the complex have block heaters and are contained in heated enclosures. Gas particulate air emissions from launch operations at KLC include the rocket-motor exhaust plume emitted during launch and diesel generator emission. Table 3.1.1-1 lists the estimated emissions generated by the four standby generators at KLC. KLC currently maintains a Preapproved Limit Permit for these generators.

Table 3.1.1-1: Existing Generator Emissions at KLC

Emissions (240 hours/year)			
Oxides of Nitrogen metric tons (tons)/year	**Hydrogen Chloride metric tons (tons)/year**	**Carbon Monoxide metric tons (tons)/year**	**PM-10 metric tons (tons)/year**
2.76 (3.04)	0.37 (0.41)	3.46 (3.81)	0.14 (0.15)

Table 3.1.1-2 lists the estimated concentration of the principal pollutants in the exhaust products from the Athena-2 (formally known as the Lockheed Martin Launch Vehicle) as presented in the KLC EA (Federal Aviation Administration, 1996). The Athena-2 was selected because it represents the largest class of solid rocket booster that can be flown from KLC.

Table 3.1.1-2: Estimated Rocket Launch Pollutant Emission Concentrations from Athena-2 at KLC

Pollutant	U.S. Air Force Standard or Noncriteria Pollutant Guidance Level	Athena-2(1) Launch
Hydrogen Chloride	10 ppm	8 ppm
Aluminum Oxide	150 µg/m^3	146 µg/m^3

Source: Federal Aviation Administration, 1996.

(1) Castor 120 motor
µg/m^3 = micrograms per cubic meter ppm = parts per million

Under worst-case meteorological conditions, which are estimated to occur 2 percent of the time, the maximum downwind concentrations of hydrogen chloride and aluminum oxide would occur at an uninhabited 610-meter (2,000-foot) high mountain peak and would be within the applicable air quality standards. (Federal Aviation Administration, 1996)

U.S. Air Force Standards are appropriate since the ceiling limit set by the Occupational Safety and Health Administration (OSHA) is for stationary sources (such as inside an industrial plant). However, launches are classified as mobile sources and their emissions are temporary. The standard is based on measured and estimated launch emission exposure concentrations and durations in the event of normal and catastrophic launches. (National Research Council, Commission of Life Sciences, Board of Environmental Studies and Toxicology, Committee on Toxicology, Subcommittee on Rocket-Emission Toxicants, 1998)

3.1.2 AIRSPACE—KODIAK LAUNCH COMPLEX

Airspace, or that space which lies above a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. The time dimension is a very important factor in airspace management and air traffic control.

Under Public Law (PL) 85-725, *Federal Aviation Act of 1958*, the FAA is charged with the safe and efficient use of our nation's airspace and has established certain criteria and limits to its use. The method used to provide this service is the National Airspace System. This system is "…a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material." Appendix B includes a detailed description of airspace.

3.1.2.1 Region of Influence

The ROI for airspace at KLC includes commercial air corridors, and the airspace over and surrounding KLC (figure 3.1.2-1).

3.1.2.2 Affected Environment

Controlled and Uncontrolled Airspace

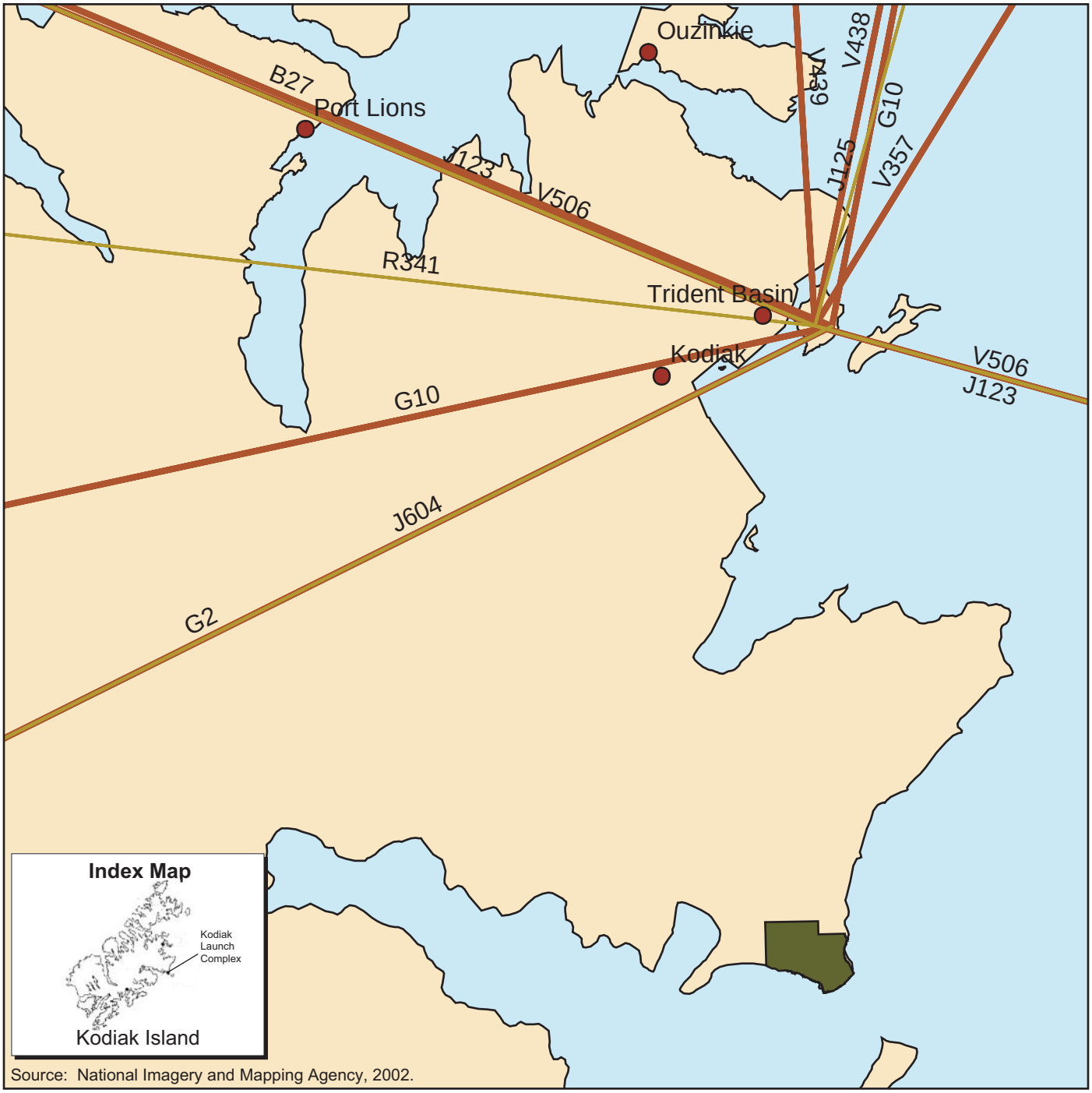
The closest controlled airspace is approximately 40 kilometers (25 miles) northeast of KLC at the Kodiak Airport. Class C and Class D airspace is in effect at Kodiak Airport. Airspace above KLC up to flight level (FL) 180 is uncontrolled class G airspace. Airspace above FL 180 is controlled airspace. The Anchorage Air Route Traffic Control Center (ARTCC) and the Kodiak Air Traffic Control Tower regulate air traffic in the vicinity of KLC.

Special Use Airspace

KLC coordinates launches with airspace users through the existing airspace coordination protocol among KLC, commercial aircraft carriers, and military aircraft. Launches from KLC do not affect U.S. Air Force training exercises.

En Route Airways and Jet Routes

Commercial air corridors enter and exit Kodiak Airport to and from the west, north, and south. Routes include G2 (J604), G10, R341, B27 (J123), V506, V439, V438, and V357. These corridors are north of the Narrow Cape area, more than 24 kilometers (15 miles) from the launch area to the edge of the V506 Corridor. Although generally north of KLC, orient-bound aircraft use flexible tracks to transition to the North Pacific route system. These routes are generated based on the prevailing jetstream and their position relative to KLC may vary. These routes are not depicted on charts. Current coordination procedures minimize any potential impacts to aircraft on these routes. (Goward, 2002)



EXPLANATION

- Land
- Water
- Kodiak Launch Complex
- High Altitude Air Routes (J)
- Low Altitude Air Routes (G,B,V)
- Airports

Scale

0 4.5 9 kilometers

0 2.75 5.5 miles

NORTH

06-09-03 Kodiak Airways

Kodiak Launch Complex Airspace

Kodiak Island, Alaska

Figure 3.1.2-1

Airports/Airfields

Kodiak Airport is the airport closest to KLC. It is located approximately 40 kilometers (25 miles) northeast of the launch site. It is a state operated regional airport that routinely handles daily passenger and cargo jet service and has accommodated C-141 and C-5 military aircraft.

3.1.3 BIOLOGICAL RESOURCES—KODIAK LAUNCH COMPLEX

Appendix B includes a definition of biological resources and the main regulations and laws that govern their protection. For this analysis, scientific names are only provided the first time that threatened and endangered species are mentioned in the text, unless required for clarification.

3.1.3.1 Region of Influence

The ROI includes areas that may potentially be affected by construction and operation activities. The ROI includes KLC and surrounding areas within a 9.7-kilometer (6-mile) radius of launch pad 1, as determined during original agency consultation in 1996, such as Ugak Island and Narrow Cape, which may be affected by noise, toxic spills, and debris.

3.1.3.2 Affected Environment

Vegetation

The predominant vegetation types covering KLC include hairgrass-mixed forb (broad leaved herbs) and open willow-hairgrass-mixed forb meadow, shrublands, wetlands, and intermittent stands of spruce (figure 3.1.3-1) (Alaska Aerospace Development Corporation, 1995b). Some of the most common plants are hairgrass, meadow fescue, alder, willow, and Sitka spruce. The vegetation community structure of the Narrow Cape region has been affected by grazing from farmed cattle, bison, and horses (Alaska Aerospace Development Corporation, 1995b).

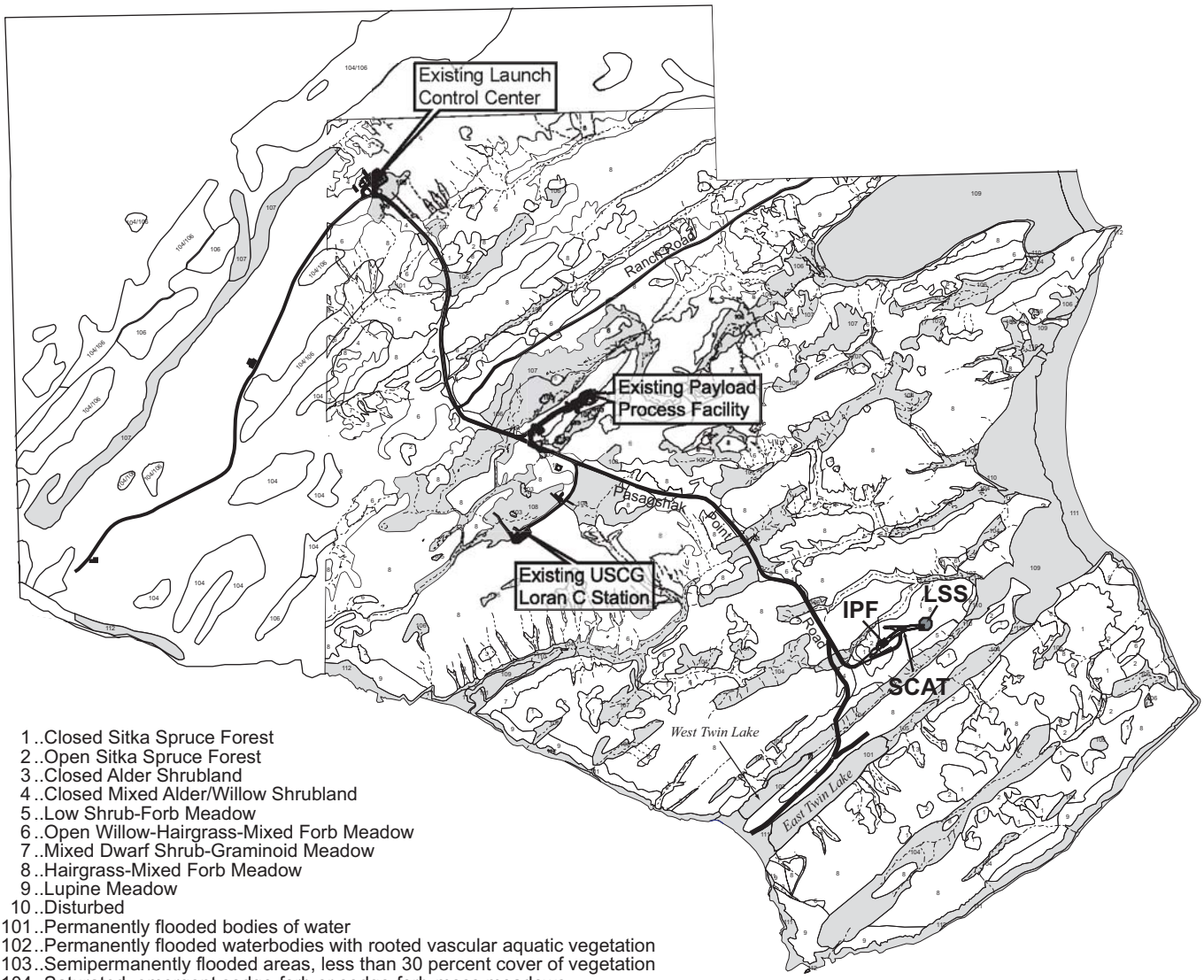
Threatened and Endangered Plant Species

No federally proposed or listed candidate, threatened, or endangered plant species have been observed within the boundaries of KLC.

Wildlife

The KLC site provides habitat for about 143 species of birds. Typical birds found in the area include loons, grebes, harlequin ducks, kingfishers, chickadees, juncos, sparrows, and terns.

Seabird colonies and nesting areas in the vicinity of KLC are shown in figure 3.1.3-2. The seabird colony closest to the KLC site, believed to be an Arctic and Aleutian tern colony, is approximately 3 to 5 kilometers (2 to 3 miles) north of the launch pad. This colony was not active during a 1994 survey, and has not been active since (Cuccarese, 2002). Ugak Pass is attractive to marine birds year-round due to its shallow waters and abundant fish and invertebrates.



1 ..Closed Sitka Spruce Forest
2 ..Open Sitka Spruce Forest
3 ..Closed Alder Shrubland
4 ..Closed Mixed Alder/Willow Shrubland
5 ..Low Shrub-Forb Meadow
6 ..Open Willow-Hairgrass-Mixed Forb Meadow
7 ..Mixed Dwarf Shrub-Graminoid Meadow
8 ..Hairgrass-Mixed Forb Meadow
9 ..Lupine Meadow
10 ..Disturbed
101 ..Permanently flooded bodies of water
102 ..Permanently flooded waterbodies with rooted vascular aquatic vegetation
103 ..Semipermanently flooded areas, less than 30 percent cover of vegetation
104 ..Saturated, emergent sedge-forb or sedge-forb-moss meadows
105 ..Semipermanently flooded emergent sedge marshes
106 ..Saturated, tall shrub thickets and graminoid-dwarf shrub-moss
107 ..Saturated, shrub meadows and shrub bogs with semipermanently flooded, emergent sedge
108 ..Saturated sedge moss
109 ..Subtidal, low energy, brackish bodies of open water
110 ..Brackish marsh and beach vegetation flooded irregularly by tidal water
111 ..Unvegetated beaches
112 ..Unvegetated upper beaches and rocky coastlines

Source: Alaska Aerospace Development Corporation, 2002; Boeing Corporation, 2002b; U.S. Geological Survey, 2002 .

EXPLANATION

Wetland
Existing Roads
Fluviatile Waters

USCG United States Coast Guard
IPF Integration and Processing Facility
SCAT Spacecraft Assemblies Transfer
LSS Launch Service System

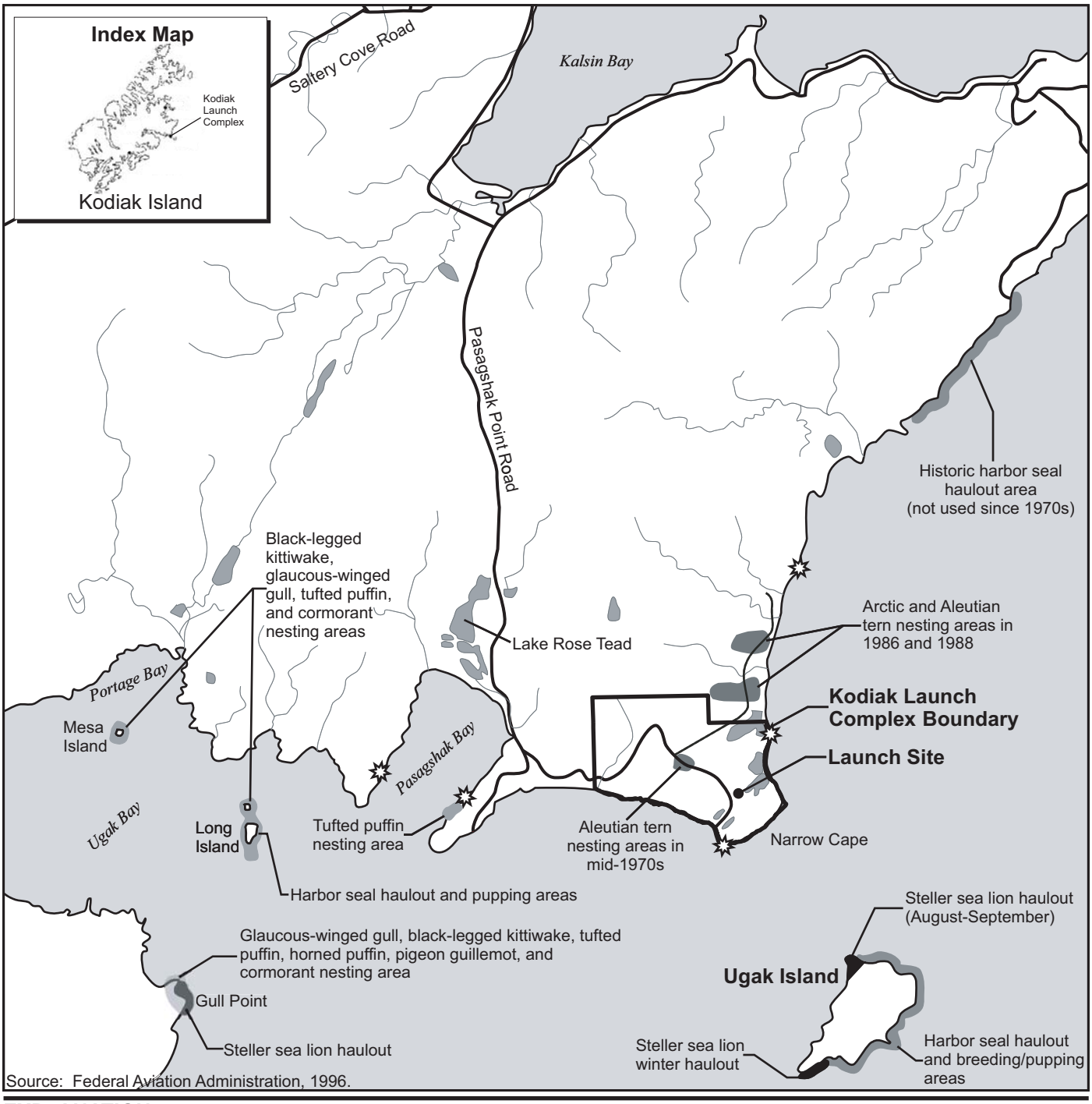
Scale
0 383.5 767 meters
0 1,258 2,516 feet
NORTH

06-09-03 GROW1_Veg

Map of Major Vegetation Types and Wetlands in the Vicinity of Narrow Cape

Kodiak Launch Complex, Alaska

Figure 3.1.3-1



EXPLANATION

- Land
- Water
- Roads
- Rivers
- Bald Eagle Nest

NORTH

Scale

0 2.2 4.3 kilometers

0 1.4 2.7 miles

06-09-03 Kodiak_bio_1

Seabird Colonies and Pinniped Haulout Areas

Kodiak Island, Alaska

Figure 3.1.3-2

The bald eagle, which is protected by the Bald and Golden Eagle Protection Act, is common throughout the year on Kodiak Island and is often seen in the Narrow Cape area. Aerial surveys were conducted in the spring of 1999, 2000, and 2001 to document bald eagle nesting activities at KLC. One active nest was observed at Narrow Cape and one at Lone Point, 8 kilometers (5 miles) north of Narrow Cape. Nine bald eagles were observed in 2000, with the same two nests appearing active. Twelve bald eagles were observed in 2002, with indications of possibly three active nests (Narrow Cape and Lone Point, and Bird Point, which is approximately 3 kilometers [2 miles] north of Narrow Cape). (Alaska Aerospace Development Corporation, 2002b)

Little brown bat, tundra vole, red fox, brown bear, short-tailed weasel, and river otter are common terrestrial mammals found at KLC. Snowshoe hare, red squirrel, muskrat, beaver, Sitka black-tailed deer, buffalo, and mountain goat are examples of species introduced to Kodiak Island.

Horses, cattle, and bison graze nearby under lease to a local ranch. A 2-meter (7-foot) chain link fence surrounds each of the structures at KLC to prevent animals from wandering onto the launch complex.

The fence and nearby steep topography keep grazing animals away from the launch stool. The nearest game trail passes approximately 76 meters (250 feet) south of the launch stool location (U.S. Department of the Air Force, 2001).

The harbor seal is a year-round resident of the area. Several haulout and general use areas occur near KLC, the closest of which is Ugak Island, approximately 5 kilometers (3 miles) southeast. The northern fur seal occurs offshore of the KLC site from January through April. The sea otter is found along most of Kodiak Island's coast in all months of the year. A number of cetacean species, including Dall's and harbor porpoise, Pacific white-sided and Risso's dolphins, and killer whales, are found year-round in the water surrounding Kodiak Island. The migratory path of the recently delisted gray whale includes the eastern nearshore edge of Kodiak Island. The greatest number of gray whales in this area occurs during April, May, November, and December. (Alaska Aerospace Development Corporation, 1995b)

Essential Fish Habitat

Approximately 12 percent of the KLC site is occupied by open water including small streams, two freshwater lakes, and a series of lagoons. Two of the streams have been incorporated into the Alaska Department of Fish and Game's anadromous stream catalog since coho salmon juveniles were detected there (Alaska Aerospace Development Corporation, 1995b). The waters south of Kodiak Island, including the Narrow Cape vicinity, are essential habitat for commercially important fish species year-round. Habitat Areas of Particular Concern include all streams, lakes, and other freshwater areas used by salmon and other anadromous fish. The closest major salmon stream to KLC is the Pasagshak River, which is approximately 10 kilometers (6 miles) to the northwest. Alternate barge landing sites 1, 2, and 3 are close to small order anadromous fish streams, which support pink salmon and are listed in the Alaska Department of Fish and Game's "Anadromous Fish Stream Catalogue" (McCrea, 2003). The most common marine fish in nearshore and offshore water around Kodiak Island are flounder, sole, pollock, skate, cods, and halibut. Other common marine organisms include crabs, scallops, octopus, shrimp, and clams.

Threatened and Endangered Wildlife Species

No federally proposed or listed candidate, threatened, or endangered species are located within the boundaries of KLC. However, several species occur in the ROI, including marine waters in the area (table 3.1.3-1). The Steller sea lion (*Eumetopias jubatus*) population near Kodiak Island was included in the population classified as endangered in 1997. Ugak Island, approximately 5 kilometers (3 miles) southeast of KLC, contains the closest sea lion haulout. No Steller sea lion rookeries have been identified in the ROI (Smith, 2001). Although seven whale species are found in the waters near Kodiak Island, only the delisted gray whale and the endangered humpback whale (*Megaptera novaeangliae*) use the nearshore waters of Kodiak Island within the ROI (Federal Aviation Administration, 1996). Humpback whales are generally found in the nearshore areas of Kodiak Island in the summer. They have been occasionally observed in the Narrow Cape and Ugak Island area. Figure 3.1.3-2 depicts the locations of seabird colonies and pinniped haulout areas in the vicinity of KLC.

Table 3.1.3-1: Threatened and Endangered Species in the Kodiak ROI

	Scientific Name	Common Name	Status	
			Federal	State
Birds				
	Phoebastria albatrus	Short-tailed albatross	E	E
	Polysticta stelleri	Steller's eider	T	SSC
Mammals				
	Balaena glacialis	Northern right whale	E	E
	Balaenoptera borealis	Sei whale	E	--
	Balaenoptera musculus	Blue whale	E	E
	Balaenoptera physalus	Fin whale	E	--
	Megaptera novaeangliae	Humpback whale	E	E
	Physeter macrocephalus	Sperm whale	E	--
	Eumetopias jubatus	Steller sea lion	E	SSC

Source: U.S. Fish and Wildlife Service, 2000

-- = Not Listed E = Endangered SSC = State Species of Special Concern T = Threatened

Most of the world's Steller's eiders (*Polysticta stelleri*) winter along the Alaskan Peninsula, an area that includes Kodiak Island, and through the Aleutian Islands. Most of the world's Steller's eiders nest in northeastern Siberia with a small portion (less than 5 percent) nesting in Alaska (State of Alaska Online, 2002c). The USFWS has classified this Alaska nesting population as threatened. The Steller's eiders occur in the Kodiak Island area primarily during the winter months. Rafts of Steller's eiders were primarily observed offshore of North and South Lagoons and offshore of Pasagshak Bay during surveys conducted in 1997 and 1998 (Alaska Aerospace Development Corporation, 1998).

The federally and state endangered short-tailed albatross (*Phoebastria albatrus*) could occur in the ROI primarily during the summer months (U.S. Fish and Wildlife Service, 2000). The short-tailed albatross is a very large seabird with narrow 2-meter-long (7-foot-long) wings. Adults also spend the summer non-breeding season at sea, feeding on squid, fish, or other organisms. Most summer sightings are in the Aleutian Islands, Bering Sea, and Gulf of Alaska. (State of Alaska Online, 2002b) The world population, which is increasing, is estimated to be 1,200 (U.S. Fish and Wildlife Service, Alaska Region, 2001).

Environmentally Sensitive Habitat

Wetlands

Wetlands in Alaska are defined by the U.S. Army Corps of Engineers as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The U.S. Army Corps of Engineers Alaska District and the U.S. Environmental Protection Agency (EPA) regulate wetlands through the Clean Water Act Section 404 Permitting Program. Wetlands cover approximately 29 percent of the KLC site, as shown in figure 3.1.3-1. Palustrine, emergent, persistent, seasonally flooded and palustrine scrub/shrub, broad-leaved deciduous, saturated wetlands are located within the area proposed for the new GBI launch site.

Critical Habitat

In surveys around Kodiak and southern Afognak Islands, Steller's eiders were reported to be present, and hundreds to low thousands are counted during the Christmas Bird Count in Kodiak. Consistent and extensive use of the Kodiak area by the Steller's eider has been observed. Although critical habitat has not been designated in the Kodiak Archipelago, the area still contains important habitat for Steller's eiders and protection afforded by the Endangered Species Act still applies.

Critical habitat for the Steller sea lion includes a special aquatic foraging area in the Shelikof Strait area consisting in part of an area between the Alaskan Peninsula and Kodiak Island (50 CFR 226.202, *Critical Habitat for Steller Sea Lions).* This area is along the western side of Kodiak Island and outside the ROI.

3.1.4 CULTURAL RESOURCES—KODIAK LAUNCH COMPLEX

Appendix B includes a description of cultural resources and the laws and regulations pertaining to them.

3.1.4.1 Region of Influence

The term ROI is synonymous with the area of potential effect as defined under cultural resources regulations (36 CFR 800.16[d], *Protection of Historic Properties, Program Alternatives*). In general, the ROI for cultural resources encompasses areas requiring ground disturbance (e.g., areas of new facility or utility construction) and all buildings or structures requiring modification, renovation, demolition, or abandonment. At KLC this includes the locations described in section 2.3.1.1 and shown on figures 2.3.1-2, 2.3.1-3, and 2.3.1-4.

3.1.4.2 Affected Environment

Prehistoric and Historic Archaeological Resources

In 1994, the Alaska State Office of History and Archaeology performed an archaeological survey in and around the KLC site. The study focused primarily on areas near the following facilities: the existing Integration and Processing Facility, the existing Launch Pad 1, the proposed Missile Assembly Building, the proposed GBI silos, the existing Payload Process Facility, the proposed

Oxidizer Storage, and the existing Launch Control Center (figures 2.3.1-2 and 2.3.1-4). There was no evidence of cultural resources recorded during this survey. However, there are two archaeological sites and a World War II bunker complex within approximately 1.6 kilometers (1 mile) of KLC. (Federal Aviation Administration, 1996)

Historic Buildings and Structures

The first recorded contact with the Kodiak natives occurred in 1763 by the Russian Stephen Glotov and in 1792 by the Russian fur trapper Alexander Baranov. The Russians continued to explore the area primarily to search for sea otter. As the Russians began to settle the area, Kodiak became the first capital of Russian Alaska. As the area was settled, the sea otter population fell to near extinction and the Kodiak natives' culture had significantly declined. By 1867, Alaska had become a U.S. territory. In 1882, the opening of a fish cannery produced the development of commercial fishing in the area. In 1940, the Town of Kodiak was established.

Kodiak Island was used extensively by the U.S. Army and the U.S. Navy during World War II, and the population of the island rose to more than 25,000. The U.S. Navy constructed a submarine base and an air station while the U.S. Army constructed an outpost near the Buskin River. (Alaska Department of Community and Economic Development, Division of Community and Business Development, 2002)

Native Populations/Traditional Resources

The primary native population of Kodiak is a group of Alaska Native people known as the Alutiiqs. Some archaeologists believe that the Alutiiq people have occupied the Kodiak region for at least 7,000 years. Several distinct cultural traditions have been identified in the Kodiak Island region, including the Ocean Bay (ca. 4500–1400 BC), the Kachemak (ca. 1400 BC–1200 AD), the Koniaq (ca. 1200–1784 AD), and the Chugash, who were present when the first Europeans arrived.

The Koniaqs and Chugash lived in permanent sod houses in the winter and set up temporary fish camps in the summer. They hunted whales, seals, sea lions, and sea otters with harpoons and clubs. Salmon was also a major dietary staple of all the Alutiiqs.

When Russian hunters began to occupy the region to benefit from sea otter furs, they used Native labor to assist them. The Alutiiq men were forced to hunt at sea while the women and children worked on the shore. Before the Russians had established a colony on Kodiak Island, there were approximately 8,000 Alutiiq. By the time the Russians left, the Alutiiq population had fallen to around 2,000 (kodiakisland.net, 1999).

Previous archaeological surveys have indicated that cultural resources are not present in upland areas occupied by KLC. However, records have indicated the presence of cultural resources near 2 of the proposed barge landing sites described in section 2.3.1 and shown in figure 2.3.1-1. Koniaq house pits and refuse have been identified near Barge Landing Site 1 – Narrow Cape Vicinity and Koniaq house pits and shell midden have been found near Site 3 – Pasagshak Bay Area (Bittner, 2003).

Paleontological Resources

Paleontological resources on the upland areas of KLC are generally found in the Narrow Cape formation which is located below the surface soils. These resources include shallow-water marine invertebrates of Oligocene and Miocene age. (Alaska Department of Natural Resources, 2003)

3.1.5 GEOLOGY AND SOILS—KODIAK LAUNCH COMPLEX

Geology and soils are those earth resources that may be adversely affected by the proposed GMD ETR test program. This resource is described in terms of landforms, geology, and soil conditions as they could contribute to erosion, depletion of mineral or energy resources, and soil contamination resulting from proposed construction and launch activities. The potential for geologic hazards is also described as relative to each site's geologic setting. A geologic hazard is a naturally occurring or man-induced geologic condition that presents a risk or a potential danger to life and property. Such hazards could include phenomena such as landslides, flooding, ground subsidence, volcanic activity, faulting, earthquakes, and tsunamis.

3.1.5.1 Region of Influence

The ROI is anticipated to be the locations described in section 2.3.1.1 and shown on figures 2.3.1-1 through 2.3.1-4, and soil areas within each Launch Hazard Area that might be subject to contamination from launch exhaust emissions and/or potential contamination from unburned fuel in the event of a terminated launch.

3.1.5.2 Affected Environment

This section draws heavily from the Subsurface Investigation and Geotechnical Recommendations Report for KLC that was prepared by R&M Consultants, Inc. (Alaska Aerospace Development Corporation, 1995b) and on a series of seismic hazard evaluation studies conducted for the U.S. Coast Guard Loran Station by Carver Geologic, William Lettis and Associates, and International Civil Engineering Consultants, Inc. (U.S. Coast Guard Civil Engineering Unit, 2001; 2002; 2003).

Physiography

KLC is located in northeastern Kodiak Island on a low-lying coastal area that forms a prominent headland at the southeast corner of the site called Narrow Cape. KLC is bounded from the southwest to the east by the Gulf of Alaska. The Marin mountain range fringes the northern boundary of KLC and achieves local elevations of greater than 640 meters (2,100 feet) less than 1.6 kilometers (1 mile) to the northwest (U.S. Geological Survey, 1952). The surface topography of KLC is characterized by a series of gently undulating northeast-southwest trending ridges approximately 43 to 110 meters (140 to 350 feet) in elevation. The ridge tops are broad, and the ground surface on the ridge tops is relatively level. The flanks of the ridges typically have moderate to steep slopes, and there is approximately 15 to 46 meters (50 to 150 feet) of topographic relief between ridge tops and adjacent valleys. The ridges terminate on the southwest end in a near-vertical bluff of exposed silty fine sandstone to a siltstone that meets the beach above the high tide line. The northeast ends of the ridges slope gradually down to the beach and lagoons located along the eastern shore of Narrow Cape (Alaska Aerospace Development Corporation, 1995b).

Geology

Narrow Cape is underlain by folded, faulted, thickly bedded to massive course clastic sediments of the Sitkalidak and Narrow Cape formations (U.S. Coast Guard Civil Engineering Unit, 2002). Lithologies include siltstone, fine and medium lithic sandstone, pebbly sandstone and conglomerate. The sediments are thickly bedded to massive and in many places contain large concretions up to 2 meters (7 feet) in diameter (U.S. Coast Guard Civil Engineering Unit, 2002). Weathered bedrock has a field textural classification of sand with traces of some silt, grading to highly weathered bedrock with a textural classification of sand with trace silt and gravel, with particles of sandstone core stones making up the gravel fraction. The thickness of the completely weathered bedrock is about 0.3 to 2 meters (1 to 7 feet), with the thicker weathered zones occurring in topographically low areas (Alaska Aerospace Development Corporation, 1995b).

Soils

The upland soils that compose the bulk of KLC are described by the U.S. Department of Agriculture (1960) as being of the Kodiak soils series. These soils developed from the weathered bedrock (sandstone) and were covered by volcanic ash from a 1912 eruption about 140 kilometers (90 miles) west of Kodiak Island. A surface litter 10 centimeters (4 inches) thick of partly decayed vegetation has accumulated on the volcanic ash. These upland soils are well-drained but are usually moist due to frequent rains (Alaska Aerospace Development Corporation 1995). Erosion of the upland soils located on slopes of less than 7 percent is not considered to be a problem. As the slopes of upland areas increase toward the adjacent valleys (i.e., greater than 7 percent), the erosion hazard may become serious (U.S. Department of Agriculture, 1960).

The soils in the valleys near KLC are a combination of Saltery peat and Ugak silt loam soils (Alaska Aerospace Development Corporation, 1995b). The Saltery soils have developed where the water table is always at or near the surface and consist of a deep layer of peat 76 centimeters (30 inches) or more in depth overlain by about a 30-centimeter (12-inch) layer of ash and a new 8- to 10-centimeter (3- to 4-inch) layer of peat at the surface. The Ugak soils associated with these valley soils have only a 2.5-centimeter (1-inch) layer of peaty material beneath the layer of volcanic ash. These soils occur in poorly drained areas and are very strongly acidic to strongly acidic (U.S. Department of Agriculture, 1960).

Geologic Hazards

Kodiak Island is located on the upper plate of the Aleutian subduction zone, the convergent boundary between the Pacific and North American plates. The Aleutian megathrust (the fault between the two plates) is one of the earth's largest active faults and has produced three of the world's six largest magnitude earthquakes of the last 100 years, including the great (moment magnitude [Mw] 9.2) 1964 "Good Friday" or Great Alaska earthquake. (U.S. Coast Guard Civil Engineering Unit, 2001) In addition to the megathrust, the subduction zone also includes several other active fault systems. Numerous faults with high levels of historical activity are contained at depth and within the subducting Pacific plate. In the Kodiak Island region since 1999 these "slab" earthquakes include several in the magnitude range of 6.5 to 7+. A second system of active faults is present in the upper plate (North American plate) of the subduction zone. These faults comprise a wide fold and thrust belt that extends along the eastern side of Kodiak Island and continues to the northeast into the Prince William Sound region. These faults also produce frequent earthquakes. During the 1964 "Good Friday" earthquake, two of the fold and thrust belt faults produced large surface displacements on Montague Island in Prince

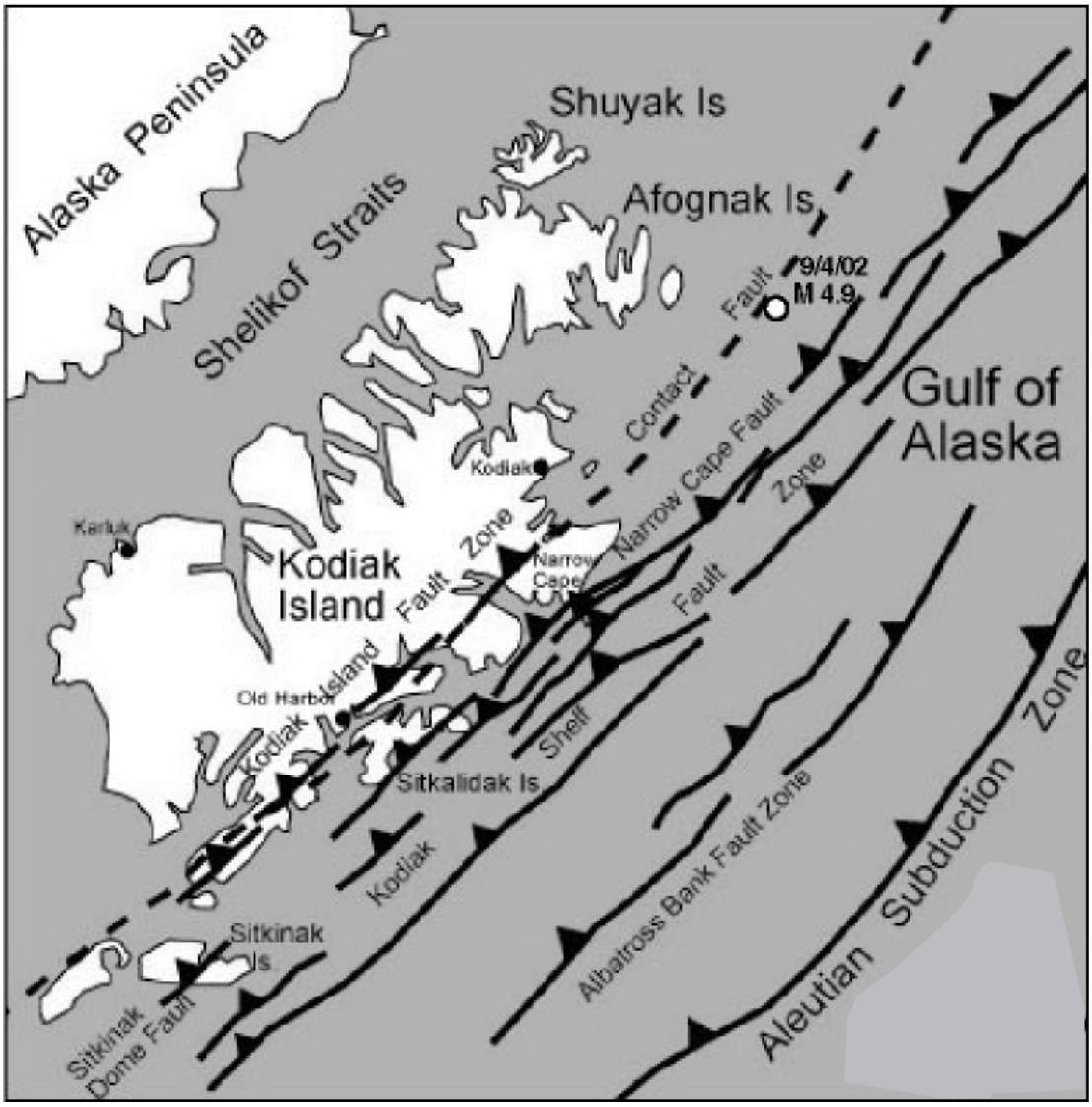
William Sound and others probably also ruptured the sea floor offshore of Kodiak, contributing to the generation of the destructive tsunami. (U.S. Coast Guard Civil Engineering Unit, 2001)

In addition to the Aleutian megathrust (and the subducting Pacific plate), there are several significant fault sources in the Kodiak region that could generate large earthquakes. The U.S. Coast Guard Civil Engineering Unit (2002) identified four active faults or zones of faults capable of generating large magnitude earthquakes at Narrow Cape. These include the Albatross Bank fault zone, the Kodiak Shelf fault zone, the Narrow Cape fault and the Kodiak Island fault (figure 3.1.5-1). Each of these faults includes several individual faults or fault segments that are seismogenic; however, the characteristics of the earthquake sources are poorly known (U.S. Coast Guard Civil Engineering Unit, 2001). In support of probabilistic and deterministic seismic hazard evaluations for the U.S. Coast Guard Loran Station (U.S. Coast Guard Civil Engineering Unit, 2002), a table characterizing the seismic sources for Narrow Cape was prepared, including maximum earthquake magnitude and recurrence interval estimates (table 3.1.5-1). Based on the source models selected for the probabilistic seismic hazard analysis, the potential maximum magnitude (M_{max}) events (judged to generate the largest ground motions at the site) were a M7.5-8.0 on the Narrow Cape fault zone and M8.5 on the Kodiak Interplate Subduction Segment. (U.S. Coast Guard Civil Engineering Unit, 2003)

The Narrow Cape fault also poses a surface rupture potential at KLC. The U.S. Geological Survey mapped the Narrow Cape fault off-shore for a proposed off-shore oil lease. The U.S. Geological Survey concluded that the fault was active and provisional maps projected the main trace and several subsidiary branches on-shore at Narrow Cape within a 6-kilometer (3.7-mile) zone. The main trace is about 2 kilometers (1.2 miles) west of the Loran site and one of the subsidiary branches was demonstrated to traverse the Loran site. Paleoseismic investigations concluded that the scarps were tectonic in origin and that there may have been three to four episodes of Holocene displacement on each of three trenched branch faults of the Narrow Cape fault. Topographic scarps, offset drainages, and other geomorphic evidence of youthful deformation to the marine terrace were also mapped at Narrow Cape (U.S. Coast Guard Civil Engineering Unit, 2002). Detailed fault studies have not been performed for the entire KLC site.

Great earthquakes generated in the Gulf of Alaska often generate tsunamis (seismic sea waves). In southern Alaska, 37 significant historical earthquakes of M7.0 or greater have generated evidence of 14 tsunamis (U.S. Coast Guard Civil Engineering Unit, 2002) The tsunami resulting from the 1964 earthquake was reported by a Narrow Cape rancher to have inundated low-lying areas along the eastern shore (Alaska Aerospace Development Corporation, 1995b). KLC facilities are located above the 30-meter (100-foot) elevation above sea level recommended by the City of Kodiak for safe refuge from flooding due to tsunamis (Alaska Aerospace Development Corporation, 1995b).

There are no active volcanoes on Kodiak Island. As discussed in the soils section, KLC can be subject to ash falls from active volcanoes in the Aleutian chain. Over 40 volcanoes are active in the Aleutian arc, generating 256 eruptions over recorded history (Ballistic Missile Defense Organization, 2000). Such eruptions could cause nuisance ash falls at the site, create a significant hazard to various types of equipment and electronics, or possibly create atmospheric conditions that would temporarily delay air transport or flight tests.



Source: U.S. Coast Guard Civil Engineering Unit, 2001.

EXPLANATION

Fault

Principal Faults in the Upper Plate of the Aleutian Subduction Zone Near Kodiak Island

Kodiak Island, Alaska

Figure 3.1.5-1

NORTH

Scale

0 23.25 46.5 kilometers

0 14.5 29 miles

06-09-03 KLC Faults

Table 3.1.5-1: Seismic Source Model, Kodiak Loran Station, Kodiak Island, Alaska

Fault Source Segmentation	Length (kilometers)	Style	Slip Rate (mm/year)	Recurrence (years)	Probability in 50 Years	Max. Magnitude (M_w)	Distance (kilometers)	Comments
Aleutian Subduction Zone	3,000	Megathrust						
1964 Segment	850	Megathrust	58	400 to 1,300	3.8-11.8%	9.2±1/4	22±3	Last rupture 1964
Kodiak Segment	400	Megathrust	58	>1,000	4.9%	8.6±1/4	22±3	Last rupture 1964
Alaska Peninsula Segment	300	Megathrust	56	60 to 150	28.3-56.5%	8.3±1/4	200±50	Last rupture 1938
Kodiak "Patch"(a)	100±25	Megathrust	58	60	56.5%	7.75±1/4	22±3	Slip "gap" 1964
Albatross Banks Zone	250	Thrust	–	250	18.1%	7.0/1/4	40±10	Mapping indicates multiple imbricate faults
Typical Segment	40±5	Thrust	–	2,500	2.0%	7.0±1/4	40±10	
Kodiak Shelf Zone	>800	Thrust	6±2					Mapping indicates multiple imbricate faults
Typical Segment	75±25	Thrust	2±1	330 to 500	9.5-14.1%	7.25±1/4	21±9	
Narrow Cape Zone	>800	LL Strike Slip		1,000 to 1,500	3.3-4.9%	7.25±1/4	21±9	
Narrow Cape Segment	100±25	LL Strike Slip	4.3±0.3	1,100 to 2,100	2.4-4.4%	7.5±1/4	2	
Kodiak Island Fault	>150	LL Strike Slip	2±1	1,500 to 3,500	1.4-3.3%	7.5±1/4	12±3	
Crustal Source	NA	Reverse or strike slip	NA					Area source
150-kilometer radius	NA			36 to 118	34.5-75.1%	7.0±1/4	<150	
Slab Source	NA	Normal or strike slip	NA					Area source
150-kilometer radius	NA			42 to 122	33.6-69.6%	7.25±1/4	<150	

Source: U.S. Coast Guard Civil Engineering Unit, 2002

Mw = Moment magnitude
NA = Not Available

A landslide approximately 430 meters (1,400 feet) long is located on slopes of 15 to 35 percent along a valley just north of Ranch Road, where it intersects Pasagshak Point Road just north of KLC. The landslide feature itself may actually extend to within the project site boundaries and was apparently caused by rotational slumping of the poorly indurated sandstone (Alaska Aerospace Development Corporation, 1995b).

3.1.6 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—KODIAK LAUNCH COMPLEX

Appendix B includes a discussion of hazardous materials and hazardous waste resource regulations.

3.1.6.1 Region of Influence

The ROI for potential impacts related to hazardous materials/wastes includes areas of KLC to be used for new construction, pre-launch site preparation, launch, and post-launch activities, and in areas where hazardous materials are stored and handled.

3.1.6.2 Affected Environment

Hazardous Materials Management

Hazardous material use, storage, and disposal are managed in adherence with the KLC Safety Policy, the KLC Emergency Response Plan, KLC Contamination Control Procedures, AADC's HazCom Program, the Kodiak Area Emergency Operation Plan, and applicable state and federal environmental laws, in such a way as to minimize impacts to the environment.

An AADC point of contact is notified before the arrival of any hazardous materials at KLC and outlines the guidelines for proper handling, storage and disposal. All contractors must provide hazardous materials information (Material Safety Data Sheet [MSDS]), label and warning signs, and a plan indicating material handling/storage procedures, spill/release prevention measures, and emergency response protocol, including cleanup and disposal procedures and first aid/medical treatment procedures. (Alaska Aerospace Development Corporation, 2001)

Table 3.1.6-1 lists hazardous materials that may be used at KLC.

Hazardous Waste Management

AADC is authorized to operate KLC as a Small Quantity Generator according to the Alaska Hazardous Waste Management Regulations (18 Alaska Administrative Code [AAC] 62). With this designation, KLC can produce no more than 998 kilograms (2,220 pounds) of hazardous waste per month, which normally amounts to just under five drums of liquid hazardous waste. The types of hazardous and nonhazardous wastes generated during routine operations at KLC are indicated in table 3.1.6-2.

Table 3.1.6-1: Potentially Hazardous Materials Used at KLC[1]

Material	Use	Location			Management
		LCC[2]	PPF[3]	LA[4]	
Construction Activities					
Anti-freeze	Construction equipment	X	X	X	Stored on impervious surface with spill materials available and is removed when construction is completed
Hydraulic fluid and lubrication oils	Construction equipment	X	X	X	Stored on impervious surface with spill materials available and is removed when construction is completed
Welding gases	Welding building structures	X	X	X	Welding of structures is minimal due to pre-fabrication/bolting
Launch Activities					
Number 2 diesel fuel[5]	Fuel for construction vehicles and emergency diesel generator	X	X	X	Stored in ASTs with secondary containment and inspected daily
Paints, thinners, solvents, cleaning fluids, adhesives, lubricants, batteries, etc.[5]	Groundskeeping and maintenance activities on backup generators, heating and cooling system, communication system, etc.	X	X	X	Only small quantities less than 4 liters (less than 1 gallon) of each substance are stored on-site at any one time; materials used for launch purposes are removed under KLC review, oversight and approval
HCFCs[6]	Cooling and fire suppression	X	X	X	No venting of systems is planned
Solid rocket fuel	Fuel for launch vehicles			X	Fuel is brought to the site sealed within rocket motor
Compressed gaseous helium and nitrogen	Evacuate atmospheric oxygen during transfer of propellants into payloads		X		Pressurized gas cylinders are removed from the site under KLC review, oversight, and approval
Isopropyl alcohol	Wipe clean dust-sensitive payloads and for flushing liquid propellant from transfer carts		X		Is removed from the site under KLC review, oversight, and approval
Hydrazine propellants	Payload propellant for post-launch steering		X		Are brought and removed under KLC review, oversight, and approval; less than approximately 380 liters (100 gallons) would be temporarily stored or transferred from specialized shipping containers by trained personnel
H_2O_2 and $Ca(OCl)_2$[7]	Neutralizing water mixed with aspirated propellant during payload fueling		X		Refer to above

[1] Adapted from U.S. Air Force, 1991, 1994; and Halliburton NUS Environmental Corporation, 1993
[2] Launch Control Center
[3] Payload Processing Facility
[4] Launch Area
[5] Also present/used during construction phase
[6] Hydrochlorofluorocarbons
[7] Hydrogen peroxide and calcium hypochlorite

Table 3.1.6-2: Potentially Hazardous Waste Generated at KLC[1]

Material	Use	Location			Management
		LCC[2]	PPF[3]	LA[4]	
Spent solvents, paper, waste oil, batteries, spill cleanup materials, anti-freeze, and empty containers	From construction, groundskeeping, housekeeping, maintenance, and spill response (if necessary) activities	X	X	X	Removed for appropriate off-site recycling or disposal during construction and after each launch (expected rates of hazardous waste generation range from 91 to 770 kilograms [200 to 1,700] pounds per year).
Diluted washdown water and isopropanol	Wash down from the transfer of liquid propellants into payloads		X		Removed for appropriate off-site disposal after each launch (expected rates of hazardous waste generation range from 91 to 1,020 kilograms [200 to 2,250 pounds] per year during operations).

[1] Adapted from U.S. Air Force 1991, 1994; and Halliburton NUS Environmental Corporation, 1993
[2] Launch Control Center
[3] Payload Processing Facility
[4] Launch Area

These wastes are handled, transported, and disposed of in accordance with AADC's HazCom Program, KLC Safety Policy, KLC Contamination Control Procedures, and applicable state and federal environmental laws. Pollution prevention, waste minimization and recycling procedures are indicated in the KLC Spill Prevention Control and Countermeasures (SPCC), Emergency Response Plan and Contamination Control Procedures.

There are no Installation Restoration Program (IRP) issues associated with KLC, since it is not a DoD installation. No NPL site is listed for Kodiak Island in the EPA's Comprehensive Environmental Response, Compensation, and Liability Information System database.

KLC has aboveground storage tanks (ASTs) for diesel fuel storage. Diesel is used to fuel generators for backup electrical power with electrical power being used for heating, ventilation, and air conditioning. KLC primary power is from Kodiak Electric Association. Petroleum, oil and lubricant (POL) storage is in accordance with federal (EPA) requirements at 40 CFR 112, and State of Alaska requirements at 18 AAC 75. KLC does not utilize underground storage tanks (USTs).

Because KLC was recently constructed, asbestos or lead-based paint is not present. Likewise, polychlorinated biphenyls (PCBs) should not be present in equipment or machinery.

Fuels are handled and stored in adherence to KLC Safety Policy, KLC Emergency Response Plan, and KLC Contamination Control Procedures. A description of the GBI solid rocket fuel and the EKV propellant system is in section 2.1.1. The propellant consists of a hypergolic fuel (monomethyl hydrazine) and oxidizer (mixed oxides of nitrogen). Monomethyl hydrazine is toxic and extremely reactive. Descriptions of candidate target missiles are in section 2.1.2. These missiles are representative of existing missile types launched from KLC.

3.1.7 HEALTH AND SAFETY—KODIAK LAUNCH COMPLEX

Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect the well-being, safety, or health of workers or members of the general public. Appendix B includes a discussion of health and safety resource regulations. Appendix C includes a detailed discussion of flight test safety.

3.1.7.1 Region of Influence

The ROI for potential impacts to the health and safety of workers includes the immediate work areas of KLC, including new construction areas; those areas associated with missile storage, assembly, and transfer; and the launch sites and areas associated with post-launch activities. If required, debris recovery and emergency operations could also potentially impact worker health and safety.

The ROI for potential impacts to public health and safety includes KLC, as well as off-range areas that may be affected by GMD ETR Program activities involving preflight transport of missile components, missile launch, and missile flight. A launch failure could potentially involve an explosion, missile debris, release of toxic materials into the air or water, high noise levels, and/or fire.

The public population of concern for the Proposed Action consists of people living in the vicinity of KLC, including occupants of Bear Paw Ranch and Burton (Kodiak) Ranch, U.S. Coast Guard personnel who periodically work at the Loran-C Coast Guard Station at Narrow Cape, members of the public who utilize the KLC area for recreation, and residents of eastern Kodiak Island, including the City of Kodiak and the U.S. Coast Guard Station (U.S. Department of the Air Force, 1997a). In general the area surrounding KLC is sparsely populated. The City of Kodiak (approximately 6,334 people according to the 2000 Census) and the U.S. Coast Guard Station, located approximately 48 to 64 kilometers (30 to 40 miles) from KLC, are the only sizable population centers on the island. Additional smaller population centers are located southwest of KLC and include Old Harbor (237) and Akhiok (80). There are also several dozen cabins located along the southeast coast of Kodiak Island that are occupied on a seasonal basis. The Range Safety program will assure that potential impacts will be well within the debris limit corridor and away from these populated areas.

3.1.7.2 Affected Environment

Range Safety

The KLC Safety Policy mandates the establishment of launch safety levels that meet or exceed those of the Range Commanders Council (RCC) *Common Risk Criteria for National Test Range*s and Standard 321-02, AFR 127-1, FAA Notice of Proposed Rulemaking (NPRM). In accordance with the KLC Safety Policy, the criteria per year of Range operations for public casualty is limited to 1 in 1 million, and the casualty criteria for personnel involved in the launch is limited to 1 in 300,000.

Standard range safety procedures at KLC are conducted in accordance with RCC 321-02, AFR 127-1, FAA NPRM, etc. These procedures provide for ground safety, flight safety, range clearance and surveillance, sea-surface area clearance and surveillance, and commercial air

traffic control. They include published NOTMARs and NOTAMs, as well as coordination with the U.S. Coast Guard and FAA.

The AADC range organization assures that all aspects of safety are covered, including transport of missile components (i.e., solid propellant boosters), and handling of the booster and EKV (pre-loaded fuel and oxidizer tanks) once they arrive at KLC, operations at the launch site, flight safety, and RF interference. The KLC range organization is responsible for assuring that the test missiles, under any flight condition, will not endanger any life or property. The launch vehicle operator and/or payload operator submits a Ground Safety Plan to AADC for review and approval before launch operations.

During launch preparation, ground safety at KLC is the responsibility of AADC. Hazardous operations will be performed in compliance with mission-specific operating procedures that will provide the requirements and direction for the activities at KLC, including explosives handling safety, hazardous operations control, explosives storage, launch pad operations and launch. Safe operating procedures are followed in accordance with DoD Standard 6055.9.

A hazard potential is present during pre-launch transport, pre-launch processing, and launch of missiles due to the significant amounts of propellant contained in the boosters. The exposure to launch mishaps is greatest within the early portions of the flight after launch. Measures are currently in place to limit the number of personnel involved in the launch operations and to ensure that hazardous operations are performed by highly skilled personnel. Regulations and practices that have been established to minimize or eliminate potential health and safety risks to the general public include, but are not limited to, OSHA and DOT regulations and U.S. Air Force procedures for transporting hazardous materials, DoD procedures for handling explosives, and the DoD Range Safety program for the processing and launch of missiles (U.S. Department of the Air Force, 1997a).

Using standard explosive safety rules, AADC will determine areas that will be evacuated for each launch to assure that the public is not exposed to unacceptable levels of risk, that physical security and safety measures can be enforced, and that adverse environmental effects are minimized. The size of the evacuation area is based upon the potential for variability of the impact due to influences of local weather conditions, and small variances in the missile guidance and engineering systems.

To ensure public safety during launch days, KLC security personnel would close Pasagshak Point Road at the site boundary and ensure that no unauthorized personnel enter the Ground Hazard Area. The safety zone is under constant surveillance during the day of launch and during any hazardous operations. If the safety zone is compromised, the launch is delayed until the area is confirmed clear. Pre-launch notifications to aviators and mariners are issued 24 hours before launches.

Each launch at KLC has an established flight termination line. These lines are established to minimize potential adverse impacts on populated areas. In addition, procedures call for various contingency plans to be in effect. These include, but are not limited to the following:

- Mishap: An Explosive Ordnance Disposal Plan will be in place, along with appropriate personnel and equipment.

- Fire: There will be a firefighting crew in place during launch countdown.
- Injury: An evacuation plan will be in place to transport injured persons to medical facilities.

Previous launches have had no effect related to either public health and safety or range safety issues.

Regional Safety

In compliance with Superfund Amendments and Reauthorization Act Title III, AADC/KLC has filed Tier II Community Right-to-Know reports with the State Emergency Response Commission, the Local (Kodiak–Kodiak Island Borough) Emergency Planning Committee, and the City of Kodiak Fire Department. (Nault, 2002) The Local Emergency Planning Committee is a committee appointed by the Alaska State Emergency Response Commission to perform local emergency planning and community right-to-know activities. The *Kodiak Area Emergency Operation Plan* (Kodiak Emergency Services Organization, 2000) is a four-volume plan, assembled in part by the Division of Emergency Services, Alaska Department of Military and Veterans Affairs, to direct preparation for, response to, mitigation of, and recovery from natural and man-caused disaster emergencies within the Kodiak Island Borough, including KLC. The Plan is activated when a disaster emergency significantly threatens human health, property, or the environment. The Chief of the Kodiak Area Fire and Rescue Department is the Kodiak Emergency Services Coordinator.

The City of Kodiak Fire and Rescue Department has three firefighters/emergency medical technicians under the supervision of a lieutenant and two chiefs on duty at all times. During emergencies, on-line firefighters are supported by 15 to 20 volunteer firefighters with various levels of emergency medical technician training. The Kodiak Fire Department does not provide general/routine firefighting service for AADC/KLC, but would respond to wildland fires at AADC/KLC by agreement with the Alaska Department of Natural Resources, Division of Forestry. The Kodiak Fire Department has three ambulances and provides ambulance service and emergency medical response at the advanced and basic life support levels for AADC/KLC. The Kodiak Fire Marshal provides fire code enforcement, fire cause investigation, and other fire prevention services for AADC/KLC and also works with the U.S. Coast Guard Marine Safety Detachment in the planning and oversight for missile component off loading. (Nault, 2002)

The City of Kodiak Fire and Police Departments provide as-needed support for closure and security of the KLC and Kodiak Island road system during missile transport and launch. Support for transportation of missile components, including closure and security of KLC and the Kodiak Island road system, is mostly provided by the U.S. Coast Guard and Alaska State Troopers.

The KLC has a fire truck and a 946-liter (250-gallon) pumper mounted on a 0.9-metric-ton (1-ton) truck to fight any brush fires that may occur during a launch. The KLC also has an ambulance to transport any injured patients. During missions, Emergency Medical Technicians are present at the KLC with the oversight of Northwest Medical. During launch day operations a doctor is in attendance at the KLC.

The closest hospital to the KLC is Providence Kodiak Island Medical Center. The Medical Center is an approximate 25-bed hospital providing emergency, surgical, maternity, general medicine, physical therapy, and diagnostic services for the Kodiak Island Borough, including KLC.

3.1.8 LAND USE—KODIAK LAUNCH COMPLEX

Appendix B includes a definition of land use and the main federal land management responsibilities that apply.

3.1.8.1 Region of Influence

The ROI for land use includes the Narrow Cape region of Kodiak Island within and adjacent to the boundaries of KLC that are potentially affected by the launch of target and GBI missiles and the construction, modification, and operation of support facilities associated with the Proposed Action.

3.1.8.2 Affected Environment

Land Use

Kodiak Island is situated in the northern Gulf of Alaska, just east of the Alaska Peninsula. It has an area of about 890,000 hectares (2.2 million acres), making it the second-largest island in the United States after the island of Hawaii. Its land use generally consists of KLC, Kodiak Harbor and airport, the City of Kodiak and neighboring U.S. Coast Guard Station, and the Kodiak National Wildlife Refuge. The remainder of the island is primarily undeveloped and utilized for an extensive number of recreational activities with small locales of residential and business uses. (U.S. Air Force, 2001)

Approximately 40 kilometers (25 miles) southwest of the City of Kodiak lies Narrow Cape, home to KLC. KLC is located within the Kodiak Island Borough on a 1,504 hectare (3,717 acre) coastal plateau leased and managed by the AADC from the Alaska Department of Natural Resources, Division of Land through an Interagency Land Management Agreement. Land management plans, expressed by the KLC Master Plan, are intended to improve the efficiency of land use by minimizing conflicts and protecting the human and natural environments (BRHP Architects Engineers, Inc., 2002). KLC consists of primary facilities and a number of support facilities which cover approximately 17 hectares (43 acres). Approximately 1 percent of KLC is considered disturbed, leaving the remainder in its natural state. In accordance with the Interagency Land Management Agreement, most undeveloped areas of KLC are made available for ranch animal and wildlife grazing. (Alaska Aerospace Development Corporation, 1995b)

Traditionally used for ranching and recreation, the Narrow Cape area is primarily underdeveloped and very sparsely populated (Kodiak Launch Complex, 1998). KLC is primarily surrounded by state-owned land, which serves as a buffer between the small amounts of privately-owned property. Only a small number of man-made structures exist within the vicinity of KLC that are not directly affiliated with KLC operations. A summer camp to the west of KLC consists of approximately 2.02 hectares (5 acres), and a ranch northeast of KLC consists of approximately 65 hectares (160 acres) adjacent to KLC's boundary. Approximately 16 hectares (40 acres) of land within the boundaries of KLC are utilized by the U.S. Coast Guard's 190-meter (625-foot) tall Loran-C navigation transmitter facilities (U.S. Air Force, 2001).

Recreation

Recreational opportunities in the Narrow Cape area are abundant and available year round. Activities include fishing, hunting, hiking, camping, boating, beachcombing, and wildlife and scenic viewing. Recreation activity peaks during the summer months. (Alaska Aerospace Development Corporation, 1995b) The Pasagshak State Recreation Area, located approximately 10 kilometers (6 miles) northwest of KLC, offers campsites, picnic areas, potable water, and latrines accessible for public use. Historic World War II jeep trails, the Narrow Cape Hiking Trail, and Burton Ranch Hiking Trail are in the vicinity of KLC, and are acknowledged by the Alaska Natural History Association. However, the trails are not regularly maintained (Kodiak Launch Complex, 1998). Other activities such as hunting bison and Sitka black-tailed deer and horseback riding are available at a nearby ranch for a fee (Alaska Aerospace Development Corporation, 1995b).

Fossil Beach and East Twin Lake are located on KLC and offer limited access for general beach activities. Beach combing, fossil hunting, and whale watching are the most significant activities available. Limited beach access and evacuations usually occur for a matter of hours. Unstable weather conditions, or any mechanical problems resulting in an abort launch or launch rescheduling, may prolong an evacuation or closure.

According to the 1999 Pasagshak/Narrow Cape Area plan, Fossil Beach/Narrow Cape and Pasagshak Point were the recreational areas most commonly identified for future State Park expansion. Although at this time no park expansion has been proposed, its existing recreational value is acknowledged. (Kodiak Island Borough Community Development Department, 1999)

Coastal Zone Management

The KLC is located in the “zone of direct influence” of the coastal environment (State of Alaska, Office of the Governor, 2001). All federal development projects in a coastal zone and all federal activities which could directly affect a coastal zone must be reviewed to determine their consistency with the local Coastal Zone Management Plan. The initial development of KLC, as examined in the Environmental Assessment of the Kodiak Launch Complex, was reviewed and received a positive determination on 18 January 1996 that the activities were consistent with the state and local standards and policies. Additional actions involving the development of KLC and the launch of missiles in support of the North Pacific Targets Program have also undergone Coastal Consistency Determinations, resulting in positive determinations on 25 September 2001 that the activities are consistent with the state and local standards and policies.

3.1.9 NOISE—KODIAK LAUNCH COMPLEX

Appendix B includes a definition of noise and the main regulations and laws that govern it.

3.1.9.1 Region of Influence

The ROI for noise analysis is the area surrounding KLC within which humans and/or wildlife may suffer annoyance or disturbance from launches and other noise sources at KLC.

3.1.9.2 Affected Environment

Based on the land use of the Narrow Cape area, the most common man-made noise is from occasional traffic on the road from the City of Kodiak to Narrow Cape, from nearby off-road recreational vehicles, intermittently, from standby generators at the nearby U.S. Coast Guard Loran Station, and occasional rocket launches.

Table 3.1.9-1 lists noise levels recorded at Ugak Island, which is a Steller sea lion haulout site and is located approximately 5.6 kilometers (3.5 miles) from the launch site, during four of the five previous rocket launches at KLC. The ait-1 took place November 1998, the ait-2 September 1999, the QRLV March 2001, the Athena-2 September 2001. The Strategic Target System vehicle launch took place in November 2001; however, noise levels could not be recorded due to adverse weather conditions. (Alaska Aerospace Development Corporation, 2002b)

Table 3.1.9-1: Recorded Noise Levels at Ugak Island During Previous Rocket Launches

	Rockets Launched			
Noise Metric (dBA)	ait-1	ait-2	QRLV	Athena-2
L_{max} (1)	78.2	81.5	73.3	90.8

Source: Alaska Aerospace Development Corporation, 2002b.

[1] Recorded at Ugak Island (5.6 kilometers [3.5 miles])

dBA = A-weighted decibels

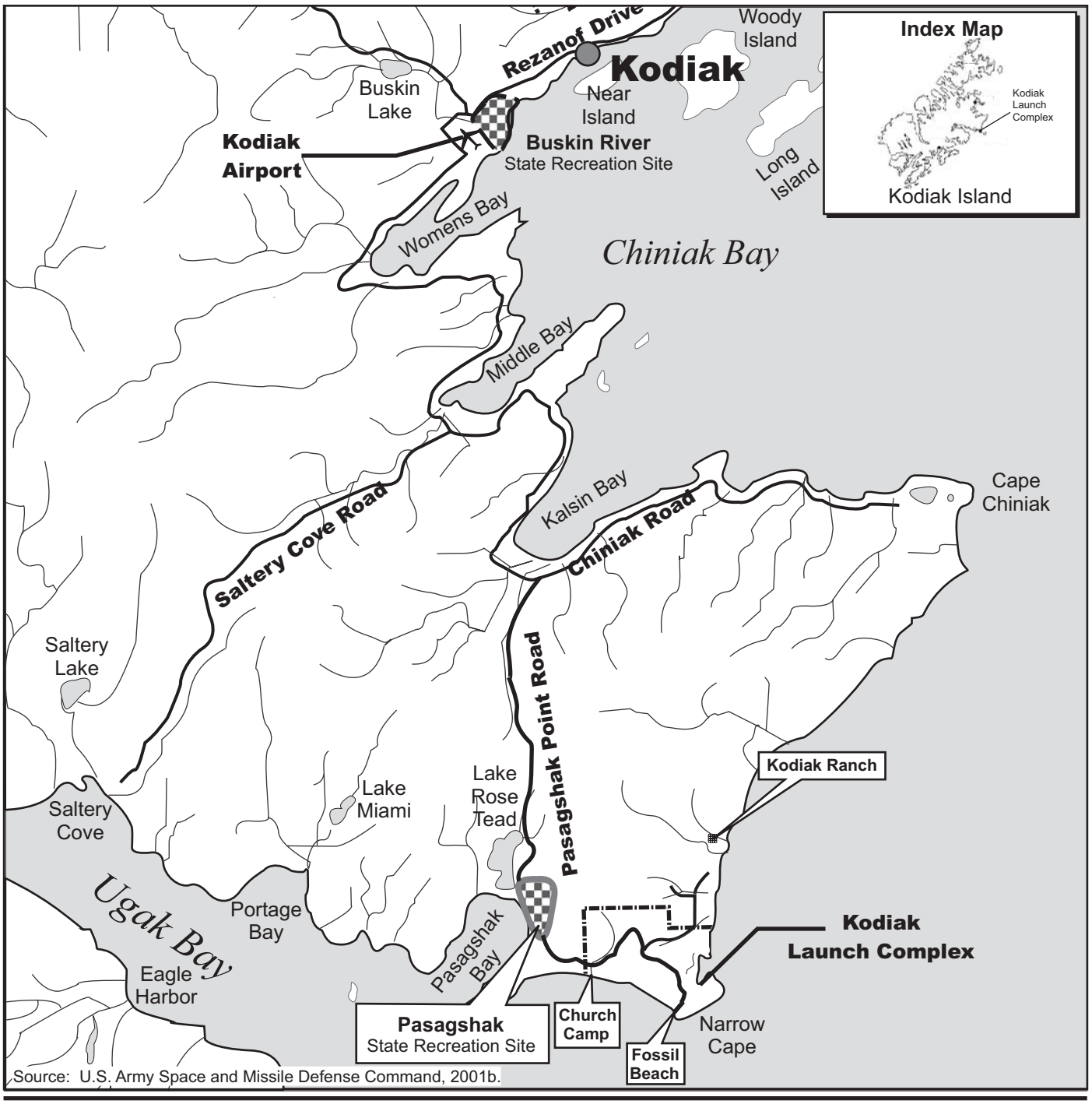
L_{max} = Maximum Sound Level

Due to the short duration of launches, an A-weighted scale is used and dBA (A-weighted decibel [dB]) measurements are employed to adequately characterize the operational noise.

Maximum Sound Level (L_{max}) is applied to compare noise levels because of its ability to cover the entire sound spectrum, especially sounds audible to humans.

Sensitive human receptors from activities at KLC are located at Kodiak Ranch (the nearest residence), a distance of 3 kilometers (2 miles); Church Camp (the nearest business), a distance of 5 kilometers (3 miles); and Pasagshak State Recreation Area (the nearest public facility), a distance of 10 kilometers (6 miles) (Federal Aviation Administration, 1996). Figure 3.1.9-1 shows a map of the nearest sensitive human receptors.

Wildlife receptors are located at the shoreline around Narrow Cape and Ugak Island at or near the water surface. Section 3.1.3, Biological Resources, describes wildlife found at KLC.



EXPLANATION

- Land
- Water
- Recreation Site
- Kodiak Airport
- River or Creek
- Road
- KLC Boundary
- Kodiak

Scale

0 2.8 5.6 kilometers

0 1.75 3.5 miles

NORTH

06-09-03 State Parks_A

Nearest Sensitive Human Receptors

Kodiak Island, Alaska

Figure 3.1.9-1

3.1.10 SOCIOECONOMICS—KODIAK LAUNCH COMPLEX

Appendix B includes a general definition of socioeconomics.

3.1.10.1 Region of Influence

The ROI for socioeconomics is defined as Kodiak Island Borough. The Proposed Action site is situated on Narrow Cape, a relatively remote area of Kodiak Island. The primary areas of analysis will concern both the communities situated adjacent to KLC and key population centers, specifically the City of Kodiak.

3.1.10.2 Affected Environment

The main population center is the City of Kodiak, at the northeastern tip of the island, about 402 kilometers (250 miles) south of Anchorage. Kodiak is a transportation hub for southwest Alaska, and home of the largest U.S. Coast Guard base in the country (Kodiak Chamber of Commerce, 2001). Other, smaller, population centers are situated along the roadway within the northeastern portion of the island. Aside from KLC, the remainder of the island is mostly uninhabited, with roughly two thirds of the western side of the island made up of the Kodiak National Wildlife Reserve (Alaska Aerospace Development Corporation, 1995a).

Population and Housing

In comparison to other Alaskan boroughs and unified municipalities, the Kodiak Island Borough ranks eighth in population. As of 2000, the population of the Kodiak Island Borough was 13,913 people (U.S. Census Bureau, 2001). The Borough has experienced an average annual growth in population of approximately 4 percent from 1980, when the population was 9,939 people. The rate of growth within the borough from 1990-2000 was 4.5 percent annually, much lower than that of the state, at 14.0 percent (U.S. Census Bureau, 2001).

The population of the island is concentrated in the City of Kodiak, where about half of the population resides, and in the smaller population centers of Port Lions, Ouzinkie, Old Harbor, Akhiok, Karluk, and Larsen Bay. As of 2000, the City of Kodiak, at 6,334 people (City of Kodiak and Kodiak Island Borough, 2001), was the seventh largest city in Alaska, in terms of population. The U.S. Coast Guard base also represents a significant proportion of the island's population, with 1,840 people as of 2000. The closest population center to KLC is Cape Chiniak with a population of 50 people. The population of the borough has shown a high degree of transience given the seasonal nature of the fishing industry, changes in personnel at the U.S. Coast Guard station, and cyclical nature of construction projects (Alaska Aerospace Development Corporation, 1995a).

As of 2000, there were an estimated 5,159 housing units within Kodiak Island Borough (U.S. Census Bureau, 2001), including mobile homes and the U.S. Coast Guard Station housing. During this time, there were 2,255 housing units in the City of Kodiak. Another estimated 670 residential units are found in more remote settings of Kodiak Island (Kodiak Chamber of Commerce, 2003). As of 2002, it was reported that within the City of Kodiak there were five hotels and motels containing a total of approximately 200 rooms, and 30 bed-and-breakfast establishments typically with one or two rooms each. Narrow Cape Lodge, a temporary lodging facility located approximately 4.8 kilometers (3 miles) from KLC, had 56 rooms, and the Coast

Guard maintains a 46-room guest house primarily to support temporary housing needs of personnel moving to or from Kodiak (Ellis, 2002).

While data is not collected on monthly vacancy rates, the Kodiak Convention and Visitors Bureau estimated an annual average vacancy rate of 45 to 50 percent (Federal Aviation Administration, 1996) but given the nature of tourism on the island, much seasonal variance is to be expected. In addition the Bureau of the Census reported vacancy rates of rental housing of 7.7 percent and 8.9 percent for Kodiak Island Borough and City of Kodiak respectively.

Income and Employment

The U.S. Bureau of the Census reported in 2000 that Kodiak Island Borough showed a per capita income of $22,195 (U.S. Census Bureau, 2001), a figure only marginally lower than the statewide average of $22,660. Showing a similar distinction, the City of Kodiak showed a per capita income of $21,552, marginally lower than both the borough and statewide averages. Conversely, Kodiak Island Borough showed a median household income of $54,636 (U.S. Census Bureau, 2001), slightly higher than the statewide average of $51,571. Further, the City of Kodiak showed a median household income of $55,142, higher than both the borough and statewide averages. In 2000, the Alaska Department of Labor reported the annual average monthly wage for workers in the Kodiak Island Borough was $2,469, having marginally increased from $2,364 in 1999.

Employment levels on Kodiak fluctuate throughout the year predominantly due to the seasonal nature of the fishing industry (City of Kodiak and Kodiak Island Borough, 2001). Employment usually peaks during the months of July, August and September when fish harvesting is busiest, and declines in November and December as yearly fishing quotas are reached. Unlike fishing communities that have few fishing seasons and a transient cannery workforce, for the most part those employed in Kodiak's canneries live within the borough year round and are unemployed between seasons.

For this reason, Kodiak is characterized by large swings in its monthly unemployment rate throughout the year, from as low as 3.4 percent to as high as 16.5 percent. The average annual unemployment rate for the Kodiak Island Borough in 2000 was 8.8 percent (City of Kodiak and Kodiak Island Borough, 2001), significantly higher than the statewide average of 6.6 percent.

Kodiak is the center of fishing activities for the Gulf of Alaska. Its fishery is among the most diverse in the state. Kodiak is consistently one of the top fishing ports in the United States both in terms of quantity and value. In 1998, Kodiak was the nation’s third highest port in seafood volume and value, with 162 million kilograms (358 million pounds) of seafood landed, at a value of $79.7 million (Kodiak Chamber of Commerce, 2001). As such, the seafood industry (including fish harvesting and seafood processing) continues to be the dominant industry on the island, in terms of employment, with nearly one-third of the total employment (table 3.1.10-1). Seafood processors are some of the largest private employers on the island (table 3.1.10-2). In addition to the fish harvesting and processing sectors, there are also several government and educational institutions that operate fisheries-related research facilities in Kodiak. There is also a large recreational fishery in freshwater streams and lakes on Kodiak (Alaskan Command, 1996).

Table 3.1.10-1: Kodiak Island Borough Employment Sectors, 2000

Sector	Employment
Construction	138
Total Manufacturing	1,774
Seafood Processing	1,678
Other Manufacturing	96
Transportation, communications, and utility	266
Trade (wholesale and retail)	928
Finance, insurance, and real estate	179
Services	1,185
Agriculture, forestry, and fishing	86
Fish harvesting (estimate)	950
U.S. Coast Guard	1,380
Other Government (local, state, and federal)	1,145
Total	**8,031**

Source: City of Kodiak and Kodiak Island Borough, 2001

Table 3.1.10-2: Top Ten Kodiak Island Borough Employers, 2000

Rank	Employer	Avg. Monthly Employment
1	Kodiak Island Borough School District	425
2	Ocean Beauty Seafoods	342
3	Trident Seafood Group, Inc.	248
4	North Pacific Processors (APS)	222
5	Polar Equipment (Cook Inlet Process)	191
6	Providence Kodiak Island Medical Center	178
7	City of Kodiak	166
8	Wal-Mart Associates	146
9	International Seafoods	142
10	Safeway	133

Source: Kodiak Chamber of Commerce, 2002a.

The U.S. Coast Guard and other government entities are the next largest employment sector. Between the various Coast Guard operating and support commands, there are approximately 1,380 military and civilian personnel (government workers) (City of Kodiak and Kodiak Island Borough, 2001) and 1,600 military dependents. The Coast Guard contributes an estimated total annual payroll of $35 million. Retail and wholesale trade accounted for about 11.6 percent, and the service sector, 14.8 percent (table 3.1.10-1). The remaining 9 percent was made up of construction, transportation, communication, utilities, financial services, insurance, and real estate.

Tourism, like many other Kodiak industries, is based on Kodiak's natural resources. Visitor spending in fiscal year 2001 was estimated at $19.6 million. As is true elsewhere in Alaska, Kodiak's visitor industry is seasonal, with approximately 76 percent of all visitors arriving during the summer months.

The University of Alaska Anchorage conducted an evaluation of the economic impacts of the Air Force's November 1998 launch and September 2001 launch of an Athena 1 missile from KLC (Alaska Aerospace Development Corporation, 2002b). The summary of their findings provides information on the economic benefits from a missile launch as follows:

- Brought $4.4 (Athena 1) and $1.3 (Air Force) million dollars of new money into the Alaska economy
- Increased the Kodiak payroll by approximately $1.3 million (Athena 1) and $450,000 (Air Force)
- Generated jobs in a wide range of industries from food service and hotels to business and health services

3.1.11 TRANSPORTATION—KODIAK LAUNCH COMPLEX

Appendix B includes a definition and general discussion of transportation.

3.1.11.1 Region of Influence

The ROI for transportation resources addressed in this EIS includes the ground, ocean, and aviation transport systems within or immediately adjacent to KLC.

3.1.11.2 Affected Environment

Kodiak Island maintains a highly capable industrial and government logistics infrastructure. Kodiak Island is home to the largest U.S. Coast Guard station in the world which currently supports C-130 aircraft and H-60 helicopters as well as a number of fully equipped oceangoing patrol vessels. Personnel and most types of equipment can be transported to Kodiak Island on daily flights offered by Alaska Airlines and ERA Aviation. Rocket motors and other heavy equipment are transported by aircraft, barge, or container ship. (Alaska Aerospace Development Corporation, 2001)

Aviation Transportation

The airport at Kodiak is shared with the U.S. Coast Guard and is located approximately 6.4 kilometers (4 miles) southwest of downtown Kodiak. It is served by Alaska Airlines (flying 737 jets) and its affiliated airline, ERA Aviation (flying Convair 580 and Dash 8 propeller aircraft), as well as Peninsula Airways (Alaska Department of Transportation and Public Facilities, 1998). All three are regularly scheduled commercial airlines with published flight schedules. The Kodiak Airport is fully instrumented and operates three runways (2,286 meters [7,500 feet], 1,981.2 meters [6,500 feet], and 1,676.4 meters [5,500 feet]), which can support C-141 and C-5A military cargo aircraft. The airport is approximately 64.4 kilometers (40 miles) north of KLC (Alaska Aerospace Development Corporation, 2001) by road. Kodiak is one of the largest airports in the region, moving over 78,000 passengers in 1996 (Alaska Department of

Transportation and Public Facilities, 1998). As there is no airfield on KLC, boosters to date have predominately been flown into the Kodiak Airport, although in one case, arrival was by barge (Cuccarese and Kelly, 2002). The Municipal Airport, also located in Kodiak, has an 878.7-meter (2,883-foot) paved runway (Kodiak Chamber of Commerce, 2002b).

Ocean Traffic

Kodiak Island offers a full range of dockage and marine services for commercial fishing, cargo, passenger, and recreational vessels. Kodiak was identified as one of only two communities in Alaska that is a Commercial Service Facility (Alaska Department of Transportation and Public Facilities, 1998). The facilities are owned by the City of Kodiak and maintained and operated by the city's Harbor Department. Two harbors provide protected moorings for 650 vessels up to 45.7 meters (150 feet) in length. Large vessels, including the state ferry, cruise ships, and cargo vessels are moored at three deepwater piers. Pier I is a 62-meter (204-foot) general use and ferry facility. Pier II is a 282-meter (925-foot) City Dock used for container and commercial work. Pier III is a 268-meter (880-foot) cargo terminal. Twenty-seven-metric-ton (30-ton) Gantry cranes are available and a 27-metric-ton (30-ton) Paceco container lift is available at Pier III (City of Kodiak, 2002).

Sealift capability includes three facilities: CSX Lines Terminal (Pier III); Lash Marine Terminal, which is privately owned; and the City Dock (Pier II). CSX Lines Terminal provides container and contract stevedore service for general commercial cargo. Lash Marine Terminal provides services to several freight carriers, freight forwarders, and consolidators. Tug and barge service is available to Kodiak Island from Seattle and Anchorage. The Lash Terminal, located south of the U.S. Coast Guard Station on the main road to KLC, is a roll-on, roll-off operation with 136-metric-ton (150-ton) lift capability provided by a mobile crane. The Lash Terminal is licensed for explosive and hazardous materials handling. Seaport Terminal Services operates the terminal and provides all necessary support services. The terminal has 366.8 meters (1,200 feet) of dock space as well as a warehouse. The City Dock is serviced by both containerized ocean shippers and barge carriers (Alaska Aerospace Development Corporation, 2001). Kodiak is one of the leading freight shippers in southwest Alaska with 696 commodity shipments in 1995 (Alaska Department of Transportation and Public Facilities, 1998).

Ferry service is provided to Kodiak Terminal as part of the Alaska Marine Highway System (AMHS) southwest and south central routes. Since 1988, Kodiak has been one of the top two ports-of-call in southwest Alaska in terms of ridership (5,541 boarding in 1996) (Alaska Department of Transportation and Public Facilities, 1998). Both passenger and vehicle services (including commercial and construction equipment vehicles) are available. In June 2002, the AMHS was officially designated as a National Scenic Byway. However, this designation has not altered policies and procedures for shipping, nor introduced any new restrictions (Reeves, 2002).

Road Traffic

From Kodiak, access to KLC is via Rezanof Drive West (also referred to as the Chiniak Highway) and Pasagshak Point Road. This road was previously paved for the first 9.7 kilometers (6 miles) outside of Kodiak, at which point it becomes a gravel surface; activities are currently underway which continue to extend the paved portion (Schoenthal, 2002). This road is narrow and, in some cases, steep. There are switchbacks and 11 bridge crossings before reaching KLC. All launch-related deliveries must be transported over this road, unless the

option is made to utilize barge transport. The Alaska Department of Transportation and Public Facilities has evaluated all of these bridges and made improvements to them to support rocket motors in transport to KLC (Alaska Aerospace Development Corporation, 2001). The average daily traffic (ADT) for Rezanof Drive just south of Kodiak airport was 2,081 in 2000 (Alaska Department of Transportation and Public Facilities, Division of Planning, 2000).

Roadways supporting the individual facilities within KLC are designed to accommodate tractor-trailer transport vehicles as well as passenger vehicles and light trucks. Road grades range from 1 percent to over 15 percent. Access roads within KLC are either improved or paved with asphalt. Access roads from the Launch Control Center to the Payload Processing Facility are 4.9 meters (16 feet) wide with 1-meter (3-foot) shoulders. Access roads from the Payload Processing Facility to the Integration and Processing Facility entrance range and at the "S" curves are 5.5 meters (18 feet) wide with 1-meter (3-foot) shoulders. Site roads at the Launch Control Center and Payload Processing Facility are 6.1 meters (20 feet) wide with 1.8-meter (6-foot) shoulders. Site roads at the Integration and Processing Facility and Launch Pad-1 are 7.6 meters (25 feet) wide with 1.8-meter (6-foot) shoulders. All these roads are paved asphalt. Road design between the Payload Processing Facility, Integration and Processing Facility, and Launch Pad-1 presumes spacecraft are arriving at the Payload Processing Facility horizontally. Roadway design provides a minimum 45.7-meter (150-foot) inside turning radius for areas where transporters will travel (Alaska Aerospace Development Corporation, 2001).

AADC and the Alaska Department of Transportation and Public Facilities have conducted extensive studies of road and bridges and culvert crossing conditions and determined they are adequate for motor loads as heavy as a Castor 120™ (Alaska Aerospace Development Corporation, 2001). These findings have been confirmed through subsequent usage. For example, for the Athena-2 (Federal Aviation Administration, 1996), a Castor 120 motor was successfully barged onto the Lash Dock Terminal and then trucked over the road to KLC.

3.1.12 UTILITIES—KODIAK LAUNCH COMPLEX

Appendix B includes a definition and general discussion of utilities.

3.1.12.1 Region of Influence

The ROI for utilities is the area within or immediately adjacent to the KLC facility and the community in the vicinity of the KLC that serves the facility. The ROI also includes the area/region defined and served by the specific utility purveyors.

3.1.12.2 Affected Environment

Kodiak Island has approximately 14,000 residents, with roughly half living within the City of Kodiak. Kodiak Island maintains a highly capable industrial and governmental logistics infrastructure, and is home to the largest U.S. Coast Guard station in the world.

Energy

Electricity is provided by the Kodiak Electric Association, which has a capacity of 1,050 kW. A cooperative facility, Kodiak Electric Association operates and purchases power from the state-owned Terror Lake Hydroelectric Facility (Vacation Sites, Inc., 1999). Kodiak Electric

Association also operates a Coast Guard-owned plant, and owns three additional diesel-powered plants at Swampy Acres, Kodiak, and Port Lions. (Alaska Department of Community and Economic Development, Division of Community and Business Development, 2002)

A three-phase, 24.9/14.4-kilovolt (kV) overhead electric power line terminates approximately 640 meters (2,100 feet) north of the U.S. Coast Guard Loran Station. This line is a radial feed from a substation located 9.7 kilometers (6 miles) away. A single-phase line extends to serve the Launch Control Center and a three-phase line runs to each main building. The three-phase line to the Launch Control Center and Payload Processing Facility is underground in the Pasagshak Point Road shoulder. The line to the Launch Area is underground to a distance of 670 meters (2,200 feet) south-southeast of the Loran Station.

Each location has a step-down transformer providing 480 volts power for each facility. Each facility has a 277 Y/480-volt main switch-board for distribution to larger items of equipment. A dry-type step-down transformer that provides 120 Y/208-volt power for receptacles and other equipment is also located at each facility (Alaska Aerospace Development Corporation, 2001). The primary transformer capacity for each facility is 500 kVA at the Launch Control Center, 750 kVA at the Payload Processing Facility, 750 kVA at Launch Pad-1, and 750 kVA at the Integration and Processing Facility (Cooper, 2002).

Backup power is provided by diesel-driven standby generators located at the Launch Control Center (with a capacity of 350 kW, 400 horsepower), Payload Processing Facility (with a capacity of 500 kW), and the Launch Pad-1/Integration and Processing Facility (with a capacity of 600 kW) (Cooper, 2002). All generators at the complex have block heaters and are contained in heated enclosures. All generators start automatically upon loss of normal power source and provide backup power for all essential equipment within the facility. Maximum capacity of each generator is 72 hours for normal operations. Each generator has a 9,500-liter (2,500-gallon) storage tank available for No. 2 diesel fuel (Cooper, 2002). The Launch Pad is serviced by the generator for the Integration and Processing Facility. Limited uninterruptible power supply backup power is provided for critical equipment in areas where required for facilities use. Users may bring their own uninterruptible power supply systems for specific equipment, racks, and test sets as appropriate (Alaska Aerospace Development Corporation, 2001).

Peak power demand for KLC to date has been 825 kW (Cooper, 2002).

Water

Though the City of Kodiak is the supplier of water services in and around the city, outlying residents rely on private wells, as does KLC, which maintains water supply wells on KLC property.

Three identical packaged domestic water supply systems, each housed in a heated building, provide pressurized domestic water service for the Launch Control Center (26.5 liters [7 gallons] per minute of output and system design capacity of 9,464 liters [2,500 gallons] per day), Payload Processing Facility (11.4 liters [3 gallons] per minute of output and system design capacity of 1,136 liters [300 gallons] per day), and Integration and Processing Facility (well abandoned, system design capacity of 2,461 liters [650 gallons] per day). The Integration and Processing Facility uses a water storage tank with a 624,600-liter (165,000-gallon) capacity. (Cooper, 2002)

Each package consists of a submersible well pump, an automatic chlorinator, a 757-liter- (200-gallon) storage tank, and a booster pump to maintain operating pressure. A dirt and rust filter is provided at the Launch Control Center and Integration and Processing Facility. A manual isolation valve bypass is used to fill the fire protection water storage tank from the Payload Processing Facility well.

Water system demand for the Launch Control Center, Payload Processing Facility, and Integration and Processing Facility during a mission has been estimated at 50 percent of the available design capacity of 13,060 liters (3,450 gallons) per day. During non-mission status the demand has been estimated at 5 percent of this available capacity. (Cooper, 2002)

Wastewater

On KLC, sanitary sewerage treatment is provided by elevated septic systems and elevated absorption fields. Individual systems are provided for the Launch Control Center, Payload Processing Facility, and Integration and Processing Facility. The system at the Launch Control Center is an 11,356-liter (3,000-gallon) septic tank with a 306-cubic meter (10,800-cubic foot) mound-type absorption bed, with a total system design capacity of 9,464 liters (2,500 gallons) per day. The system at the Payload Processing Facility is a 4,732-liter (1,250-gallon) septic tank with 82-cubic foot (2,904-cubic foot) mound-type absorption bed, with a total system design capacity of 1,136 liters (300 gallons) per day. The system at the Integration and Processing Facility is a 4,732-liter (1,250-gallon) septic tank with 106.2-cubic meter (3,750-cubic foot) mound-type absorption bed, with a total system design capacity of 2,461 liters (650 gallons) per day. (Cooper, 2002)

Wastewater treatment capacity for the Launch Control Center, Payload Processing Facility, and Integration and Processing Facility during mission status has been estimated at 50 percent demand of available supply, and during non-mission status has been estimated at 5 percent demand of available supply. (Cooper, 2002)

Solid Waste

Refuse collection services in Kodiak are provided by the Kodiak Island Borough, which operates a permitted landfill and baler facility. The Kodiak Island Borough Landfill is located at Monashka Bay, about 9.7 kilometers (6 miles) north of the city. (Alaska Department of Community and Economic Development, Division of Community and Business Development, 2002; Alaska Department of Environmental Conservation, 1999) The capacity of the landfill was reached in 1998; however, in November 1999, the Borough completed a vertical and lateral expansion of the landfill, increasing its available capacity (State of Alaska Online, Department of Environmental Conservation, 1999). Residents within the city have home pickup service, while Borough residents have neighborhood dumpsters. Kodiak Sanitation, a private contractor, provides refuse collection services. Kodiak Island Borough also operates a recycling program.

At the time of the 1999 expansion, KLC negotiated a price for dumpster service with the Kodiak Island Borough and Waste Management, Inc. Due to the launch facility's location outside the normal coverage area, the service provided was limited to an 11.5-cubic meter (15-cubic yard) roll-off. During mission status the service is on a monthly basis, and during non-mission status the service is quarterly. (Cooper, 2002)

3.1.13 VISUAL AND AESTHETIC RESOURCES—KODIAK LAUNCH COMPLEX

3.1.13.1 Region of Influence

The Proposed Action site is on Narrow Cape, which is in a relatively remote area of Kodiak Island. The ROI for visual and aesthetic resources is that area surrounding KLC including land area and adjacent ocean area.

Alternative locations for remote telemetry sites in Alaska would include Pasagshak Point, Kenai, Homer, Soldotna, King Salmon, Adak, Cordova, and Pillar Mountain. Activities at these locations would be short-term and temporary. Sites would consist of several instrumentation trailers and at least two mobile antennas. Because of the portable and temporary nature of the activities, the potential for impacts to visual resources is expected to be minimal and therefore will not be discussed further in this document.

3.1.13.2 Affected Environment

Kodiak Island consists primarily of mountainous terrain, with most mountain peaks ranging from 914 to 1,219 meters (3,000 to 4,000 feet) high. About 40 small cirque glaciers are evident along the main ridge of the mountains, which runs northeast to southwest. Canyons radiate from the central divide, many of which have relatively short, swift streams. Exposed bedrock and shallow soils predominate along the rugged coastline. Northwest Kodiak Island has long, narrow fjords and U-shaped valleys, whereas southwest Kodiak Island has few bays and long, continuous shorelines, some with sandy beaches.

Habitat distribution on Kodiak Island is related to differences in elevation. Unconsolidated material is generally absent at very high elevations. Alpine vegetation occurs in mountainous areas below the peaks. Dense shrub and ground cover occurs on steep slopes below 914 meters (3,000 feet) in elevation. Lower slopes and valley floors are covered by sand, gravel, and volcanic ash.

The Narrow Cape area of Kodiak Island, in the vicinity of KLC, has low, grass-covered mountains that level off into a plateau. The mountains are covered with wild flowers in seasons, with patches of Sitka spruce, alder, and willow. Bedrock beaches border the plateau and include Fossil Beach. Barrier beaches and lagoon systems dominate the eastern shoreline, creating a long strip of sandy beaches.

Vegetation colors in the vicinity of KLC range from green to brown, and snow often covers the ground during the winter, although snow cover normally does not last more than a week. At a distance, the mountainous background appears as a darker brown. The climate at KLC has not been well documented; however, it is expected to be similar to the City of Kodiak, where clouds cover an average of 70 percent of the sky throughout the year and the sky is completely overcast about 50 percent of the time. As a result, the sky is often gray.

The varied terrain, extensive vegetative cover, and generally scenic shorelines all contribute to a high visual quality for much of Kodiak Island. The Narrow Cape area has been previously disturbed by commercial launch facilities, a ranch, and a U.S. Coast Guard facility. KLC has several existing structures that could be used to support the GMD program. Existing facilities include two launch pads, a Payload Processing Facility and Launch Control Center, Spacecraft

Assemblies Transfer Facility, and an Integration and Processing Facility (figures 2.3.1-2 through 2.3.1-4). Aside from the existing buildings and structures associated with KLC, man-made structures in the area include the U.S. Coast Guard's 190-meter-high (625-foot-high) Loran-C navigation transmitter tower and associated white-colored buildings, a few buildings associated with ranching, a complex of buildings associated with World War II activities, and unimproved roads.

Narrow Cape is in a relatively remote area of Kodiak Island. Potentially concerned persons who may have views of KLC include recreational users (fishers, hunters, hikers, etc.); employees and visitors at the Loran-C station, Kodiak Ranch, and KLC; and passengers on offshore vessels. Pasagshak State Recreation Area, a small park containing seven campsites, is about 10 kilometers (6 miles) northwest of Narrow Cape. Approximately a dozen small vacation homes are located in the Pasagshak Bay area. The Kodiak Island Highway, which runs from Kodiak to Narrow Cape, is primarily undeveloped.

3.1.14 WATER RESOURCES—KODIAK LAUNCH COMPLEX

Potentially affected water resources include freshwater surface and groundwater resources and marine waters in the ROI described in the next section. Potential changes in the availability of water supplies as a result of project water use requirements also are addressed. As required by Executive Order 11988, *Floodplain Management*, potential effects to floodplains were considered; however, none of the proposed facilities in any of the action alternatives would be constructed in a floodplain and further analysis of such issues is not warranted. Potentially affected wetland resources are described in section 3.1.3.

Appendix B includes a description of the primary laws and regulations regarding water resources.

3.1.14.1 Region of Influence

The water resource ROI includes those surface water bodies (streams, lakes and saltwater-influenced lagoons), drainage areas, and groundwater resources that may be affected by the project's construction or operations. Figure 3.1.14-1 shows the major water bodies near KLC that could be affected along with related water quality sampling points discussed in section 3.1.14.2. These water bodies include Barry Lagoon, Twin Lakes, Triple Lakes, and a number of unnamed streams near KLC. Interceptors launched from KLC could also affect the Pacific Ocean in areas below target interception points, or in other areas between KLC and the target point if interceptors unexpectedly do not reach their targets.

Remote telemetry sites in Alaska are also being considered for the Proposed Action. Activities in these locations would use existing paved or gravel areas and would be short-term, temporary activities. Therefore, the potential for impacts on water resources is minimal and the affected environment in these areas is not discussed further.

3.1.14.2 Affected Environment

Surface Water and Groundwater Resources

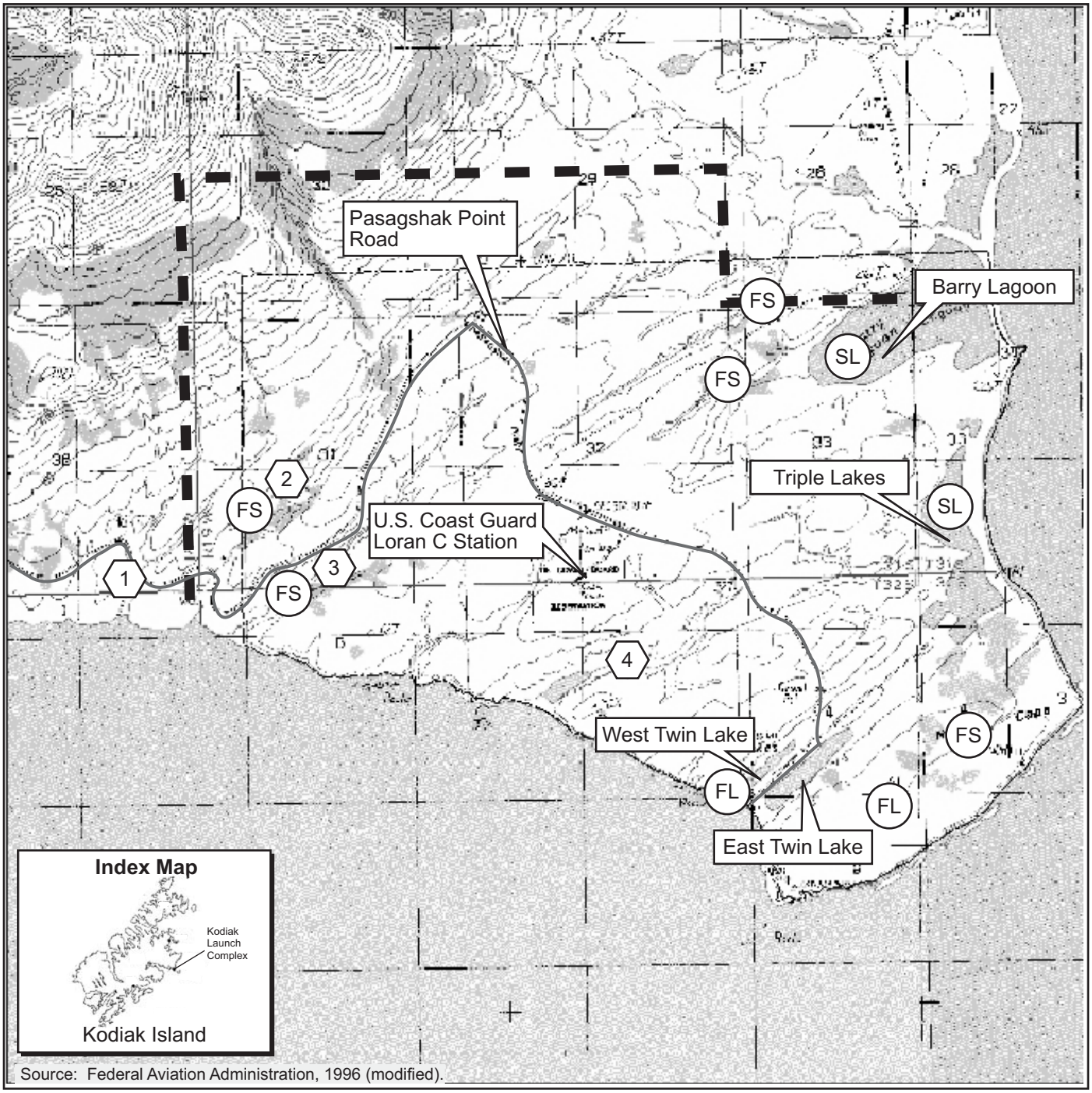
Kodiak Island has a marine climate with many natural streams, lakes, and lagoons. Precipitation is common and typically occurs in all months of the year; average precipitation was reported in the 1995 Environmental Baseline of Narrow Cape as 188.57 centimeters (74.24 inches) per year (Alaska Aerospace Development Corporation, 1995b). Streams near KLC are relatively short (generally less than 3.2 kilometers [2 miles] in length) and steep, and they have an average discharge of less than 1.3 cubic meters (46 cubic feet) per second (Alaska Aerospace Development Corporation, 1995b). The major lakes in the ROI are shown in figure 3.1.14-1; West and East Twin Lakes are shallow, freshwater lakes while Triple Lakes and Barry Lagoon are saltwater-influenced lagoons. While some water-bearing zones have been found in underlying bedrock in the ROI, most of the groundwater in the coastal area near KLC is in an unconfined aquifer composed of sand and gravel. Information concerning potential groundwater yields is not available. (Alaska Aerospace Development Corporation, 1995b)

Water Quality

Water quality in the ROI is generally good, and water quality sampling has shown that water quality in the vicinity of KLC is within historical ranges for Kodiak Island as a whole (Alaska Aerospace Development Corporation, 1995b). Water quality samples were taken at the locations shown in figure 3.1.14-1 during 1994, and the key results of this sampling are shown in table 3.1.14-1. In addition, an analysis of surface water collected at East Twin Lake and Triple Lakes (Alaska Aerospace Development Corporation, 1995b) showed that none of the following contaminants were present: volatile organic compounds, pesticides/herbicides, PCBs, nitrates or nitrites, gross alpha radioactivity, total cyanide, and most metals of concern. However, two metallic elements were found: cadmium and beryllium. Cadmium was found in both East Twin Lake and Triple Lakes at a concentration of 0.1 microgram per liter, and beryllium was detected in Triple Lakes at a concentration of 0.9 microgram per liter (Alaska Aerospace Development Corporation, 1995b). These levels of cadmium and beryllium are both below the EPA's national water quality criteria for the protection of aquatic organisms (the standards are 0.25 and 5.3 micrograms per liter, respectively and assuming a hardness of 15 milligrams of calcium carbonate per liter for the cadmium criterion) (Federal Aviation Administration, 1996). The cadmium concentrations were both well below the 5.0 micrograms per liter maximum contaminant levels allowed by the EPA and the State of Alaska's drinking water regulations (Federal Aviation Administration, 1996). In the absence of any human-related sources, it is assumed the cadmium and beryllium are from natural sources. The sampling also found coliform bacteria levels in East Twin Lake and Triple Lakes that exceed the "no detect" criteria of the State of Alaska drinking water regulations; therefore, drinking water would require some treatment before it could be used. The likely sources of the bacteria are the bison, cattle, and horses that are raised on the nearby ranch. (Alaska Aerospace Development Corporation, 1998)

Water Use

The primary potable water sources for existing KLC operations are wells on KLC. West and East Twin Lakes have been used for construction water. The potable water supply system has a designed capacity of about 13,060 liters (3,450 gallons) per day; demand is currently estimated at 50 percent of available supply during mission status and 5 percent of available supply when not in mission status (Cooper, 2002). Section 3.1.12 provides more information about KLC utilities,



Source: Federal Aviation Administration, 1996 (modified).

EXPLANATION

- FS — Freshwater Streams Sampled
- FL — Freshwater Lakes Sampled
- SL — Saltwater - Influenced Lagoons Sampled
- # — Sampled for Fish
- Kodiak Launch Complex Boundary
- Pasagshak Point Road

Not to Scale

NORTH

06-09-03 KLC Water

Major Water Bodies and Sampling Points

Kodiak Launch Complex, Alaska

Figure 3.1.14-1

including water and wastewater utilities. KLC is in a fairly remote area, with other nearby water uses limited to a ranch and a local business. The town of Kodiak has its own water supply and treatment system and is located approximately 40 kilometers (25 miles) to the north.

Table 3.1.14-1: Water Quality on Kodiak Island and in the Vicinity of Kodiak Launch Complex

Water Quality Parameter	Unit of Measure	Kodiak Island		KLC Vicinity		
		Max	Min	Max	Min	Avg
Freshwater Streams						
Temperature	°Celsius (°Fahrenheit)	--- (a)	---	13 (55)	8 (46)	10 (50)
Conductivity	Micromhos per centimeter	206.0	24.0	92.8	46.0	55.4
PH		8.5	6.2	7.5	6.8	7.1
Dissolved oxygen	Percent saturation	---	---	92.0	65.0	84.0
Alkalinity	Milligrams calcium carbonate per liter	30.0	10.0	24.0	13.0	19.0
Freshwater Lakes						
Temperature	°Celsius (°Fahrenheit)	---	---	12 (53)	11 (52)	12 (53)
Conductivity	Micromhos per centimeter	165.0	52.0	97.3	76.6	86.2
PH		8.0	5.8	7.3	7.1	7.2
Dissolved oxygen	Percent saturation	---	---	93.0	77.0	87.0
Alkalinity	Milligrams calcium carbonate per liter	---	---	26.0	15.0	20.0
Saltwater-Influenced Lagoon (Barry Lagoon)(b)						
Temperature	°Celsius (°Fahrenheit)	---	---	---	14 (57)	---
Conductivity	Micromhos per centimeter	---	---	---	119.0	---
PH		---	---	---	7.1	---
Dissolved oxygen	Percent saturation	---	---	---	91.0	---
Alkalinity	Milligrams calcium carbonate per liter	---	---	---	14.0	---

Source: Alaska Aerospace Development Corporation, 1995b

Note: Sampling locations are shown on figure 3.1.14-1.

(a) dashed lines: --- indicate no data are available

(b) only one sample was taken from Barry Lagoon

3.1.15 SUBSISTENCE—KODIAK LAUNCH COMPLEX

Many families living in rural areas of Alaska are partially or wholly dependent upon the harvesting of natural resources for food and other living necessities. The Alaska National Interest Lands Conservation Act of 1980 provides for the continued opportunity for customary and traditional uses of fish and wildlife for subsistence.

In rural communities, the harvesting of subsistence resources can be the primary means of support for a family unit. While food is the primary use of subsistence resources, there are many other uses for subsistence products such as clothing, food for work animals, fuel, home crafts, customary trade, ceremonial tools, as well as arts and crafts. In addition to the material importance of subsistence hunting, it also plays a strong role in the social and cultural traditions of many native Alaskan communities. (Ballistic Missile Defense Organization, 2000)

3.1.15.1 Region of Influence

The ROI for subsistence is the area adjacent to and including Narrow Cape.

3.1.15.2 Affected Environment

Major villages found on Kodiak Island include Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions. These communities are accessible from Kodiak only by air or water. The populations of these communities range from 80 (Akhiok) to 237 (Old Harbor) and all are 63 percent or more native (table 3.1.15-1). The natives are mainly Alutiiq. Section 3.1.4.2 includes a description of native populations and traditional resources. Commercial fishing is the main source of cash income in these communities, and subsistence is another important activity economically as well as culturally. The percentage of households that use subsistence resources is high in all communities, averaging approximately 99 percent (Ballistic Missile Defense Organization, 2000).

Table 3.1.15-1: Demographic Comparison Table

Geographic Area	Total Population	Percent American Indian and Alaska Native
Kodiak	6,334	10
Akhiok	80	86
Karluk	27	96
Larsen Bay	115	78
Old Harbor	237	73
Ouzinkie	225	81
Port Lions	256	63

Source: U.S. Census Bureau, 2002

A small number of Old Harbor residents use the coastal and adjacent inland areas around Narrow Cape for subsistence. Salmon, halibut, crab, waterfowl, seal, sea lion, and deer are the primary species harvested by these residents. Other inhabitants of Kodiak Island also engage in subsistence activities. The primary areas for subsistence used by Kodiak residents are the Buskin River, which is adjacent to the Kodiak Airport, and the Afognak and Litnik Rivers, which are both on Afognak Island. The Narrow Cape area is used primarily for harvesting deer and freshwater fish in the vicinity of Twin Lakes. The potential for subsistence use growth of the Narrow Cape area is limited since it is currently being used as a working ranch and as the site of KLC.

3.2 MIDWAY

Although Midway was an alternative site in the Draft EIS, MDA has determined that it is no longer a reasonable alternative and will not be a proposed site for ETR activities. The IDT on-board the SBX would perform the function that had been planned for Midway. The discussion of Midway has been retained in the Final EIS, however, in order to preserve the work that has already been performed.

The proposed GMD ETR activities could have an effect on air quality, biological resources, and hazardous materials and waste at Midway. These resource areas are summarized in the following sections.

Areas that are not expected to be affected sufficiently at Midway to warrant further discussion in this section include airspace, cultural resources, geology and soils, health and safety, land use, noise, socioeconomics, transportation, utilities, visual and aesthetic resources, water resources, and environmental justice. Proposed activities at Midway would not affect controlled and uncontrolled airspace, Special Use Airspace, en route airways and jet routes, or airfields. While many of the islands at Midway Atoll have important historic resources, many of them relating to battles during World War II, there are not expected to be any ground disturbing activities within areas where these resources are located. While proposed construction activities at Sand Island will result in limited clearing and excavation of pad, roadway and cable alignments, it is not expected to create any adverse erosion effects to geology or soils, due primarily to the flat relief and highly permeable nature of the coral soils and artificial (coral rubble) fill. Consequently, this section will not include further analysis of geological resources. Construction and operation activities would follow standard health and safety guidelines. Land use impact would be minimal since the proposed activities would occur in paved areas and would not produce a change in land utilization. No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels are expected to be below OSHA workplace standards. As a result of its isolation, limited population, minute local economic activity, and limited GMD ETR activities, socioeconomic impacts would not occur. The few additional personnel would not affect the utilities infrastructure or transportation. Visual and aesthetic resource impacts would be avoided by actions taking place in secure locations that are somewhat hidden by vegetation. The water resources requirements for the proposed activities would result in a minor increase above the existing usage levels, but below past usage levels. An Environmental Justice impact would be a long-term health, environmental, cultural, or economic effect that has a disproportionately high and adverse effect on a nearby minority or low-income population, rather than all nearby residents. No adverse long-term impacts have been identified at Midway. As such, there would be no disproportionately high and adverse human health or environmental effects on the minority or low-income populations.

3.2.1 AIR QUALITY—MIDWAY

Appendix B includes a general description of air quality and the main regulations and laws that govern its protection.

3.2.1.1 Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending no more than a few tens of kilometers (miles) downwind from the source.

The ROI for ozone may extend much further downwind than the ROI for inert pollutants; however, as the project area has no heavy industry and very few automobiles, tropospheric ozone and its precursors are not of concern. Consequently, for the air quality analysis, the ROI for project operational activities includes the area surrounding Sand and Eastern Islands of Midway.

3.2.1.2 Affected Environment

Climate

Due to its low topographic profile and small size, Midway Atoll does not affect its own climate. The climate of Midway Atoll is semi-tropical oceanic, consisting of two distinct seasons. The months from December to February tend to be cool, windy and wet, with the temperature dropping into the low 10s °C (60s °F), while May through October tend to be warm and sunny, with most days reaching the high 20s °C (80s °F).

Midway experiences frequent, but modest, rainfall. It rains, on average, approximately 165 days a year, and the mean annual rainfall is 107 centimeters (42 inches). Since 1918, a minimum annual rainfall of 64 centimeters (25 inches) and a maximum annual rainfall of 175 centimeters (69 inches) have been recorded.

East-northeasterly tradewinds, averaging about 19 kilometers per hour (10 knots), are predominate from March through November, and are generally accompanied by fair weather. From November through February, the weather can be quite variable, ranging from southwesterly winds accompanied by rain and squalls, to gale-force northwesterly winds. Midway is well north of any hurricane areas and has not been struck by a hurricane in recorded history. (Pacific Division, Naval Facilities Engineering Command, 1994)

Regional Air Quality

No ambient air quality monitoring data is available for the Midway Atoll; however, there are no air pollution problems at Midway, due to the lack of air emissions and sources, and given the amount of strong trade winds. These trade winds quickly disperse any local emissions.

Existing Air Emissions

Current facilities that may emit air pollutants include the carpenter shop, spray paint shop, power plant, boilers, open burning of solid waste at landfills, and open burning of waste oil. Other emissions are from automobiles, small motorized equipment, airplanes, and power boats. (U.S. Department of the Interior, Fish and Wildlife Service, 1996)

3.2.2 BIOLOGICAL RESOURCES—MIDWAY

Appendix B includes a definition of biological resources and the main regulations and laws that govern their protection.

3.2.2.1 Region of Influence

The ROI includes areas on Midway Island that may be affected by construction and operation of an IDT and two COMSATCOM terminals.

3.2.2.2 Affected Environment

Vegetation

Over 200 plant species have been introduced to Midway's islands since the arrival of permanent residents in 1902. The most common of these include ironwood, golden crown-beard, wild poinsettia, Haole koa, sweet alyssum, buffalo grass, peppergrass, and Bermuda grass. Ironwood trees can grow as much as 12 meters (40 feet) in 18 months unless aggressively managed. Efforts have been undertaken to prevent further colonization, especially in beach areas, to preserve the remaining beach strand vegetation (Pacific Division, Naval Facilities Engineering Command, 1994). Golden crown-beard grows so quickly that it can exclude birds from otherwise desirable nesting habitat. (U.S. Fish and Wildlife Service, Midway Atoll National Refuge, 2002)

Plants indigenous or naturalized to Midway Atoll include beach naupaka, tree heliotrope, beach morning glory, lovegrass, sickle grass, ihi, alena, puncture vine (nohu), and 'ena'ena. Ihi occurs commonly on Eastern and Spit Islands but is much less common on Sand Island. (U.S. Fish and Wildlife Service, 2002a)

Beach naupaka and tree heliotrope are examples of beach strand vegetation, which are dune-binding species. Although once abundant over much of the coastal areas of Sand Island, these plants have been reduced in extent due to grazing by rats and shading by ironwood trees. Frigate Point on Sand Island contains the only large stand of beach naupaka. (Pacific Division, Naval Facilities Engineering Command, 1994)

Threatened and Endangered Plant Species

No threatened or endangered plant species are located on Midway Atoll.

Wildlife

A large variety of wildlife occurs on Midway Atoll, including an abundance of migratory seabirds. Over 100 species of birds have been identified. About 15 species of birds nest on Midway Atoll with a total population of almost 2 million. Midway has the world's largest colony of Laysan albatross, nearly 400,000 nesting pairs, and the largest colonies of red-tailed tropicbirds, black noddies, and white terns. Additional bird species include short-tailed and black-footed albatross; shearwaters; brown, masked, and red-footed booby; brown noddy; and terns. Birds native or indigenous to Midway include a small variety of arctic nesting shorebirds, such as the bristle-thighed curlew and ruddy turnstone, and vagrant species observed in small numbers. (U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, 2002)

An introduced species that has had a profound adverse affect on Midway's wildlife is the black rat. Due to a very aggressive rat control program, rats have been eliminated from Eastern and Spit islands and are probably also absent from Sand Island. (U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, 2002)

About 250 spinner dolphins inhabit the lagoon during the day and generally leave it each night to feed in deeper waters. The lagoon also supports over 130 species of fish and a variety of marine invertebrates (U.S. Department of the Interior, Fish and Wildlife Service, 1996)

Threatened and Endangered Wildlife Species

The endangered short-tailed albatross (*Phoebastria albatrus*) is a visitor to Midway during its migration, and single nests occasionally occur on the island (U.S. Fish and Wildlife Service, Pacific Region, 2002b).

Approximately 45 to 55 endangered Hawaiian monk seals (*Monachus schauinslandi*) live on Midway Atoll. Eastern and Spit islands are the main pupping areas. The monk seal is endemic to the Hawaiian archipelago and is found almost exclusively in the Northwestern Hawaiian Islands. A number of threatened green sea turtles (*Chelonia mydas*) live and forage within Midway's lagoon. Nesting has not been recorded on Midway Atoll. (U.S. Fish and Wildlife Service, 2002a) The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare visitor to Midway (Pacific Division, Naval Facilities Engineering Command, 1994). Current rules on Midway require that people stay at least 31 meters (100 feet) from monk seals on the beach and from basking sea turtles (U.S. Fish and Wildlife Service, 2002a).

Environmentally Sensitive Habitat

All of Midway Atoll, except for Sand Island and its harbor, has been designated as critical habitat for the Hawaiian monk seal. A small (less than 0.2 hectare [0.5 acre]), emergent wetland area has been identified on Sand Island. It is located west of Decatur Avenue, north of the cemetery, and south of Halsey Drive. (Pacific Division, Naval Facilities Engineering Command, 1994)

The *Coral Reef Ecosystem Fishery Management Plan* for the western Pacific has established Marine Protected Areas. No-take Marine Protected Areas are at 0- to 10-fathom (0- to 18-meter [60-foot]) depths for all the chain. No-take Marine Protected Areas are also located from 10 to 50 fathoms (18 to 91 meters [300 feet]) at French Frigate Shoals, Laysan, and the northern half of Midway. The southern half of Midway is for recreational catch and release only. (American Association for the Advancement of Science, 2002)

3.2.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—MIDWAY

Appendix B includes a general description of hazardous materials and waste.

3.2.3.1 Region of Influence

The ROI for potential impacts related to hazardous materials/wastes includes areas of the atoll to be used for communications operations, and in areas where hazardous materials are stored and handled.

3.2.3.2 Affected Environment

The U.S. Navy closed Naval Air Facility Midway in 1993 and turned control of Midway Atoll over to the USFWS in 1997. USFWS manages the location as the Midway Atoll National Wildlife Refuge. Essential facilities services are provided by a contractor.

There is currently no military presence on Midway Atoll. Pollution Prevention/Recycling/Waste Minimization would be practiced in accordance with EPA, DoD, and Army requirements. IRP activities were conducted by the U.S. Navy in the early- to mid-1990s under the Comprehensive Long-Term Environmental Action Navy (CLEAN) program. IRP sites 72, 77, and 79 are at the proposed IDT and COMSATCOM location. These IRP sites were identified as areas where only POL releases had occurred in the past. IRP Site 50 was a formerly contaminated with hazardous material, but all remedial actions were completed. (Naval Facilities Engineering Command, Pacific Division, 1997)

Currently, Midway has two 7.95-million-liter (2.1-million-gallon) jet petroleum #5 (JP-5) storage tanks and five 25,170-liter (66,500-gallon) motor gasoline (MOGAS) tanks. In addition, there are five tank truck refuelers, 2,745 meters (9,000 feet) of fuel spill boom and skimmer/vacuum truck. The USFWS reports an average of approximately 643,520 liters (170,000 gallons) of JP-5 and 11,356 liters (3,000 gallons) of MOGAS usage per month. (U.S. Fish and Wildlife Service, 2002a)

All known USTs and POL pipelines were removed by the U.S. Navy under the CLEAN program. (Naval Facilities Engineering Command, Pacific Division, 1997)

Asbestos remediation/removal was conducted at Midway by a U.S. Navy contractor in the mid-1990s. Lead-based paint was assessed in all buildings and structures on Sand and Eastern Islands. PCB removal activity was initiated by the U.S. Navy in 1984. By September 1996, removal activity was substantially complete. (Naval Facilities Engineering Command, Pacific Division, 1997)

Aviation jet fuel is used for transportation of personnel to and from the atoll, in support of USFWS service activities.

Small quantities of nonhazardous and hazardous wastes generated at Midway may include batteries, waste oil, fuels, paints, cleaners, spill cleanup materials, and empty containers.

3.3 REAGAN TEST SITE

The existing environment at RTS was described in the Final Supplemental EIS for Proposed Actions at USAKA (U.S. Army Space and Strategic Defense Command, 1993a). For the most part, that description is still accurate and will not be repeated in this document. Rather, for resources that may be affected by ETR activities at RTS, the pertinent resource discussions will be summarized and any differences in existing environmental conditions, including new facilities or infrastructure, will be noted. The more detailed discussion in the Final Supplemental EIS is incorporated by reference and will be made available for review by those who wish more information concerning the existing environment at RTS.

The RTS environmental program is governed by the *Environmental Standards and Procedures for the U.S. Army Kwajalein Atoll (USAKA) Activities in the Republic of the Marshall Islands*, unofficially called the UES. The UES is mandated in the Compact of Free Association between the Republic of the Marshall Islands and the United States as approved by U.S. Public Law 99-239. They became effective 4 December 1995. The UES is a one-of-a-kind regulatory program document with substantively similar U.S. and RMI statutes and regulations. As required in the UES, RTS issues Documents of Environmental Protection, similar to federal and state permits, for conducting activities with potential to affect the environment. The Documents of Environmental Protection are streamlined environmental protection documents for specific environmental activities (e.g., air emissions from major stationary sources; construction and operation of power plants; point source discharges) that specify in detail how UES compliance will be maintained. The Documents of Environmental Protection are tailored specifically for conditions and considerations at RTS (U.S. Army Space and Missile Defense Command, 2001a).

The proposed ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, and utilities at RTS. These resource areas are summarized in the following sections.

Areas that are not expected to be affected sufficiently at RTS to warrant further discussion in this section include cultural resources, geology and soils, land use, noise, socioeconomics, transportation, water resources, visual and aesthetic resources, and environmental justice. While many of the islands at Kwajalein Atoll have important historic resources, many of them relating to battles during World War II, there are not expected to be any ground disturbing activities within areas where these resources are located. Consequently, this section will not include further analysis of cultural resources. While proposed GBI and target launch activities would result in minor soil contamination from rocket emissions in and around the designated Launch Hazard Area at Meck, they are not expected to create adverse effects beyond those previously analyzed in the USAKA Supplemental EIS (U.S. Army Space and Strategic Defense Command, 1993a). Use of existing range radars and minor construction upgrades to GBI and radar facilities will have no adverse effects on site soils. Consequently, this section will not include further analysis of geological resources. Land use at RTS and surrounding areas would not change. Utilization of adjacent lands would be consistent with existing land use agreements. The existing noise levels at RTS would continue, including those associated with proposed missile launches. None of the noise levels outside of the Ground Hazard Area boundary for the proposed launch areas where non-essential personnel and the public are excluded would exceed either DoD or OSHA safety requirements. Personnel within the Ground Hazard Area wear hearing protection devices. Due to RTS's isolation, and a population

consisting exclusively of RTS employees and support contractors and their families, GMD ETR activities would not produce any adverse socioeconomic impacts. Shipping of project-related materials, as well as transportation of personnel, would utilize air, roadway, and shipping/ferrying routes that are equipped to handle both the loads and frequency of project demands. These actions are considered typical and a routine activity.

Although the visual resources on RTS may be considered significant by some viewers, much of the area is already developed with the types of structures and activities that are being considered in the Proposed Action. Therefore, this section does not include further analysis of visual resources at RTS. An Environmental Justice impact would be a long-term health, environmental, cultural, or economic effect that has a disproportionately high and adverse effect on a nearby minority or low-income population, rather than all nearby residents. No adverse long-term impacts have been identified at the proposed RTS sites. As such, there would be no disproportionately high and adverse human health or environmental effects on the minority or low-income populations that may be present in the vicinity of those locations.

3.3.1 AIR QUALITY—REAGAN TEST SITE

The UES regulate air quality at RTS. These standards are based upon the U.S. Clean Air Act and its promulgated regulations, but do not include many of the procedural and technology based requirements. The standards are designed to maintain the current air quality at RTS. Pollutant ambient air concentrations may not increase above the baseline level by more than an increment of 25 percent of the applicable Ambient Air Quality Standards (AAQS). The UES AAQS are set at 80 percent of the NAAQS provided in appendix B. The UES requires a Document of Environmental Protection, similar to an operating permit in the United States, for all new major stationary sources, or sources regulated under the U.S. National Emissions Standards for Hazardous Air Pollutants. Existing sources at RTS are covered by the *Air Emissions from Major Sources at USAKA/KMR Document of Environmental Protection*, as revised November 2000. This Document of Environmental Protection establishes operational requirements and limitations for sources at RTS.

3.3.1.1 Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending no more than a few tens of miles downwind from the source.

The ROI for ozone may extend much further downwind than the ROI for inert pollutants; however, as the project area has no heavy industry and very few automobiles, tropospheric ozone and its precursors are not of concern. For the air quality analysis, the ROI for project operational activities includes Kwajalein, Meck, Eniwetak, and Omelek islands. However, the ROI also includes areas that may potentially be affected by the use of RTS for the SBX, including the mooring sites identified in section 2.3.1.3.

3.3.1.2 Affected Environment

Because of the relatively small numbers and types of air pollution sources, the dispersion caused by trade winds, and the lack of topographic features that inhibit dispersion, air quality at RTS is considered good (i.e., well below the maximum pollution levels established for air quality in the United States). (U.S. Army Space and Missile Defense Command, 2001a)

Kwajalein

Climate

Kwajalein Atoll is located less than 1,000 kilometers (600 miles) north of the equator and has a tropical marine climate characterized by relatively high annual rainfall and warm to hot, humid weather throughout the year. The mean annual temperature at Kwajalein is 28°C (82°F). The average annual precipitation is 256 centimeters (101 inches). The main rainfall season lasts from mid-May to mid-December, with about 30 centimeters (10 inches) of rainfall per month. Kwajalein's relative humidity averages between 70 and 85 percent throughout the year. Virtually constant cloud cover, light easterly winds, and frequent moderate to heavy rain showers prevail during the wet season.

Trade winds are dominant throughout the year and strongest from November to June. The prevailing winds blow from the east to the northeast with an average speed of 26 kilometers (16 miles) per hour in the winter and 10 kilometers (6 miles) per hour in the summer.

Regional Air Quality

The ambient air on Kwajalein was analyzed in a U.S. Army Environmental Hygiene Agency study completed in 1993. This testing was conducted before the adoption of the UES and its unique UES AAQS. In this study the concentration of criteria pollutants was measured both upwind and downwind of power plants 1A and 1B (table 3.3.1-1). The concentrations of sulfur dioxide, lead, and particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM-10) were found to be below their NAAQS. Since there is no short-term NAAQS for nitrogen dioxide, the study compared the measured concentrations at Kwajalein to the 1-hour California AAQS for nitrogen dioxide; the concentrations at Kwajalein were below this standard. The concentrations measured at Kwajalein were below the 1-hour NAAQS for carbon monoxide, but downwind concentrations were greater than the 8-hour NAAQS for carbon monoxide. (U.S. Army Environmental Hygiene Agency, 1993)

Table 3.3.1-1: Ambient Air Quality at Kwajalein Island

			Measured Ambient Concentrations	
Pollutant	**NAAQS***		**Upwind**	**Downwind**
Sulfur dioxide	3-hr max.	0.5 ppm	0.05 ppm	0.14 ppm
	24-hr max.	0.14 ppm	0.01 ppm	0.01 ppm
Nitrogen dioxide*	1-hr max.	0.25 ppm	0.05 ppm	0.10 ppm
PM-10	24-hr max.	150 $\mu g/m^3$	114 $\mu g/m^3$	107 $\mu g/m^3$
Lead	Quarterly	1.5 $\mu g/m^3$	< 0.1 $\mu g/m^3$	< 0.1 $\mu g/m^3$
Carbon monoxide	1-hr max.	35 ppm	13.9 ppm	27.9 ppm
	8-hr max.	9 ppm	5.2 ppm	11.4 ppm

Source: U.S. Army Environmental Hygiene Agency, 1993

*As no short-term NAAQS exist for nitrogen dioxide, the California Ambient Air Quality Standard was used for comparison.

Existing Emissions Sources

Ambient air quality in generally characterized as good due to the relatively small number of air pollution sources and because of good dispersion produced by the strong, persistent tradewinds and lack of topographic features to inhibit pollution dispersion. The power plants are the primary source of air emissions on Kwajalein. The concentration of the criteria air pollutants was measured both upwind and downwind of power plants 1A and 1B. The concentrations of sulfur dioxide, lead, and PM-10 were found to be below their UES AAQS both upwind and downwind. Since there is no short-term UES AAQS for nitrogen dioxide, the study compared the measured concentrations at Kwajalein to the 1-hour California AAQS for nitrogen dioxide; the concentrations at Kwajalein were below this standard. The concentrations measured at Kwajalein were below the 1-hour UES AAQS for carbon monoxide, but downwind concentrations were greater than the 8-hour UES AAQS for carbon monoxide.

The existing primary pollution sources include power plants (1A and 1B), fuel storage tanks, solid waste incinerators, diesel fired commercial boilers, a concrete batching plant, and transportation. Rocket launches tend to be smaller sources of emissions. USAKA performs an Air Emissions Inventory on a biennial basis in accordance with the UES (table 3.3.1-2).

Table 3.3.1-2: Summary of Emissions of Regulated Air Pollutants on Kwajalein

PM-10 metric tons (tons)/year	Sulfur Dioxide metric tons (tons)/year	Carbon Monoxide metric tons (tons)/year	Nitrogen Dioxide metric tons (tons)/year	Volatile Organic Compounds metric tons (tons)/year
72.35 (79.75)	199.98 (220.44)	318.39 (350.96)	1,180.16 (1,300.90)	48.45 (53.41)

Source: Raytheon Range System Engineering, 2002

Meck

Climate

Temperature, rainfall, humidity, and trade winds at Meck are similar to those described for Kwajalein.

Regional Air Quality

The Supplemental EIS for USAKA predicts that Kwajalein Island has far more air pollutant emissions than Meck. Therefore, the ambient air quality is assumed to be comparable to that measured at the upwind location at Kwajalein Island, as listed in table 3.3.1-1.

Existing Emission Sources

Existing pollution sources for Meck are similar to those listed for Kwajalein, including a power plant, a solid waste incinerator, fuel storage tanks, and transportation. Infrequent rocket launches also occur on Meck. Table 3.3.1-3 summarizes air emissions on Meck.

Table 3.3.1-3: Summary of Emissions of Regulated Air Pollutants on Meck

PM-10 metric tons (tons)/year	Sulfur Dioxide metric tons (tons)/year	Carbon Monoxide metric tons (tons)/year	Nitrogen Dioxide metric tons (tons)/year	Volatile Organic Compounds metric tons (tons)/year
2.12 (2.34)	18.67 (20.58)	31.42 (34.63)	118.30 (130.40)	5.13 (5.65)

Source: Raytheon Range System Engineering, 2002

Rocket launch emissions are also considered to be sources of pollutants, which result in short term, temporary increases in pollutants. Table 3.3.1-4 lists the estimated rocket launch emissions per year for a high level of activity according to the Final Supplemental EIS for Proposed Actions at USAKA (U.S. Army Space and Strategic Defense Command, 1993a). For Meck, the estimated number of launches was 28 per year for Strategic Launch Vehicles (assuming the use of SR-19 rocket motors).

Table 3.3.1-4: Estimated Rocket Launch Emissions for a High Level of Activity

Carbon Monoxide metric tons (tons)/launch	Hydrogen Chloride metric tons (tons)/launch	Aluminum Oxide metric tons (tons)/launch
7.14 (7.88)	5.18 (5.71)	9.27 (10.22)

Source: U.S. Army Space and Strategic Defense Command, 1993a.

Roi-Namur

Climate

The climate of Roi-Namur is similar to that described for Kwajalein.

Regional Air Quality

The Supplemental EIS for USAKA predicts that air pollution emissions on Rio-Namur are comparable to those on Kwajalein; therefore, air quality on Roi-Namur is expected to be comparable to that of Kwajalein Island (table 3.3.1-1).

Existing Emission Sources

Existing pollution sources for Roi-Namur are similar to those listed for Kwajalein and Meck, including a power plant, a solid waste incinerator, fuel storage tanks and transportation on the island. RTS constructed a new power plant on Roi-Namur, bringing it online in 2002. Air quality requirements for the plant were established in a May 1999 Document of Environmental Protection entitled: *Construction and Operations of Power Plant Demolition of Existing Power Plant, Roi-Namur*. Table 3.3.1-5 summarizes air emissions on Roi-Namur.

Table 3.3.1-5: Summary of Emissions of Regulated Air Pollutants on Roi-Namur

PM-10 metric tons (tons)/year	Sulfur Dioxide metric tons (tons)/year	Carbon Monoxide metric tons (tons)/year	Nitrogen Dioxide metric tons (tons)/year	Volatile Organic Compounds metric tons (tons)/year
6.69 (7.37)	58.99 (65.03)	98.29 (108.35)	373.79 (412.03)	11.28 (12.43)

Source: Raytheon Range System Engineering, 2002

3.3.2 AIRSPACE—REAGAN TEST SITE

Appendix B includes a general description of airspace.

3.3.2.1 Region of Influence

The ROI for airspace at RTS includes the airspace over and surrounding the potential radiation hazard areas that extend from the mooring location north of Kwajalein in the USAKA lagoon (figure 3.3.2-1).

3.3.2.2 Affected Environment

Controlled and Uncontrolled Airspace

RTS is located in international airspace. Therefore, the procedures of the International Civil Aviation Organization (ICAO) outlined in ICAO Document 4444, *Rules of the Air and Air Traffic Services*, are followed (International Civil Aviation Organization, 1996; 1997). ICAO Document 4444 is the equivalent air traffic control manual to the FAA Handbook 7110.65, *Air Traffic Control*. The ICAO is not an active air traffic control agency and has no authority to allow aircraft into a particular sovereign nation's Flight Information Region or Air Defense Identification Zone and does not set international boundaries for air traffic control purposes. The ICAO is a specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

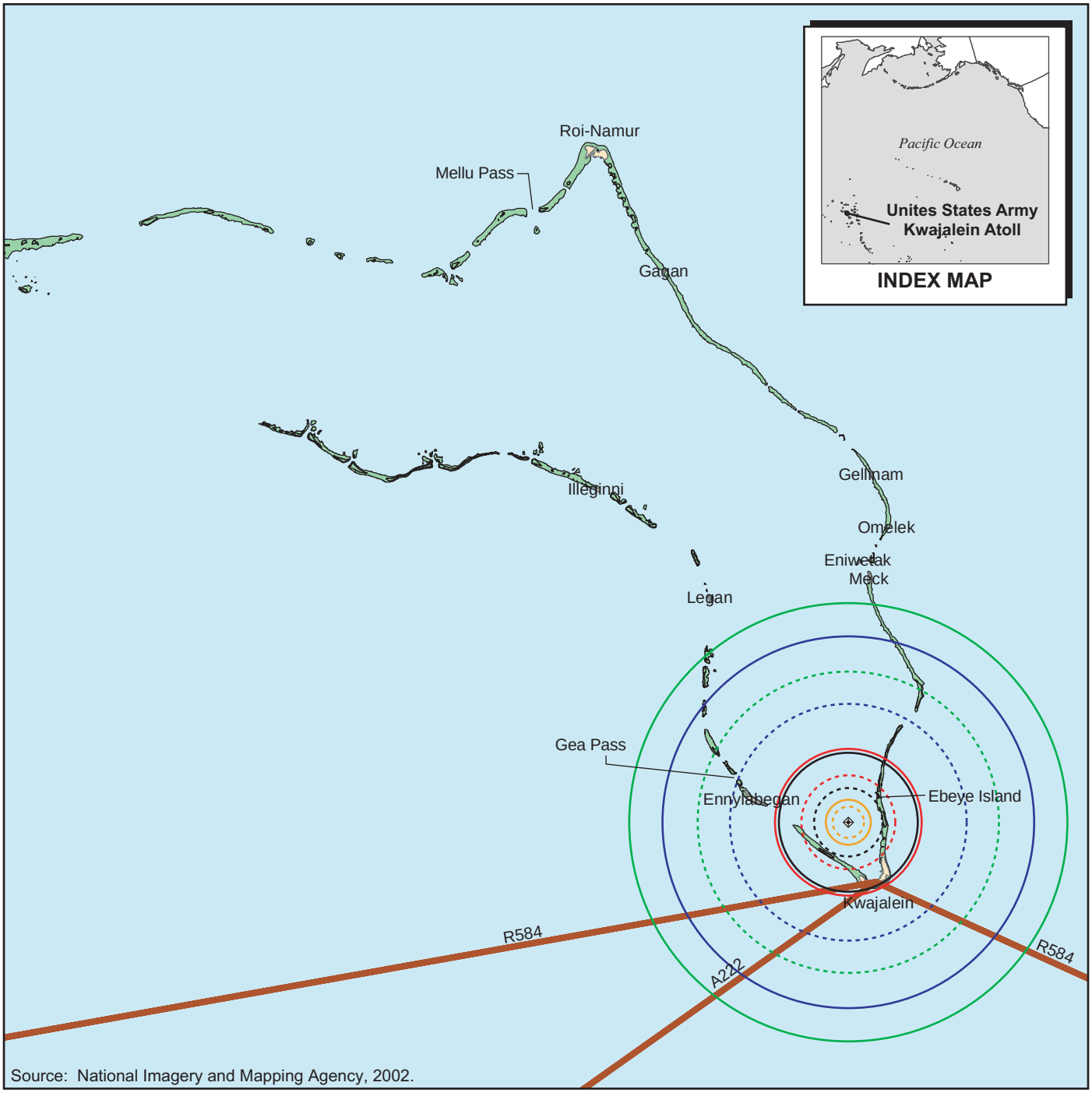
The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the ROI is managed by the Oakland ARTCC in its Oceanic Control-6 Sector, the boundaries of which are shown in figure 3.3.2-2.

Special Use Airspace

There is no special use airspace in the ROI.

En Route Airways and Jet Routes

Although relatively remote from the majority of jet routes that cross the Pacific, the RTS and vicinity have several jet routes passing nearby, including R-584 and A-222 (figure 3.3.2-1). An accounting of the number of flights using each jet route is not maintained.



EXPLANATION

- Land
- Coral
- SBX Mooring Site
- Low Altitude Air Routes

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note:
- Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

NORTH

Scale

0 7.5 15 kilometers

0 4.75 9.5 miles

Airspace Over the Potential SBX Site at Reagan Test Site

United States Army
Kwajalein Atoll

Figure 3.3.2-1

06-09-03 Kwaj Air-SBX_2

EXPLANATION

FIR = Flight Information Region
OC = Oceanic Control Sectors within the Oakland FIR

- Oakland FIR Boundary
- Sector Boundaries
- Radar Control Areas

Airspace Managed by the Oakland Oceanic Control Area Administrative Boundaries (Oakland FIR)

Pacific Ocean

Not to Scale

NORTH

Figure 3.3.2-2

06-09-03 Oakland Airspace

Although not depicted on either the North Pacific Route Chart, Southwest Area or Composite, there are low altitude airways carrying commercial traffic between the various islands of the RMI, particularly between the Marshall Islands International Airport at Majuro and Bucholz Army Airfield on Kwajalein.

Airports/Airfields

In 1993 Bucholz Army Airfield had a reported 1,674 operations per month, an average of over 55 per day. Many of the 55 flights per day were aircraft and helicopter flights to other USAKA islands. Currently flight activity through Bucholz Army Airfield is reduced. Dyess Army Airfield on Roi-Namur provides service to a variety of aircraft and helicopters.

3.3.3 BIOLOGICAL RESOURCES—REAGAN TEST SITE

Appendix B includes a general definition of biological resources. Regulations governing endangered species and wildlife resources at RTS are specified in UES Section 3-4. Water quality and reef protection standards at RTS are in UES Section 3-2 (U.S. Army Space and Missile Defense Command, 2001a).

3.3.3.1 Region of Influence

The ROI includes areas on RTS that may be affected by interceptor launches from existing silos, target launches from existing and new launch sites, and the use of existing sensors. The ROI for biological resources includes the entire island and near-shore reef area for islands where target and interceptor missiles would be launched. For islands where only sensors would be placed, the ROI would be limited to the sites where program activities are conducted and the EMR hazard area. The ROI for the flight test corridor includes the missile over-flight area and the potential debris impact areas over the BOA or Kwajalein Lagoon within the Mid-atoll Corridor. The ROI also includes areas that may potentially be affected by the use of RTS for the SBX, including the mooring sites identified in section 2.3.1.3.

3.3.3.2 Affected Environment

Vegetation

The types of vegetation currently found on USAKA consist of managed vegetation, herbaceous (green, leaf-like) strand, littoral (relating to the shore) shrubland, littoral forest, and coconut plantation. Managed vegetation is disturbed vegetation dominated by alien weeds and is usually maintained by mowing. Herbaceous strand is a narrow zone of vegetation on upper sandy or rocky beaches dominated by grasses, sedges, and vines. Littoral shrubland consists of vegetation in coastal areas dominated by wide spread shrubs. Littoral forest is usually the most common type of vegetation on tropical islands dominated often by a single tree species. Coconut plantations are dominated by planted coconut palms. (Oak Ridge Institute for Science and Education and U.S. Army Environmental Center, 1999)

Kwajalein

Much of Kwajalein has been cleared and paved, including the large runway occupying the entire center (southern) portion of the island, and very little undisturbed vegetation remains. Non-native grasses and weeds dominate the open areas and are maintained by mowing. The island

has been enlarged over the years with dredged landfill since the 1930s and consequently exhibits vegetation characteristic of heavily disturbed areas. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995)

Most of the managed vegetation on Kwajalein consists of weedy alien plants such as mat grass, coat buttons, temple grass, and Bermuda grass. Some herbaceous strand is found along the coast and is dominated by beach morning glory, hurricane grass, and sickle grass. Tree heliotrope and beach sunflower are examples of littoral shrubland species found on the island. The most common trees on Kwajalein are coconut, screwpine, and ironwood; however, no littoral forest is present. (Oak Ridge Institute for Science and Education and U.S. Army Environmental Center, 1999)

Previously existing lagoon and nearshore marine habitat along the Kwajalein lagoon shoreline has been buried under landfill. However, along the northern edge of the island on the lagoon floor are several small communities of the rare seagrass *Halophila minor*. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995)

Meck

Much of Meck has been cleared and paved. Non-native grasses and weeds dominate the open areas and are maintained by mowing. A few native trees still exist on the northern end of the island within the ROI. The island has been enlarged with dredged fill material. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995)

Vegetation on Meck is mainly managed vegetation with some small patches of herbaceous strand and littoral shrubland. Managed vegetation consists of plants such as coat buttons, mat grass, hurricane grass, and garden spurge. Herbaceous strand vegetation such as mat grass, beach morning glory, and sickle grass tends to occur in areas near the ocean that are no longer mowed. No littoral forest occurs on Meck. (Oak Ridge Institute for Science and Education and U.S. Army Environmental Center, 1999)

Roi-Namur

All five vegetation types described above are found on Roi-Namur. Non-native grasses and weeds dominate the open areas of the island and are maintained by mowing. Most of the island is maintained (i.e., open grassy areas, golf course, runway, housing areas) and a sizable portion of the island is used for radar operations, has been recently cleared, and/or is used as a repository for plant debris/compost and is overgrown with vines (e.g., beach sunflower and beach morning glory). Herbaceous strand is found in some coastal areas such as the west end of the runway and is dominated by beach sunflower, hurricane grass, and sickle grass. Littoral shrubland is also found along some of the coast and consists mainly of tree heliotrope and beach naupaka. A small patch of disturbed littoral forest is located in the northwest corner of Roi-Namur. Only a small portion (the southeastern tip) of Roi-Namur has been left relatively undisturbed since World War II. A forested area with coconut palm in the overstory has been allowed to recover on the eastern shore since approximately 1945. Coconut plantation vegetation includes some large patches of beach hibiscus and pisonia. Thick strands of small-leafed mangrove surround a small wetland in the center of the island. Although the harbor area on the lagoon side of the island has been dredged, the area supports the largest known community of the rare seagrass *Halophila minor* at Kwajalein Atoll. (Oak Ridge Institute for

Science and Education and U.S. Army Environmental Center, 1999; U.S. Army Space and Strategic Defense Command, 1995)

Threatened and Endangered Plant Species

No threatened or endangered plant species have been identified on Kwajalein, Meck, or Roi-Namur. (U.S. Army Space and Strategic Defense Command, 1995; U.S. Army Space and Missile Defense Command, 2001a)

Wildlife

Kwajalein

Numerous small parcels of seabird roosting habitat have been identified on the western end of Kwajalein within the ROI. Large numbers of migrating shorebirds have been observed, including the Pacific golden plover and the ruddy turnstone. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995) Since 1996, white terns have been the only seabirds observed breeding on Kwajalein. Black noddies and great crested terns were observed foraging in the main harbor and along the northwestern coastline respectively. (U.S. Department of the Army, 2001)

Five species of giant clam are found at USAKA along the surrounding reef on the lagoon side and ocean side, and between several of the islands. The largest species, the bear's paw or gigas clam (*Tridacna gigas*), which was observed during the 1998 inventory (U.S. Department of the Army, 2001) has been significantly reduced in number, and the Republic of the Marshall Islands (RMI) government and the National Marine Fisheries Service are examining all species for listing as threatened or endangered. (U.S. Army Space and Strategic Defense Command, 1995)

Meck

Seabirds have been observed nesting along the eastern perimeter of the runway on Meck. Habitat for seabird roosting exists to the southwest of the launch site in the fill area at the edge of the ROI. Black-naped terns regularly roost at the southeast corner of the runway. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995) Black-naped terns were observed roosting on the southeastern tip of Meck and in active colonies on the east side of the helicopter pad during the 1998 inventory (U.S. Department of the Army, 2001).

Roi-Namur

Nesting terns use the southern tip of Roi-Namur, and assorted shorebirds roost in the shrubs along the western shore. Reef herons feed in the shore flats and tidepools east of the runway and along the eastern shore. The only seabird that appeared to be nesting during the 1998 inventory was the white tern (U.S. Department of the Army, 2001). The forested area on the east side of Roi-Namur supports habitat for a variety of nesting seabirds. (U.S. Army Space and Strategic Defense Command, 1995) Great-crested terns, golden plovers, ruddy turnstones, whimbrels, and grey-tailed and wandering tattlers were observed during the 1998 inventory (U.S. Department of the Army, 2001).

Coconut crabs occur in the forested area on the east side of Roi-Namur. Additional non-avian fauna includes rodents, lizards, and domestic dogs and cats. (U.S. Army Space and Strategic Defense Command, 1995)

Essential Fish Habitat

Hundreds of species of coral, as well as 250 species of reef fish, can be found in the atolls of the Marshall Islands. Food cultivation on these islands is limited; as a result, fish and seafood are staples of the Marshallese diet. (Pacific Island Travel, 2002) The multilateral fisheries agreement between the United States and South Pacific island governments, including the Marshall Islands, seeks to protect the fisheries in the Exclusive Economic Zones. This has contributed to the adoption of the United Nations Agreement on Highly Migratory Fish Stocks and Straddling Fish Stocks, a treaty that promotes the long-term sustainable use of highly migratory species, such as tuna, by balancing the interests of coastal states and states whose vessels fish on the high seas. (U.S. Department of State, 2002)

Threatened and Endangered Wildlife Species

Kwajalein

Sea turtles frequently enter the lagoon and are commonly seen in the harbors at Kwajalein. Green and hawksbill (*Eretmochelys imbricata*) sea turtles have been observed on Kwajalein, but very little sea turtle nesting activity has been documented in recent years. (U.S. Army Space and Strategic Defense Command, 1995)

Meck

Sea turtles frequently enter the lagoon and are commonly seen feeding in the waters surrounding Meck. Although some sandy beaches on the lagoon side of Meck provide potential sea turtle nesting habitat, no evidence of nesting has been observed.

Roi-Namur

Sea turtles frequently enter the lagoon and are commonly seen in the harbors at Roi-Namur. Some of the sandy beaches of Roi-Namur provide potential nesting habitat for the green and hawksbill sea turtles. At least two instances of nesting have been reported on Roi-Namur in recent years.

Threatened and endangered marine species that may possibly occur in and around USAKA include the blue whale (*Balaenoptera musculus*), finback whale (*Balaenoptera physalus*), humpback whale, sperm whale (*Physeter macrocephalus*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), olive ridley sea turtle (*Lepidochelys olivacea*), hawksbill sea turtle (*Eretmochelys imbricata*) and green sea turtle (*Chelonia mydas*). These marine mammals and sea turtles are widely distributed, open-water species. (U.S. Army Space and Strategic Defense Command, 1995; U.S. Army Space and Missile Defense Command, 2001a)

Environmentally Sensitive Habitat

Kwajalein

Extensive dredge and fill activities since the 1930s have degraded the marine habitat surrounding Kwajalein, particularly on the lagoon side. A remnant of the original reef flat is

located just north of Echo Pier, outside the harbor. Despite the lack of natural vegetation, the islet provides limited habitat for several species of birds, particularly migrant shorebirds and waterfowl. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995; U.S. Army Space and Missile Defense Command, 2001a)

Meck

Extensive dredging and the deposition of fill on the lagoon reef flat have greatly altered the marine environment of Meck. Most of the island is surrounded by riprap intended for shoreline protection. The only remaining undisturbed reef flats occur at the north and south tips of the island. Giant clams are found on the reef. (U.S. Army Strategic Defense Command, 1989a; U.S. Army Space and Strategic Defense Command, 1993a; 1995)

Roi-Namur

Marine habitat of importance to biological resources on Roi-Namur includes the lagoon-facing and ocean-facing reef slopes and flats, inter-island reef flat, lagoon floor, seagrass beds, and intertidal zone. The reef flats at the east and west ends of Roi-Namur support coral and giant clams but do not exhibit high coral coverage due to the strong current. More active coral growth was observed on the southwestern corner of the island along the lagoon side. The seagrass beds along the lagoon side may serve as a juvenile fish nursery area. (U.S. Army Space and Strategic Defense Command, 1995)

3.3.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—REAGAN TEST SITE

Appendix B includes a general description of hazardous materials and hazardous waste laws and regulations. Regulations governing hazardous material and hazardous waste management at RTS are specified in UES Section 3-6.

3.3.4.1 Region of Influence

The ROI for potential impacts related to hazardous materials/wastes would be limited to areas of the atoll to be used for missile launch (Meck) and related communications operations, and in areas where hazardous materials are stored and handled (Kwajalein and Meck islands). Some materials may also be stored or trans-shipped via Roi-Namur. All three islands are part of the East Reef of Kwajalein Atoll.

3.3.4.2 Affected Environment

The affected environment at the RTS is the Kwajalein Lagoon (where the SBX would be moored), the island of Kwajalein (where the GBI would be received and temporarily stored), and Meck, where launch would occur.

Hazardous Materials and Waste Management

The use of hazardous materials at RTS, including Kwajalein Island, is limited primarily to materials used in facility infrastructure support and flight operations, with some additional quantities of hazardous materials used by various test operations at the range. Hazardous materials used in base infrastructure support activities include various cleaning solvents

(chlorinated and non-chlorinated), paints, cleaning fluids, pesticides, motor fuels and other petroleum products, freons (for air conditioning), and other materials. A hazardous materials management plan is prepared for all hazardous materials or petroleum products shipped to RTS. The hazardous materials management plan outlines the procedures for storage, use, transportation, and disposal of the hazardous materials or petroleum products. These substances are shipped to RTS by ship or by air (U.S. Army Space and Missile Defense Command, 2001a). Upon arrival at RTS, hazardous materials to be used by RTS assets are distributed, as needed, to various satellite supply facilities, from which they are distributed to the individual users. Distribution is coordinated through the base supply system; however, the issue of such materials requires prior authorization by the RTS Environmental Office to prevent unapproved uses of hazardous materials. An activity-specific Hazardous Materials Procedure must be submitted to the Commander, RTS for approval within 15 days of receipt of any hazardous material or before use, whichever comes first. Hazardous materials to be used by organizations utilizing the test range and its facilities (i.e., range users) are under the direct control of the user organization, which is responsible for ensuring that these materials are stored and used in accordance with local and federal requirements.

Users provide storage of all materials in accordance with established procedures applicable to individual operations. The use of all hazardous materials is subject to ongoing inspection by RTS environmental compliance and safety offices to ensure the safe use of all materials. The majority of these materials are consumed in operational processes (including small losses to the air and water).

Aircraft flight operations conducted at RTS consist primarily of flights between Bucholz Army Airfield on Kwajalein Island and Dyess Army Air Field at Roi-Namur, as well as flights using RTS as a trans-Pacific stopover. Helicopters also operate at RTS. These flight operations involve the use of various grades of jet propellant, which are refined petroleum products (kerosenes). Fuels are stored in ASTs located at several islands in the USAKA. Fuels are transported to RTS by ship (U.S. Army Space and Missile Defense Command, 2001a). Significant quantities of waste fuels are not normally generated since fuels are used up in power generation, flight operations, marine vessels, and vehicle and equipment usage.

Hazardous or toxic waste treatment or disposal is not allowed at RTS under the UES. Hazardous waste, whether generated by RTS activities or range users, is handled in accordance with the procedures specified in the UES Part 3-6.5. Hazardous wastes are collected at individual work sites in waste containers. These containers are labeled in accordance with the waste which they contain and are dated the day that the first waste is collected in the container. Containers are kept at the point of generation accumulation site until full or until a specified time limit is reached. Once full, containers are collected from the generation point within 72 hours and are prepared for transport to the RTS Hazardous Waste 90-Day Storage Facility (Building 1521), located on Kwajalein Island. Each of the point of generation accumulation sites is designed to handle hazardous waste and provide the ability to contain any accidental spills of material, including spills of full containers, until appropriate cleanup can be completed. For the staging area on Roi-Namur, hazardous wastes are transported on the weekly barge to Kwajalein (Department of Defense, Ballistic Missile Defense, U.S. Space and Missile Defense Command, 1999).

At the 90-Day Storage Facility any sampling of waste is performed (for waste from uncharacterized waste streams), and waste is prepared for final off-island shipment for disposal.

Wastes are shipped off-island within 90 days of arrival at Building 1521 to Honolulu on the supply barge, for treatment and disposal in the continental United States. The barge departs Kwajalein every 4 weeks. Therefore, the facility does not need to qualify for long-term storage under the UES (U.S. Army Space and Strategic Defense Command, 1995).

The UES requires preparation and implementation of a Kwajalein Environmental Emergency Plan for responding to releases of oil, hazardous materials, pollutants, and contaminants to the environment. The Kwajalein Environmental Emergency Plan is a contingency plan similar to a spill prevention, control and countermeasure plan, but which incorporates response provisions of a National Contingency Plan. The hazardous materials management plan is incorporated into the Kwajalein Environmental Emergency Plan.

Pollution Prevention/Recycling/Waste Minimization

Pollution Prevention/Recycling/Waste Minimization activities are performed in accordance with the UES and established contractor procedures in place at RTS.

Installation Restoration Program

The IRP is not applicable to RTS, since it is located in a foreign country (the RMI). Remedial action is performed as needed, in accordance with the UES.

Underground and Aboveground Storage Tanks

A number of active ASTs are located on RTS. Bulk fuel capacity (diesel, MOGAS, and JP-5) on Kwajalein is approximately 38 million liters (10 million gallons). Full capacity is rarely used. The few remaining USTs are in the process of being removed. Installation of new USTs is prohibited.

Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls

All areas containing asbestos are identified by signs in English and Marshallese. Asbestos-containing materials are used and maintained in accordance with the provisions of the UES and hazardous materials management plan. Any asbestos abatement activities would be conducted in accordance with the UES. Incineration, landfilling, or disposal of asbestos-containing materials at RTS is prohibited.

Existing areas containing lead-based paint are maintained according to established RTS safety procedures. Lead-base paint abatement activities are also conducted according to established procedures and monitored by the RTS Logistics Contractor Industrial Hygiene staff. Lead-based paint hazardous waste is shipped to the continental United States for disposal at a permitted treatment, storage, or disposal facility.

All existing areas or locations that contain PCBs or PCB equipment are regularly inspected and maintained in accordance with the UES and hazardous materials management plan. New uses of PCBs and the introduction of PCBs, PCB articles, or PCB items are prohibited. Incineration, landfilling, or disposal of PCBs or PCB items is prohibited.

Liquid Propellants and Other Toxic Fuels

Existing procedures assure safe handling of liquid propellants and other toxic materials. Current operations include storage and handling of GBI and EKV propellants.

3.3.5 HEALTH AND SAFETY—REAGAN TEST SITE

Appendix B includes a general description of health and safety.

3.3.5.1 Region of Influence

The ROI for potential impacts to worker health and safety at the RTS is greatest in the areas where missile components are stored and handled (Kwajalein and Meck Islands) and where launch (Meck) and post-launch activities occur.

The worker population of concern for the Proposed Action includes all of RTS, but would predominantly consist of the contractor, military and government civilian personnel directly involved with GMD ETR program operations.

The ROI for potential impact to public health and safety encompasses all 11 USAKA islands and other islands at Kwajalein Atoll and nearby atolls that could be affected by GMD ETR Program activities including pre-launch transport of missile components, missile launch, and missile flight. A launch failure could potentially involve an explosion, missile debris, release of toxic materials into the air or water, high noise levels, and/or fire. The population of concern for the Proposed Action consists of the community living on the various atolls and low-lying islands that comprise the RMI.

The ROI for EMR human health effects includes an area up to 85 meters (280 feet) from the SBX platform. The ROI for certain electronic equipment and civilian aircraft includes an area up to 19 kilometers (11.8 miles) from the SBX platform.

3.3.5.2 Affected Environment

Range Safety

RTS has the unique mission of serving as the target for a wide variety of missile launch operations from Vandenberg AFB, California, and the PMRF, Hawaii. These missions are conducted with the approval of the RTS Commander. A specific procedure is established to ensure that such approval is granted only when the safety of all proposed tests has been adequately addressed.

Range safety is accomplished by compliance with RTS regulations and use of established procedures and safety precautions to prevent injury to people and minimize damage to property. Range safety applies to preparation, testing and execution of RTS programs. Other range safety objectives are the successful completion of mission objectives.

All program operations must receive the approval of the Safety Office. This is accomplished by the user through presentation of the proposed program to the Safety Office. All safety analyses, SOPs, and other safety documentation applicable to those operations affecting RTS must be

provided, along with an overview of mission objectives, support requirements, and schedule. The Safety Office evaluates this information and ensures that all RTS safety requirements, as specified in the Safety Manual and supporting regulations, are followed. (U.S. Army Space and Strategic Defense Command, 1995)

Ground Safety

Ground safety is the protection of range personnel and the public from injury when conducting potentially hazardous operations and handling hazardous materials. Several of the islands are affected by building construction, the storage and assembly of explosives and rocket propellants, and the operation of heavy equipment.

Kwajalein Island is the center of RTS operations and has activities that include receiving fuels, propellants and explosives; maintaining aircraft vehicles and other equipment; providing electricity, water and waste disposal services; and conducting specialized testing activities. Kwajalein, Roi-Namur, Meck, Omelek, and Illeginni Islands are, or in the past have been, sites for assembling and launching missiles.

Missile launch programs at RTS typically consist of single or multi-staged solid propellant missiles with payloads that may contain liquid propellants. The solid rocket motors are composed of fuels and oxidizers in a rubber binding material (other chemical compounds are added to modify performance characteristics). While solid rocket motors are classified as explosives, most propellants do not detonate, but are extremely flammable. Payload vehicles have propulsion systems based on gaseous propellants such as helium or nitrogen, or liquid propellants such as monomethyl hydrazine and nitrogen tetroxide. Liquid fuels may be toxic, corrosive, and/or flammable.

Explosives are used at RTS for missile flight programs and for destruction of unexploded ordnance, fireworks, small arms rounds, and flares. Small amounts of explosives are used in missile launches for stage separation and flight termination systems, which destroy in-flight missiles that show abnormal flight characteristics. Explosives are stored on Kwajalein, Roi-Namur, and Meck. Solid rocket motors are stored on Kwajalein and Roi-Namur and moved to the other islands for a limited time before launches.

Launch facilities consist of structures used for the assembly and launch of missiles that contain experimental payloads. The primary buildings are missile assembly buildings, payload assembly buildings, launch control buildings and launch pads. These structures are spaced according to ESQD criteria defined in AR 385-64, *U.S. Army Explosives Safety Program*, and other regulations. The buildings at launch areas are designed to protect personnel from explosive pressure and fragments. Launches on smaller islands may be done remotely, when building separation is insufficient to protect personnel. The number of personnel working at launch facilities is limited during missile assembly and other potentially hazardous operations.

The site plans of launch facilities are reviewed and approved by the DoD Explosives Safety Board before construction. This evaluation takes into account the separation between magazines, operations buildings, transportation routes and unrelated inhabited buildings. Waivers for building separation have been obtained for storage magazines adjacent to the Kwajalein and Roi-Namur airfields.

The ground safety plans for programs at RTS contain emergency procedures for response to potential accident scenarios. For example, the emergency procedures for a missile launch program include the response to misfire and hangfire conditions, an explosion or fire on the launch pad, and the impact of an errant missile flight.

Fire protection is provided by fire suppression systems in most operations buildings and by continuously staffed fire stations on Kwajalein, Roi-Namur, and Meck Islands.

Missile Flight Safety

Flight safety provides protection to RTS personnel, inhabitants of the Marshall Islands, and ships and aircraft operating in areas potentially affected by these missions. Specific procedures are required for the preparation and execution of missions involving aircraft, missile launches, and reentry payloads. These procedures include regulations, directives, and flight safety plans for individual missions.

The area affected by aircraft and missile operations varies according to the type of mission. Incoming reentry vehicle impacts may affect the Mid-Atoll Corridor or the BOA to the north and east of the atoll. Aircraft operations may affect an area of 289 kilometers (180 miles) around RTS. A larger area is affected by sounding rocket or ballistic missile launches from RTS with trajectories typically to the north-northeast, where the lowest number of inhabited islands are located.

The largest affected areas result from test flights involving the collision of a target missile with an interceptor missile launched from RTS. The collision debris footprint, or area where collision debris could fall, extends for hundreds of miles away from the designated intercept point.

Flight safety activities include the preparation of a flight safety plan that includes evaluating risks to inhabitants and property near the flight, calculating trajectory and debris areas and specifying range clearance and notification procedures.

Flight safety plans are developed for both launch missions and incoming reentry vehicles. Potential hazards exist at RTS when missiles are launched and when reentering payloads are targeted for areas near the islands. Reentry vehicles are typically launched from Vandenberg AFB in California, PMRF in Hawaii, or Wake.

Notification is made to inhabitants near the flight path, and international air and sea traffic in the caution area designated for specific missions. Warning messages are transmitted to appropriate authorities to clear caution areas of this traffic and to inform the public of impending missions. The warning messages contain information describing the time and area affected and safe alternate routes. RMI is informed in advance of launches and reentry payload missions.

In missions that involve the potential for reentry debris near inhabited islands, precautions are taken to protect personnel. In Mid-Atoll hazard areas, where an island has a high probability of impact by debris, personnel are evacuated. In caution areas, where the chance of debris impact is low, precautions may consist of evacuating or sheltering non mission essential personnel. Sheltering is required for reentry vehicle missions impacting the Mid-Atoll Corridor in

Kwajalein Atoll. The Mid-Atoll Corridor is declared a caution area when it contains a point of impact.

Instrumentation is used for range safety by tracking incoming reentry vehicles and terminating missile flights in order to prevent an impact on inhabited islands. The Kwajalein Range Safety System links the RTS radar system to a range safety center on Kwajalein. A missile and payload can be tracked during the entire flight by the range safety center. Missiles launched from RTS are equipped with flight termination systems that allow destruction of the missile if the flight deviates significantly from planned criteria or otherwise poses a threat to the public. For example, a flight would be terminated if the missile path intersects the Marshall Islands protection circle, an artificial boundary around inhabited atolls and islands.

RTS Sensor Complex

EMR emitted from RTS radars is a potential hazard to humans and a potential source of interference with other communications and sensing equipment. Radars and RF transmitters emit non-ionizing radiation. Communications emissions are generally of low frequency and low emitted power and pose minimal threat. Radar testing at RTS involves several powerful radar systems and requires safety measures to protect RTS personnel. Sources of EMR at RTS and the mechanisms used to ensure the safety of personnel and to prevent interference are described in the *Final Ground-Based Radar (GBR) Family of Radars Environmental Assessment and Finding of No Significant Impact* (U.S. Army Program Executive Office Missile Defense, 1993).

According to a U.S. Army Space and Missile Defense Command fact sheet, the RTS complex of radar, optical and telemetry sensor instrumentation includes:

- Radar—High-resolution radars provide precision metric, signature, and imaging for deep-space operations, satellite observations, strategic reentry missions, and multiple-intercept engagement tracking. RTS's wide range of radar capability includes S-band, L-band, C-band, Ka-band, and W-band, as well as beacon tracking, passive skin tracking, and impact scoring.
- Optics—Precise optical metric data are collected on objects both inside and outside the atmosphere using large-aperture optics equipped with video, infrared, and film sensors. RTS's optics capability includes 35/70-millimeter cameras with frame rates up to 2,500 frames per second and focal lengths to 1,219 centimeters (480 inches).
- Telemetry—Critical onboard missile information transmitted to the ground is collected with nine geographically dispersed telemetry antennas capable of receiving data at frequencies of 1,700 to 2,400 megahertz (MHz). State-of-the-art ground stations receive, record, and display up to 30 megabytes of mission data.

The RTS integrated command and control center provides technical range support with secure fiber optic network and offers the range user calibration, range timing, meteorology, flight/ground safety, logistics, and data reduction/analysis services.

There are currently 22 RF sources at RTS, including 11 radar systems and 11 communication transmitters. Kwajalein has seven major sources of microwave radiation; Roi-Namur has five

sources, four of which are the major radar systems at RTS. There are smaller radar systems on the mid-atoll islands of Legan and Gellinam.

RTS radars are typically operated at a minimum inclination of 2 degrees above horizontal, which allows a hazard free zone from ground surface to at least 5 meters (15 feet). In tests requiring radar beams to go below the horizon, safety procedures require exclusion from hazard zones. Radar systems have mechanical and software stops to prevent the main beam from being directed at the ground or in specified sectors where it may present a hazard. Radars also have the potential to interfere with aircraft instrumentation. More powerful radars, such as TRADEX, have computer-controlled interlocks to reduce power output in the direction of approaching aircraft.

The primary physical reaction to EMR exposure is cellular heating with symptoms such as eye damage as an early consequence. EMR hazard zones provide a safety factor 10 times greater than the Institute of Electrical and Electronics Engineers (IEEE) Maximum Permissible Exposure Limit (MPELs). Per IEEE Standard C95.1-1999, *Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,* MPELs are capped at 5 milliwatts per square centimeter (mW/cm^2) for frequencies greater than 1,500 MHz. General public exposure is typically limited to one-fifth of the occupational limits. These hazard zones are defined in Army guidance and regulations on microwave and RF safety (appendix B). For non-ionizing radiation, OSHA established a radiation protection guide (29 CFR 1910.97, *Non-ionizing Radiation*) for normal environmental conditions and for incident electromagnetic energy of frequencies from 10 MHz to 100 MHz. This radiation protection guide is 10 mW/cm^2, as averaged over any possible 1-hour period. DoD Instruction 6055.11, *Protection of DoD Personnel from Exposure to Radiofrequency Radiation*, established permissible exposure limits (PELs) for controlled and uncontrolled environments and for High Power Microwave narrow-band and Electromagnetic Pulse broad-band simulator systems.

Regional Safety

The Kwajalein Hospital is the primary health care facility for RTS. The approximate 16-bed hospital has a dental clinic and provides emergency treatment, surgical, obstetric, general medical and diagnostic services for the community and range personnel. One medical technician staffs a dispensary located on Roi-Namur. A first aid station on Meck is also staffed by a medical technician. The hospital, dispensary, and first aid station is contractor operated and staffed. Video consultations with Tripler Army Medical Center in Honolulu, Hawaii provide access to medical specialists for those patients requiring supplemental evaluation. Medical specialists such as optometrists schedule periodic visits to Kwajalein. Other health facilities in the RMI include a private clinic on Majuro and a public hospital on Ebeye.

3.3.6 UTILITIES—REAGAN TEST SITE

3.3.6.1 Region of Influence

The ROI includes areas of Kwajalein that may potentially be affected by the use of Kwajalein Lagoon for the SBX activities, as well as the potential construction of an environmentally controlled warehouse. This site has not been determined.

3.3.6.2 Affected Environment

Utilities at USAKA/RTS are operated to meet the needs of the resident population of approximately 2,500 people, including dependants. However, it must be noted that this figure varies depending on mission status and construction activity.

Energy

Kwajalein has one electrical power plant using engine generator sets that burn diesel fuel; the electricity is distributed by underground feeders. In 1993, there were three power plants (PP1, PP2, and PP1A), which had a combined capacity of 26,790 kW. Historical peak loads totaled 13,500 kW over different periods, or 50 percent of capacity (U.S. Army Space and Strategic Defense Command, 1993a). Power distribution is conventional, with underground high-voltage transmission lines and aboveground "user voltage" (110-220 volt alternating current) distribution lines. Generating capacities have not changed in several years. Currently, there are seven generators operating with a total output of 29,200 kW (U.S. Army Space and Missile Defense Command, 2002b). The power plant at Kwajalein is designated Power Plant 1A and 1B.

Power Plant 1A became operational in April 1991 and reached full plant production in June 1991. Power Plant 1A produced 58 percent of Kwajalein's electrical requirements for June through December 1991 and was expected to produce a higher percentage of the island's power in future years. Power Plant1B went online in 1994 with four 4,400-kW units. Once Power Plant 1A and Power Plant 1B became functional, there was no longer a need for Power Plant 1 or Power Plant 2, so they were decommissioned.

Water

Kwajalein has a conventional package filter drinking water system for potable (drinkable) water production. Under normal conditions, Kwajalein's potable water system can provide an adequate supply of fresh water. In 1993, the daily supply of 1.6 million liters (430,000 gallons) per day from rainwater treatments, and groundwater was more than sufficient to meet the average demand of 1.1 million liters (300,000 gallons) per day. A desalination facility was decommissioned in 2002.

The capacity of the system is 1,703,435 liters (450,000 gallons) per day. Upgrades are in progress to improve this system's ability to meet USAKA/RTS environmental standards. These upgrades include the addition of reverse osmosis to units for control of total trihalomethanes and haloacetic acids. Drinking water quality is produced to meet the standards of the UES. Drinking water standards are essentially the same as EPA standards for public systems that serve a population of 10,000 people (U.S. Army Space and Missile Defense Command, 2001a).

Raw water is provided primarily by a rainwater catchment system along the runway. During dry seasons, additional water is provided by pumping the freshwater lens that forms an unconfined surficial aquifer beneath the island surface. Portable reverse osmosis water-purifying units are employed to remove organic contaminants from the lens well water. (U.S. Army Space and Missile Defense Command, 2002b)

Kwajalein has twelve 1-million-gallon (3.8-million-liter) reinforced concrete tanks for storage of rain water collected from the catchments and lens wells. Rain water is pumped from storage to treatment in the package water treatment plant. The treated water receives pH adjustment and

chlorination before being stored in one of two covered concrete tanks. Nine of the 14 existing raw water storage tanks are covered.

Wastewater

The wastewater system for Kwajalein consists of a force main and gravity collection system, nine pump stations, a secondary wastewater treatment plant, and an outfall extending into the lagoon. The wastewater treatment plant is now approximately 20 years old. Plant flow for the period September 1992 through August 1993 averaged 1.4 million liters (382,000 gallons) for this period at approximately 560 liters (148 gallons) per capita per day. Wastewater is reclaimed by conventional secondary treatment followed by chemical (chlorine) disinfection. Reclaimed water is used for non-potable uses, including sanitation and irrigation. Excess water is discharged in accordance with the UES. Wastewater sludge is treated and composted per the UES for use as soil amendment for lawns, landscaping, and gardens (U.S. Army Space and Missile Defense Command, 2002b).

Solid Waste

Kwajalein Island generates approximately 20.3 to 30.5 metric tons (20 to 30 tons) of municipal solid waste per day. Green waste is collected and taken to a composting area. Food wastes are no longer disposed of in the ocean off Kwajalein. The compost mulch is used for landscaping and in a nursery. Municipal solid waste is incinerated at the incinerator facility. Ash and inert waste solids are buried at an adjacent landfill. Metals are shipped to Honolulu to be recycled (U.S. Army Space and Missile Defense Command, 2002b). Waste batteries are shipped off-island intact. Used oil is collected in 208.2-liter (55-gallon) drums and used for energy reclamation. Glass, concrete rubble, and similar materials are processed for reuse as construction (including shoreline protection) and fill material at USAKA.

3.4 PACIFIC MISSILE RANGE FACILITY

The existing environment at PMRF was described in the *PMRF Enhanced Capability EIS* (Pacific Missile Range Facility, Barking Sands, 1998) and the *North Pacific Targets Program EA* (U.S. Army Space and Missile Defense Command, 2001b). For the most part, those descriptions are still accurate and are not repeated in this document. Rather, for resources that may be affected by ETR activities at PMRF, the pertinent resource discussions are summarized, and any differences in existing environmental conditions, including new facilities or infrastructure, are noted. The more detailed discussion in the Final EA or EIS is incorporated by reference and will be made available for review by those who wish more information concerning the existing environment at PMRF.

The proposed ETR activities could have an effect on air quality, biological resources, hazardous materials and waste, health and safety, and socioeconomics at PMRF. These resource areas are summarized in the following sections.

Areas that are not expected be affected sufficiently at PMRF to warrant further discussion include airspace, cultural resources, geology and soils, land use, noise, transportation, utilities, visual and aesthetic resources, water resources, and environmental justice. The ongoing missile launches and use of transportable radars result in short term temporary impacts to airspace that are mitigated through coordination with the FAA. While many areas of PMRF have important historic resources, many of them relating to native Hawaiian culture, there are not expected to be any ground disturbing activities within areas where these resources are located. Activities proposed in the GMD ETR EIS would adhere to the 1999 Memorandum of Agreement between the U.S. Department of the Navy, PMRF, and the Hawaii State Historic Preservation Officer as shown in the *PMRF Enhanced Capability EIS* (Pacific Missile Range Facility, Barking Sands, 1998). While proposed target launch activities will result in minor soil contamination from rocket emissions in and around the designated Launch Hazard Area at KTF, it is not expected to create adverse effects beyond those previously analyzed in the *PMRF Enhanced Capability EIS* (Pacific Missile Range Facility, Barking Sands, 1998). Land use at PMRF and surrounding areas would not change. Utilization of adjacent lands would be consistent with existing land use agreements. The existing noise levels at PMRF would continue, including those associated with proposed missile launches. Noise generated during the launches would be anticipated to have minimal impact on off-base areas and would not affect the noise levels estimated in the current PMRF Air Installation Compatible Use Zone report. None of the noise levels outside of the Ground Hazard Area boundary for the proposed launch areas where non-essential personnel and the public are excluded would exceed either DoD or OSHA safety requirements. Personnel within the Ground Hazard Area wear hearing protection devices. Any increase in daily trips by support personnel, including any utilized to support mid-range telemetry functions, would be short term and small, utilizing existing transportation infrastructure. Shared vehicle and/or off-peak hour travel would further serve to minimize effects on transportation levels. The utilities infrastructure and water resources requirements for the proposed activities are included in the existing usage levels and are not expected to be adversely affected by the proposed activities. Although the visual resources on PMRF may be considered significant by some viewers, much of the area is already developed with the types of structures and activities that are being considered in the Proposed Action. Therefore, this section does not include further analysis of visual resources at PMRF. An Environmental Justice impact would be a long-term health, environmental, cultural, or economic effect that has a disproportionately high and adverse effect on a nearby minority or low-income population, rather than all nearby residents. No adverse long-term impacts have been identified at the proposed sites on PMRF. As such, there would be no disproportionately high and adverse

human health or environmental effects on the minority or low-income populations that may be present in the vicinity of those locations.

3.4.1 AIR QUALITY—PACIFIC MISSILE RANGE FACILITY

Appendix B includes a general description of air quality.

3.4.1.1 Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending no more than a few tens of miles downwind from the source.

The ROI for ozone may extend much further downwind than the ROI for inert pollutants; however, as the project area has no heavy industry and very few automobiles, tropospheric ozone and its precursors are not of concern. Consequently, for the air quality analysis, the ROI for project operational activities is the existing airshed surrounding the various sites, which encompasses the Mana Plain, including the PMRF/Main Base and Ground Hazard Area restrictive easements.

3.4.1.2 Affected Environment

Climate

PMRF, which is located just south of the Tropic of Cancer, has a mild and semitropical climate with scattered clouds and generally light and variable trade winds from the northeast.

Regional Air Quality

The only sampling station on Kauai is located in Lihue, and monitors for PM-10. The State of Hawaii is in attainment of the NAAQS established for carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, ozone, and lead (40 CFR 81.312 and 52.631(b)).

The major source of air pollution emissions external to, and not associated with, PMRF/Main Base is the seasonal burning of the cane fields east of the base. This burning produces periods of elevated smoke and ash. In addition, the smoke temporarily degrades visibility over an extended area.

Existing Emissions Sources

The main pollution sources at PMRF are diesel-fuel powered generators, aircraft, and rocket launches. PMRF was issued a Title V Covered Source Permit for five diesel generators, which covers all significant stationary emission sources on PMRF. Aircraft emissions and missile exhaust emissions are both considered mobile sources and are thus exempt from permitting requirements. (Pacific Missile Range Facility, Barking Sands, 1998) Table 3.4.1-1 lists the estimated exhaust products from typical launch vehicles at PMRF as presented in the *PMRF Enhanced Capability EIS.* (Pacific Missile Range Facility, Barking Sands, 1998) No adverse air quality impacts were anticipated from current launches.

Table 3.4.1-1: Estimated Emissions of Typical Missile Launches at PMRF

Pollutant	Guidance Levels	Hawk[1] (milligrams per cubic meter)	Talos/Zest[2] (milligrams per cubic meter)	Strategic Target System[3] (milligrams per cubic meter)
Aluminum Oxide	10 (8-hour TLV)			8.46[4]
	5 (8-hour TWA)	0.07[5]	0.06	
Carbon Dioxide	40 (1-hour TWA)	0.094		0.92[6]
	10 (8-hour TWA		0.096	0.68[6]
Hydrogen Chloride	1.5 (1-hour TWA)	0.087	0.051	0.47[6]

Source: Pacific Missile Range Facility, Barking Sands, 1998
(1) Hawk emissions based on EPA approved version of TSCREEN/PUFF model at 1,900 meters (6,200 feet)
(2) Talos/Zest emissions based on commercial version of TSCREEN/PUFF model at 3,000 meters (9,840 feet)
(3) Strategic Target System used Rocket Exhaust Effluent Dispersion Model to model Hydrogen Chloride
(4) At 190 meters (623 feet)
(5) Value is a 1-hour TWA. Due to near-instantaneous nature of emissions, 8-hour TWA would be lower
(6) At 3,000 meters (9,840 feet)
TLV = Threshold Limit Value
TWA = Time-weighted Average

3.4.2 BIOLOGICAL RESOURCES—PACIFIC MISSILE RANGE FACILITY

Appendix B includes a definition of biological resources and the main regulations and laws that govern their protection.

3.4.2.1 Region of Influence

The ROI includes areas on PMRF that may be affected by target launches from existing launch sites and the use of existing sensors.

3.4.2.2 Affected Environment

Vegetation

The vegetation on PMRF/Main Base is composed of two principal habitat types: non-native ruderal vegetation and kiawe/koa haole scrub. Within PMRF/Main Base and the KTF area of the complex, ruderal vegetation is present where man has disturbed the natural vegetation, and much of this vegetation is mowed on a regular basis. The vegetation adjacent to PMRF/Main Base in the Ground Hazard Area is dominated by sugar cane, ruderal vegetation, and wetlands associated with agricultural ponds and drains. Kiawe/koa haole scrub and ruderal vegetation are the dominant vegetation in the undeveloped portions of the PMRF/Main Base ROI. In the south-central part of PMRF/Main Base, mosaic-like patches of vegetation dominated by the indigenous wedge-leaf hop bush are present on a sandy substrate. Coastal dune vegetation covers much of the dunes north of KTF, and a well-developed native strand community exists along the shoreline.

Vegetation at Makaha Ridge is dominated by introduced non-native species. Well-maintained grassy lawns and landscape plantings are located around the existing buildings. A few shrubs of the native false sandalwood or naio and the introduced lantana occur along the makai (coastal) edge of the Makaha Ridge complex. (Pacific Missile Range Facility, 2000)

Threatened and Endangered Plant Species

Table 3.4.2-1 lists threatened and endangered species that could potentially be located within the ROI.

Table 3.4.2-1: Listed Species Known or Expected to Occur in the Vicinity of the Proposed Action

		Status	
Scientific Name	**Common Name (Location)**	**State**	**Federal**
Reptiles			
Caretta caretta	Loggerhead sea turtle	E	T
Chelonia mydas	Green sea turtle	E	T
Dermochelys coriacea	Leatherback sea turtle	E	E
Eretmochelys imbricata	Hawksbill sea turtle	E	E
Lepidochelys oliveacea	Olive ridley sea turtle	E	T
Birds			
Anas wyvilliana	Hawaiian duck	E	E
Fulica americana alai	Hawaiian (American) coot	E	E
Gallinula chloropus sandvicensis	Hawaiian common moorhen	E	E
Himantopus mexicanus knudseni	Hawaiian black-necked stilt	E	E
Nesochen sandvincensis	Hawaiian goose (ne ne) (Makaha Ridge)	E	E
Pterodroma phaeopygia sandwichensis	Hawaiian dark-rumped petrel	E	E
Puffinus auricularis newelli	Newell's Townsend's shearwater	E	T
Mammals			
Balaenoptera borealis	Sei whale (Open Ocean)	E	E
Balaenoptera musculus	Blue whale (Open Ocean)	E	E
Balaenoptera physalus	Fin whale (Open Ocean)	E	E
Lasiurus cinereus semotus	Hawaiian hoary bat	E	E
Megaptera novaeangliae	Humpback whale (Open Ocean)	E	E
Monachus schauinslandi	Hawaiian monk seal	E	E
Physeter macrocephalus	Sperm whale (Open Ocean)	E	E
Plants			
Panicum niihauense	Lau'ehu	E	E
Sesbania tomentosa	Ohai	E	E
Wilkesia hobdyi	Dwarf iliau (Makaha Ridge)	E	E

NOTES:

T Threatened
E Endangered

Two federally listed plant species have been observed north of PMRF. Ohai (*Sesbania tomentosa*), a spreading shrub, is a federally endangered species that has been observed in the sand dunes to the north of the KTF launch complex and in Polihale State Park and could potentially occur on PMRF/Main Base. Lau'ehu (*Panicum niihauense*), a federally endangered species of rare grass, has been observed near Queens Pond north of PMRF/Main Base.

The dwarf iliau (*Wilkesia hobdyi*), an endangered member of the daisy or sunflower family, is found on rocky outcrops of the cliff overlooking Makaha Valley to the north of the tracking station on Makaha Ridge (Department of the Navy, Pacific Missile Range Facility, Hawaii, 2001).

Wildlife

Forty species of birds have been identified at PMRF/Main Base, including non-native and migratory birds and species endemic to Hawaii. The pueo (*Asio flammeus sandwichensis*) (Hawaiian short-eared owl) is a state listed endangered species. This owl is the only endemic terrestrial bird species that occurs in the region. Non-native bird species on Kauai are usually common field and urban birds such as the ring-necked pheasant. Several species of migratory waterfowl may be present during some portion of the year. The Laysan albatross, a migratory bird protected under the Migratory Bird Treaty Act, uses ruderal vegetation areas for courtship and nesting. PMRF has an ongoing feral dog-trapping program to protect the albatross as well as the wedge-tail shearwater and other birds on base. However, the Laysan albatross is being discouraged from nesting at PMRF/Main Base to prevent interaction between the species and aircraft using the runway. Albatross on the airfield are tagged and released on the north portion of the base or returnees are relocated to Kilauea National Wildlife Refuge in order to prevent bird/aircraft strikes. This action is being accomplished under a USFWS permit. (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Space and Missile Defense Command, 2001b)

Feral dogs and cats occur in the region and prey on native and introduced species of birds. Rodents including the Polynesian black rat, Norway or brown rat, and the house mouse are also known to occur in the region. (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Space and Missile Defense Command, 2001b)

Three endemic birds, the white-tailed tropicbird, the Pacific golden plover, and the common amakahi, have been observed at Makaha Ridge. Introduced birds commonly found in this area of Kauai include the spotted dove, zebra dove, and the common myna. In addition, two native species that may occur in the area are the short-eared owl and the Hawaiian honeycreeper (‘I’iwi). It is likely that mice or rats inhabit the Makaha Ridge area. Feral goats have been seen in this general area. (Pacific Missile Range Facility, 2000)

Essential Fish Habitat

Essential Fish Habitat occurs and is incorporated within Kauai’s Exclusive Economic Zone, the 322-kilometer (200-mile) limit around the island. Essential Fish Habitat for adult and juvenile bottomfish includes the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (219 fathoms), which encompasses important steep drop-offs and high relief habitats. Shallow-water (0 to 100 meters [0 to 55 fathoms]) bottomfish species include uku, thicklip trevallys, groupers, emperors, amberjack, and taape. Deep-water (100 to 400 meters [55 to 219 fathoms]) species include ehu, onaga, opapaka, gindai, hapupuu, and lehi. (Western Pacific Fishery Management Council, 1998)

Pelagic habitat areas of particular concern are designated as the water column down to 1,000 meters (3,280 feet) from the shoreline to the Exclusive Economic Zone that lies above all seamounts and banks shallower than 2,000 meters (1,100 fathoms). Marketable pelagic species include striped marlin, bluefin tuna, swordfish, albacore, mackerel, skipjack, sailfish, kawakawa, and various sharks. (Western Pacific Fishery Management Council, 1998)

Banks with summits less than 30 meters (98 feet) have been designated as habitat areas of particular concern for crustaceans. Crustacean species include spiny lobster, slipper lobsters, and Kona crabs. (Western Pacific Fishery Management Council, 1998)

Threatened and Endangered Wildlife Species

Table 3.4.2-1 lists threatened and endangered species that could potentially be located within the ROI.

Six species of birds that are listed as federally threatened or endangered are potentially present or confirmed in the PMRF area. Kauai provides the majority of the nesting habitat for the federally threatened Newell's Townsend's shearwater (*Puffinus auricularis newelli*). The Newell's shearwater nests from April to November in the interior mountains of Kauai. Nestlings leave the nesting grounds at night in October and November and head for the open ocean. They may become temporarily blinded by lights when flying near brightly lit urban areas or street lights and some may collide with trees, utility lines and light poles, buildings, and automobiles. The most critical period for these collisions is a week before and a week after the new moon in October and November.

The Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*), which is listed as federally endangered, may traverse the area from its nesting grounds to the sea. Fledging of the dark-rumped petrel occurs in October, slightly earlier than that of the Newell's shearwater.

The Hawaiian (American) coot *(Fulica americana alai*), Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*), Hawaiian common moorhen (*Gallinula chloropus sandvicensis*), and Hawaiian duck (*Anas wyvilliana*) are federal and state endangered birds that have been observed in the drainage ditches and ponds on PMRF.

The federal and state endangered Hawaiian goose (*Nesochen sandvincensis*), or *ne ne*, occurs as a breeding population within the Makaha Ridge facility (Pacific Missile Range Facility, 2000).

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is listed as a federal and state endangered species. While it has not been recorded as flying over PMRF, it is known to feed offshore and has been observed at the Polihale State Park north of the base. It is likely that the bat also flies over PMRF.

Three marine wildlife species listed as federal and state threatened or endangered commonly occur in the area. The endangered Hawaiian monk seal (*Monachus schauinslandi*) is an indigenous mammal that has been observed at PMRF. The first Hawaiian monk seal birth observed on a Kauai beach since 1993 occurred on PMRF in 1999 on the beach adjacent to the runway (Pacific Missile Range Facility, 1999). Only four other Hawaiian monk seal births had been recorded on Kauai since 1961 (Navy Environmental News, 1999). The fact that humans frequent all beaches on PMRF may generally discourage use by monk seals.

The federal threatened and state endangered green sea turtle (*Chelonia mydas*) basks and nests on PMRF adjacent to the Nohili Ditch (Pacific Missile Range Facility, 1999; Pacific Missile Range Facility, 2001). Ninety percent of the Hawaiian population of the green sea turtle returns to French Frigate Shoals to breed (University of Hawaii, 2002).

The federal and state endangered migratory humpback whale is known to use the channel between Kauai and Niihau. Approximately two-thirds of the North Pacific population of humpback whales winter in Hawaii.

Environmentally Sensitive Habitat

Wetlands

Wetlands are associated with the Mana base pond, Kawaiele wildlife sanctuaries (a State Waterbird Refuge for Hawaii's four endangered waterbird species, created at Mana during a sand removal program), and agricultural drains (Nohili and Kawaiele ditches) within PMRF/Main Base.

Hawaiian Islands Humpback Whale National Marine Sanctuary

The Hawaiian Islands Humpback Whale National Marine Sanctuary was created by Congress in 1992 (figure 3.4.2-1). A small portion of the sanctuary lies within the ROI. Humpback whales are endangered marine mammals and are therefore protected under provisions of the Endangered Species Act and the Marine Mammal Protection Act wherever they are found. Humpbacks are seen in the winter months in the shallow waters surrounding the Hawaiian Islands where they congregate to mate and calve. The humpback population is growing by an average of 7 percent annually. That means their numbers, which stand at about 5,000, would double in approximately 13 years. The whales travel more than 5,633 kilometers (3,500 miles) from Alaska to Hawaii's warm waters to mate, give birth, and care for their calves. The estimated 5,000 whales traverse more than a half-million square kilometers (quarter-million square miles) of ocean surrounding Hawaii. The first whales of the season usually arrive around October, with the greatest number seen around Hawaii between 1 December and 15 May. (Star Bulletin, 2002)

Submerged Barrier Reef Offshore of PMRF

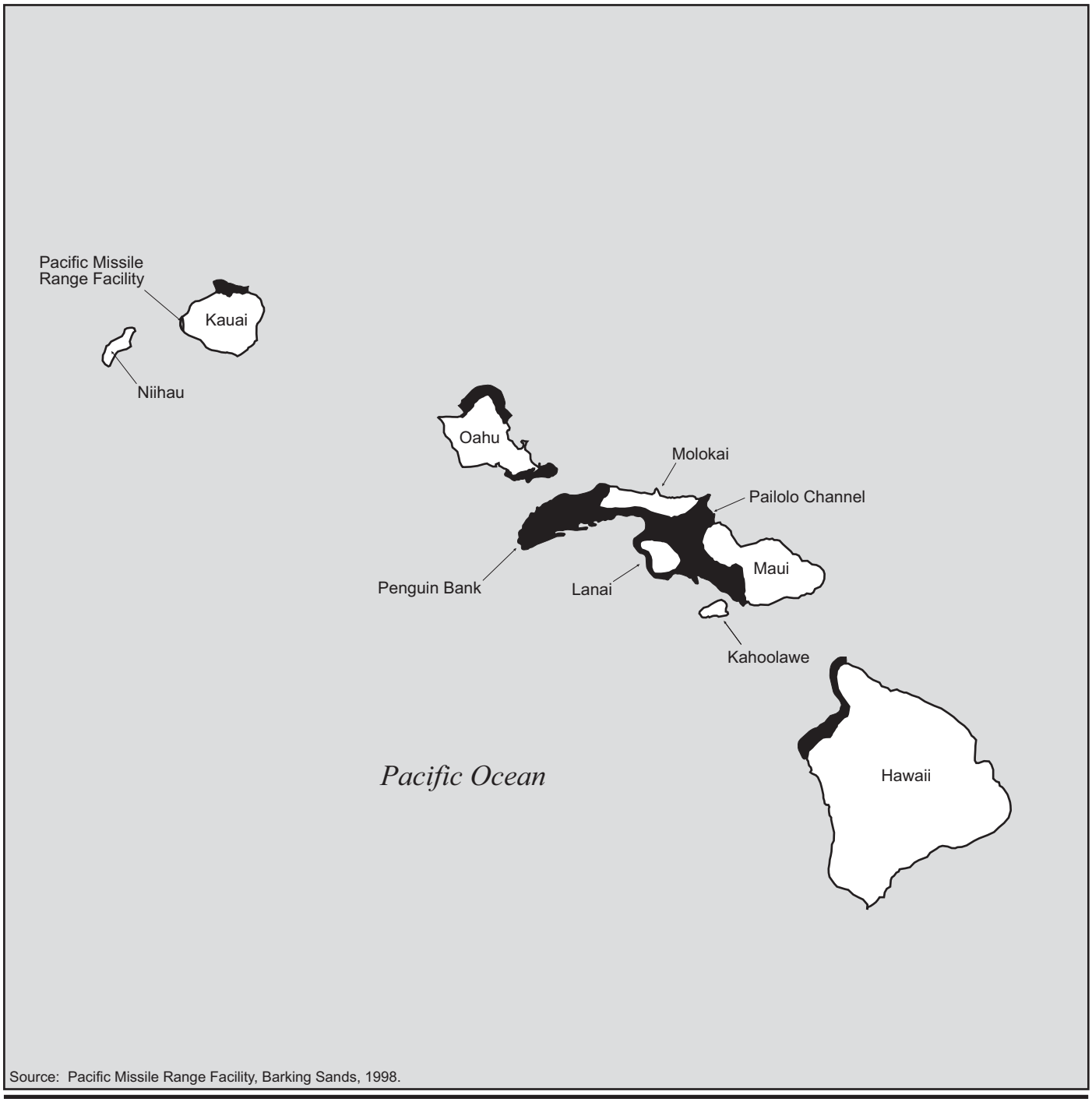
A submerged barrier reef, roughly 13 kilometers (8 miles) long, lies offshore of PMRF. Coral density is low and is dominated by lobe coral (*Porites lobata*) and small stands of arborescent (branched or tree shaped) corals.

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve is discussed in the BOA, section 3.11.

Critical Habitat

Critical habitat is the term used in the Endangered Species Act to define those areas of habitat that are known to be essential for an endangered or threatened species to recover and that require special management protection. A proposed rule to designate critical habitat for 76 listed plant species on the islands of Kauai and Niihau was published in the Federal Register in November 2000 (Federal Register, 2000b). This proposed rule included land in the northwestern end of PMRF near Polihale Park as critical habitat for the endangered ohai and lau'ehu. In January 2002, the USFWS proposed critical habitat for additional plant species on Kauai and



Source: Pacific Missile Range Facility, Barking Sands, 1998.

EXPLANATION

State of Hawaii's Areas for Inclusion in Sanctuary Boundary, 1997 (defined as within the 100 fathom isobath)

Land Area

Hawaiian Islands Humpback Whale National Marine Sanctuary Boundary

NORTH

Scale

0 40 80 kilometers

0 25 50 miles

06-09-03 Humpback Sanctuary

Hawaiian Islands

Figure 3.4.2-1

Niihau, revising the total number of plants to 83, which includes additional land in the southern portion of PMRF for protection of lau'ehu. (U.S. Fish and Wildlife Service, Pacific Region, 2002a; Federal Register, 2002) The USFWS reevaluated the dune habitat on PMRF and the habitat on Navy land at Makaha Ridge and determined that these lands were not essential for the conservation of ohai or dwarf iliau. However, the USFWS has determined that land on PMRF adjacent to Polihale State Park and dune areas along the southern portion of the range contain primary constituents necessary for the recovery of lau'ehu because not enough areas exist outside of PMRF. If the Navy revises its Integrated Natural Resources Management Plan to address the maintenance and improvement and long-term conservation of the lau'ehu, the USFWS will reassess critical habitat boundaries. (Federal Register, 2003)

3.4.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—PACIFIC MISSILE RANGE FACILITY

Appendix B includes a general definition of hazardous materials and hazardous waste and a brief summary of regulations and laws.

3.4.3.1 Region of Influence

The ROI for potential impacts related to hazardous materials/wastes would be limited to areas of the PMRF to be used for launch preparation, launch, and post-launch activities, and in areas where hazardous materials are stored and handled.

3.4.3.2 Affected Environment

Hazardous Materials and Hazardous Waste Management

Hazardous Materials Management

PMRF manages hazardous materials through the U.S. Navy's Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP). CHRIMP mandates procedures to control, track, and reduce the variety and quantities of hazardous materials in use at facilities. The CHRIMP concept established Hazardous Materials Minimization Centers as the inventory controllers for U.S. Navy facilities. All departments, tenant commands, and work centers must order hazardous materials from the Hazardous Materials Minimization Centers, where all such transactions are recorded and tracked. The exception to this is KTF, which obtains its hazardous materials through Department of Energy channels. Hazardous materials on PMRF are managed by the operations and maintenance contractor through CHRIMP. Hazardous materials managed through the CHRIMP program other than fuels are stored in Building 338. Typical materials used on PMRF/Main Base and stored at Building 338 include cleaning agents, solvents, and lubricating oils. (Pacific Missile Range Facility, Barking Sands, 1998)

PMRF has management plans for oil and hazardous materials outlined in the *PMRF Spill Prevention Control and Countermeasures Plan* and the *Installation Spill Contingency Plan,* both of which also regulate tenant organizations and PMRF associated sites. (Pacific Missile Range Facility, Barking Sands, 1998) Specifically, sites included are KTF, Makaha Ridge, Kokee, Kamokala Magazines, and Port Allen.

PMRF has developed programs to comply with the requirements of the Superfund Amendments and Reauthorization Act Title III and Emergency Planning and Community Right-to-Know Act. This effort has included submission to the state and local emergency planning committees of annual Tier II forms, which are an updated inventory of chemicals or extremely hazardous substances in excess of threshold limits. These chemicals at PMRF include jet fuel, diesel fuel, propane, gasoline, aqueous fire fighting foam, chlorine, used oil, paint/oils, and paint.

Hazardous Waste Management

PMRF/Main Base is a large-quantity hazardous waste generator with an EPA number. Hazardous waste on PMRF is not stored beyond the 90-day collection period. In 1996, PMRF/Main Base generated 40,214 kilograms (88,654 pounds) of hazardous waste, which is a significant reduction in the amount of hazardous waste generated when compared to the 88,800 kilograms (195,766 pounds) generated in 1990.

PMRF/Main Base has two accumulation points on base for hazardous wastes: Building 392 and Building 419. Building 392 accumulates all base waste except for otto (torpedo) fuel, a liquid monopropellant. Building 419 is the torpedo repair shop. At present, both buildings are not used at their maximum hazardous waste storage capacity. KTF has one accumulation point.

Makaha Ridge and Kokee generate only used oil, which is recycled. Port Allen generates used oil, paint wastes, and oily bilge water. The oily bilge water is processed through an oil/water separator and then is fed into the nearby sewage treatment plant. (Pacific Missile Range Facility, Barking Sands, 1998)

Under state regulations oil is not regulated as a hazardous waste, but is a hazardous substance subject to notification. (Pacific Missile Range Facility, Barking Sands, 1998) PMRF outlines management and disposal procedures for used oils and fuels in the Hazardous Waste Management Plan. Additionally, degraded jet fuel is used in crash-fire training exercises.

The majority of wastes are collected and containerized at PMRF/Main Base for direct offsite disposal through the Defense Reutilization and Marketing Office (DRMO) at Pearl Harbor within 90 days. (Pacific Missile Range Facility, Barking Sands, 1998) The DRMO provides for the transportation and disposal of the wastes to the final disposal facility. (Pacific Missile Range Facility, Barking Sands, 1998)

KTF on PMRF/Main Base is a small-quantity generator and has an EPA identification number. (U.S. Army Program Executive Office, 1995) KTF has not generated enough hazardous waste for disposal since becoming a small quantity generator in 1994. (Pacific Missile Range Facility, Barking Sands, 1998)

Pollution Prevention/Recycling/Waste Minimization

PMRF has a pollution prevention plan in place for the Main Base and all sites on Kauai, which was updated in February 1996 and follows CHRIMP procedures for controlling, tracking and reducing hazardous materials use and waste generation. (Pacific Missile Range Facility, Barking Sands, 1998) In regards to hazardous waste elimination programs, PMRF/Main Base currently has three in place. These involve the recycling of toner cartridges, mercury from mercury lamps, and acid/lead batteries. (Pacific Missile Range Facility, Barking Sands, 1998)

In calendar year 1996, 624 kilograms (1,376 pounds) of fluorescent tubes containing mercury were recycled, as well as 208 kilograms (458 pounds) of acid/lead batteries. (Pacific Missile Range Facility, Barking Sands, 1998) Additionally, all spent toner cartridges were sent to the manufacturer for recycling.

Installation Restoration Program

PMRF/Main Base has 16 IRP sites. The two fire fighting training pits, the battery acid disposal pit, and the torpedo post run facility require no further action based on the results of past investigations and approval by the State of Hawaii, Department of Health.

Three former oil change pits and a battery acid neutralization unit are currently being investigated. Three landfills, a tanker truck pod facility, former missile (Regulus) defueling pit, and former oil/fuel pipelines are scheduled to be investigated.

Investigation at a reclamite asphalt rejuvinator burial area and various transformer sites (four each) have been completed and are waiting Department of Health concurrence for no further action. (Miyashiro, 2002)

Underground and Aboveground Storage Tanks

PMRF/Main Base has nine 189,270-liter (50,000-gallon) USTs and ten smaller USTs containing petroleum products. All USTs are equipped with a vapor detection system. The tanks were tested approximately 5 years ago, with no leaks detected. (Pacific Missile Range Facility, Barking Sands, 1998) Eight of the smaller USTs are 757-liter (200-gallon), double-walled, fiberglass-reinforced plastic.

Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls

PMRF manages asbestos in accordance with the base asbestos management plan. Prior to any construction projects, areas to be disturbed are surveyed for asbestos, and any asbestos is removed, before disturbance, by a certified asbestos contractor.

The handling of hazardous materials and the potential generation and disposal of hazardous wastes follow ongoing, standard, and applicable regulations and procedures at PMRF.

All facilities associated with PMRF follow its lead-based paint management plan. The exception is KTF, which follows Department of Energy plans for the removal of lead-based paint wastes Components containing PCBs that become waste are labeled according to the Toxic Substances Control Act, 40 CFR 761, requirements for shipping, and are disposed of through the DRMO or a contractor within 1 year of the waste's initial storage.

Liquid Fuels and Other Toxic Fuels

PMRF uses gasoline and diesel fuels to power range trucks and equipment. Aircraft at PMRF utilize jet fuel, JP-10 and Jet-A. Jet-A and JP-10 fuels are available at the fuel farm near the airfield, and are delivered to the flight line in refuelers.

3.4.4 HEALTH AND SAFETY—PACIFIC MISSILE RANGE FACILITY

Appendix B includes a general description of health and safety.

3.4.4.1 Region of Influence

The ROI for potential impact related to the health and safety of workers is limited to work areas associated with transportation of missile components, missile storage and handling areas, missile launch, post-launch activities and radiation hazard areas. The population of concern for the Proposed Action would include the approximate 870 employed at PMRF, but would predominantly encompass the contractor, military, and government civilian personnel directly involved with target launch and launch support operations.

The ROI for potential impact related to public health and safety includes the areas of Kauai County and the island of Kauai affected by preflight transport of missile components, missile launch and missile flight. These areas include the PMRF overwater training areas. The population of concern for the Proposed Action consists of visitors to Kauai and the approximate 56,539 people living in Kauai County (U.S. Census Bureau, 2001).

3.4.4.2 Affected Environment

Range Safety

The U.S. Navy takes every reasonable precaution during the planning and execution of the operations, training exercises, and test and development activities to prevent injury to human life or property. In addition to explosive, physical impact, and electromagnetic hazards, potential hazards from chemical contamination, ionizing and non-ionizing radiation, radioactive materials, and lasers are studied by NAWCWD. (Pacific Missile Range Facility, Barking Sands, 1998)

Range Control is in charge of surveillance, clearance, and real-time range safety. Range Safety Approval and Range Safety Operation Plan documents are required for all weapons systems using PMRF. PMRF sets requirements for minimally acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. The NAWCWD, Point Mugu, is responsible for establishing Ground Hazard Areas and Launch Hazard Areas over water beyond which no debris from early flight termination is expected to fall. Hazard areas are determined by size and flight characteristics of the missile, as well as individual flight profiles of each flight test. Data processed by ground-based or onboard missile computer systems may be used to recognize malfunctions and terminate missile flight. Before an operation is allowed to proceed, the range is determined cleared using input from ship sensors, visual surveillance from aircraft and range safety boats, radar data, and acoustic information. Other safety areas under PMRF's control include radars, explosives, airspace. All range users must: (1) provide a list of project materials, items, or test conditions that could present hazards to personnel or material through toxicity, combustion, blast, acoustics, fragmentation, EMR, radioactivity, ionization, or other means; (2) describe radiation, toxic, explosive, or ionization problems that could accumulate as a result of their tests; (3) provide warhead information (if any), aerodynamic and flight control information, and destruct system information and parameters; (4) submit plans, specifications, and procedural or functional steps for operations involving explosives to conform to criteria in the NAWCWD instruction; and (5) provide complete operational specifications of any laser to be used and a detailed description of its planned use. (Pacific Missile Range Facility, Barking Sands, 1998)

Missile Flight Analysis

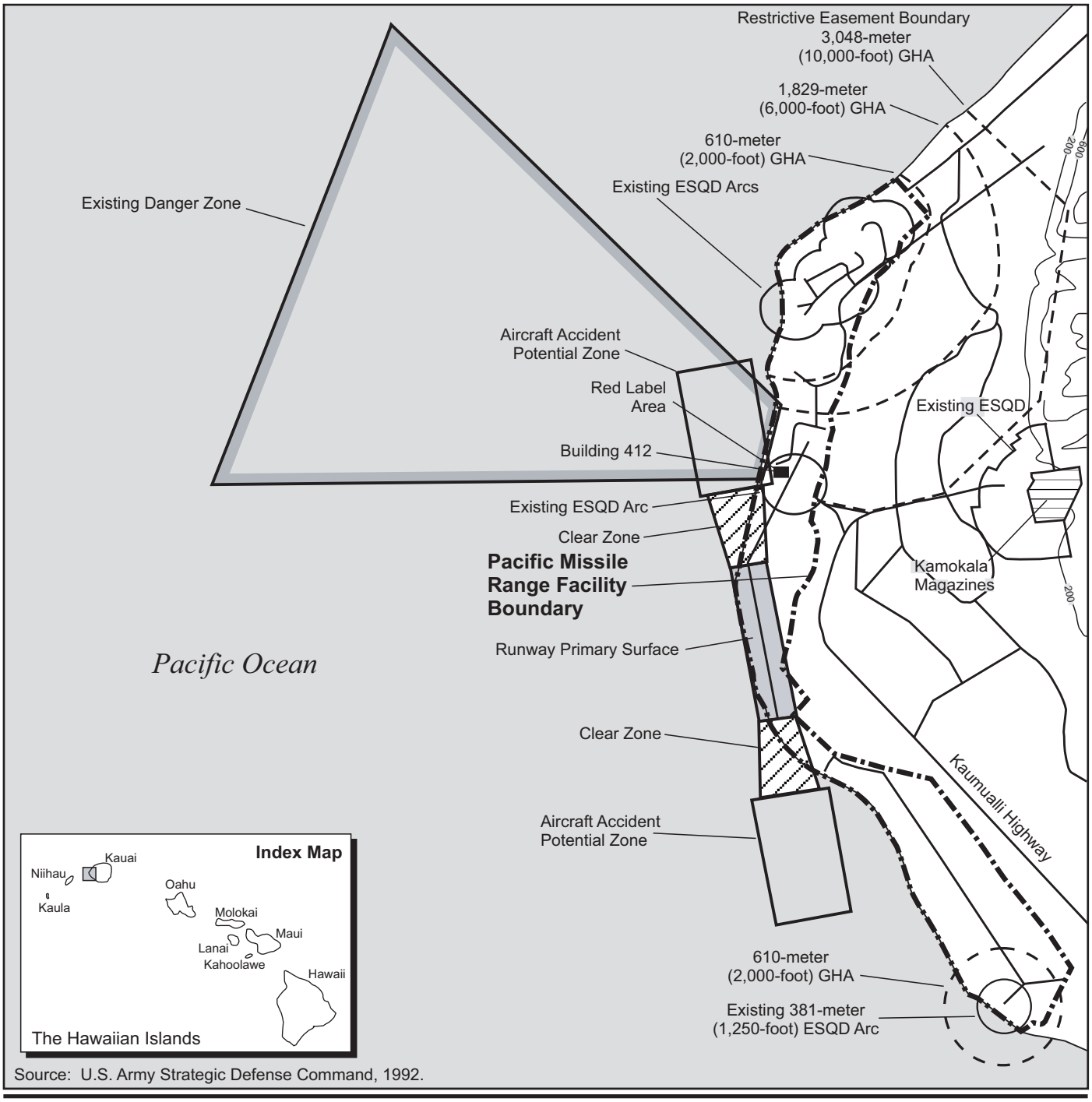
PMRF conducts missile flight safety, which takes into account potential hazards from chemical contamination, ionizing and non-ionizing radiation, radioactive materials, and lasers in accordance with NAWCWD Instruction 5100.2. This includes analysis of missile performance capabilities and limitations, of hazards inherent in missile operations and destruct systems, and of the electronic characteristics of missiles and instrumentation. It also includes computation and review of missile trajectories, launch azimuths, and hazard area dimensions, review and approval of destruct systems proposals, and preparation of the Range Safety Approval and Range Safety Operational Plans required of all programs at PMRF. These plans are prepared by the NAWCWD, Point Mugu, for each program and must be in place before project initiation.

Ground Safety

The Range Control Officer using PMRF assets is solely responsible for determining range status and setting RED (no firing) and GREEN (range is clear and support units are ready to begin the event) range firing conditions. The Range Safety Approval and the Range Safety Operation Plan documents are required for all weapons systems using PMRF (Pacific Missile Range Facility, Barking Sands, 1998). PMRF uses RCC 321-02, *Common Risk Criteria for National Test Range*s. RCC 321-02 sets requirements for minimally-acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. Under RCC 321-02, individuals of the general public shall not be exposed to a probability of fatality greater than 1 in 10 million for any single mission and 1 in 1 million on an annual basis. (Range Commanders Council, Range Safety Group, 2002)

Figure 3.4.4-1 shows the PMRF health and safety areas including the Ground Hazard Areas associated with missile launch activities at PMRF. These Ground Hazard Areas consist of Vandals at 1,829 meters (6,000 feet), Strategic Target Systems at a modified 3,048 meters (10,000 feet), and smaller 762-meter (2,500-foot) and 914-meter (3,000-foot) areas used for rail launch rockets.

To ensure the protection of all persons and property, safety procedures have been established and implemented for the Ground Hazard Areas. These SOPs include establishing road control points and clearing the area using vehicles and helicopters (if necessary). The road control points are established 3 hours before launch to allow security forces to monitor traffic as it passes through the Ground Hazard Area. At 20 minutes before launch, the area is determined to be clear of the public to ensure that, in the unlikely event of early flight termination, no injuries or damage to persons or property would occur. After the Range Safety Officer declares the area safe, the security force gives the all-clear signal, and the public is allowed to reenter the area. (Pacific Missile Range Facility, Barking Sands, 1998) No inhabited structures are located within the off-base sections of the Ground Hazard Area. To further minimize the potential for launch associated hazards, PMRF has a Missile Accident Emergency Team assembled for all launches from KTF and on-call status for PMRF launches in accordance with PMRF Instruction 5100.1F.



Source: U.S. Army Strategic Defense Command, 1992.

EXPLANATION

- Existing Ground Hazard Areas
- Pacific Missile Range Facility Boundary
- 200 Contour Lines (ft)

ESQD = Explosive Safety Quantity Distance
GHA = Ground Hazard Area

NORTH

Scale
0 795 1,590 meters
0 2,608 5,216 feet

06-09-03 PMRF health

Pacific Missile Range Facility Health and Safety Areas

Kauai, Hawaii

Figure 3.4.4-1

Ordnance Management and Safety

Ordnance safety includes procedures to prevent premature, unintentional, or unauthorized detonation of ordnance. Any program using a new type of ordnance device for which proven safety procedures have not been established requires an Explosive Safety Approval before the ordnance is allowed on PMRF or used on a test range. This approval involves a detailed analysis of the explosives and of the proposed operations, procedures, and facilities for surveillance and control, an adequacy analysis of movement and control procedures, and a design review of the facilities where the ordnance items will be handled.

Ordnance management procedures are found in PMRF Instruction (PMRFINST) 8020.5, *Explosive Safety Criteria for Range Users Ordnance Operation*s. The Range Control Branch of the Range Programs Division is responsible for: (1) detailed analysis of all proposals concerning missiles or explosives and their proposed operation on the range; (2) establishing procedures for surveillance and control of traffic within and entering hazard areas; (3) reviewing the design of facilities in which ordnance items are to be handled to ensure that safety protection meets the requirements of Naval Sea System Command Publication (NAVSEAOP) -5, *Ammunition and Explosives Ashore; Safety Regulations for Handling, Storing, Production, Renovation, and Shippin*g, Chapter 4; (4) training, certifying, and providing Launch Control Officers, Safety Monitors, and Ordnance personnel for operations involving explosive ordnance; (5) assuming responsibility for the control of all emergency facilities, equipment, and personnel required in the event of a hazardous situation from a missile inadvertently impacting on a land area; (6) providing positive control of the ordering, receipt, issue, transport, and storage of all ordnance items; and (7) ensuring that only properly certified handling personnel are employed in any handling of ordnance.

Ordnance is delivered to PMRF/Main Base by aircraft to the on-base airfield and by ship to Nawiliwili Bay, then over land by truck transport along Highway 50 to the base. The barges carrying explosives are met at Nawiliwili Harbor by trained ordnance personnel and special vehicles for transit to and delivery at PMRF. All ordnance is transported in accordance with DOT regulations. Ordnance is stored in caves at the Kamokala Magazine area, except for the Strategic Target System, which is stored in a specially constructed facility on KTF. (Pacific Missile Range Facility, Barking Sands, 1998) No mishaps involving the use or handling of ordnance have occurred at PMRF.

PMRF/Main Base has defined ESQD arcs. The arcs are generated by launch pads, the Kamokala Magazine ordnance storage area, the Interim Ordnance Handling Pad, and the Missile Assembly/Test Buildings 573 and 685. Only the ESQD arcs generated by the Interim Ordnance Handling Pad and Building 573 are covered by a waiver or exemption. The Kokole Point Department of Energy launch site can accommodate a 381-meter (1,250-foot) ESQD arc.

A 381-meter (1,250-foot) ESQD Red Label Area, to handle incoming and outgoing ordnance items, is centered on the airfield taxiway, 381 meters (1,250 feet) from Building 412 (see figure 3.4.4-1). A soft pad in the Red Label recovery area is used by helicopters for setting down targets and weapons recovered from the range. The 244-meter (800-foot) ESQD surrounding the soft pad falls totally within the Red Label ESQD area. (Pacific Missile Range Facility, Barking Sands, 1998)

Ocean Area Clearance

Range Safety officials ensure operational safety for projectiles, targets, missiles, and other hazardous operations into PMRF operational areas. The operational areas consist of two Warning Areas (W-186 and W-188) and one Restricted Area (R-3101) under the local control of PMRF. The Warning Areas are in international waters and are not restricted; however, the surface area of the Warning Areas is listed as "HOT" (actively in use) 24 hours a day. For special operations, multi-participant or hazardous weekend firings, PMRF publishes dedicated warning NOTMARs and NOTAMs 1 week before hazardous operations. In addition, a 24-hour recorded message is updated daily by Range Operations to inform the public when and where hazardous operations will take place.

The range safety clearance procedures at PMRF are some of the most rigorous because of the extra sensors available. Before an operation is allowed to proceed, the range is determined cleared using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, radar data, and acoustic information from a comprehensive system of sensors and surveillance from shore.

Transportation Safety

PMRF transports ordnance (e.g., missiles) by truck from Nawiliwili Bay to PMRF along Highway 50. The barges carrying explosives are met at Nawiliwili Bay by trained ordnance personnel and special vehicles for transit to and delivery at PMRF. All ordnance is transported in accordance with DOT regulations. In addition, PMRF has established PMRFINST 8023.G, which covers the handling and transportation of ammunition, explosives, and hazardous materials on the facility.

In addition, liquid fuels (e.g., nitrogen tetroxide and unsymmetrical dimethylhydrazine) are transported to KTF. These fuels are shipped to the site by truck, aircraft or barge, which do not affect transportation routes on the island of Kauai. Transportation of these materials is conducted in accordance with DOT regulations and specific safety procedures developed for the location. (Pacific Missile Range Facility, Barking Sands, 1998)

Range Control and the FAA are in direct communication in real time to ensure the safety of all aircraft using the airways and the Warning Areas. Within the Special Use Airspace, military activities in Warning Areas W-186 and W-188 are under PMRF control. Warning Areas W-189, W-187, and W-190 are scheduled through the Fleet Area Control and Surveillance Facility.

The Warning Areas are located in international airspace. Because they are in international airspace, the procedures of the ICAO are followed. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the ROI is managed by the Honolulu ARTCC.

Fire and Crash Safety

The U.S. Navy has developed standards that dictate the amount of fire/crash equipment and staffing that must be present based on the number and types of aircraft stationed on base, and the types and total square footage of base structures and housing. The PMRF fire department meets these standards by maintaining three P-19 crash trucks (two primary and one backup) with both water and foam delivery capacities. For structural fires, the fire department maintains

two combinations of structural fire trucks (one primary and one backup), and one brush fire truck as required by U.S. Navy standards for an installation the size of PMRF. One centrally located facility houses the equipment for both the flightline and the structure fire protection needs. The positioning of this facility also meets the U.S. Navy time and distance requirements for facility response.

In addition to fire equipment, PMRF has two ambulances and Emergency Medical Technician available 24 hours a day, 7 days a week.

3.4.5 SOCIOECONOMICS—PACIFIC MISSILE RANGE FACILITY

Appendix B includes a general definition of socioeconomics.

3.4.5.1 Region of Influence

The ROI for socioeconomics is defined as the island of Kauai, Hawaii. The Proposed Action site is situated on the western side of the island, and the primary areas of analysis will concern both the community situated adjacent to PMRF, Kekaha, and other main population centers on the island such as Kapaa and Lihue.

3.4.5.2 Affected Environment

Kauai is the fourth-largest Hawaiian island, covering 1,424 square kilometers (550 square miles), and northernmost in the chain. The county seat, Lihue, is the island's commercial and transportation center. Other population centers include Kapaa, Kalaheo, and Kekaha, the community closest to the Proposed Action. Most of the island's population lives in towns close to the coast or in the valleys a few miles inland. The island is characterized by both tourism and visitor related development and a certain extent of agricultural production. In 1992, the island was physically and economically decimated by Hurricane Iniki. It has taken almost 10 years to recover from the impacts of the hurricane.

Population and Housing

The population of Kauai County numbered 58,463 people as of 2000, having increased from 51,000 people in 1990 (14.2 percent) (U.S. Census Bureau, 2001). Kauai is the least populous of the major Hawaiian Islands representing, as of 2000, only 4.82 percent of the population of the state (1,211,537 people). The nearest county in size, Maui, had more than twice the number of inhabitants as Kauai as of 2000. Kauai has also exhibited the slowest growth rate of all the neighbor islands, remaining considerably behind the growth rates of Maui (27.6 percent) and Hawaii County (23.6 percent). However, Kauai did exceed the growth rate of the state by 5.0 percent (U.S. Census Bureau, 2001).

Prior to Hurricane Iniki striking the island in 1992, Kauai's population had been projected to grow from approximately 52,000 (in 1990) to 65,000 by the year 2000. It was estimated in 1993 (Pacific Missile Range Facility, Barking Sands, 1998) that 8,000 to 10,000 of Kauai's population had emigrated to flee the effects of the hurricane. The latest data shows that the population of Kauai is growing once more, albeit at a markedly slower rate that what was once projected.

As of 2000, there were an estimated 25,331 housing units within Kauai, of which 2,339 housing units were located within Lihue, 3,632 in Kapaa, and 1,162 in Kekaha. In addition, the U.S. Bureau of the Census reported that vacancy rates of rental housing on Kauai averaged 6.1 percent, compared with vacancy rates of 8.1 percent, 4.6 percent, and 6.0 percent, for Lihue, Kapaa and Kekaha respectively.

Visitor serving accommodations are numerous on Kauai, with many different sized hotels and motels. Kauai has approximately 7,200 rooms or 10 percent of the total 72,204 available visitor rooms in the state (eHawaiiGov, 2002).

Income and Employment

The U.S. Bureau of the Census reported that the per capita income in Kauai County, in 2000, was $20,301, 5.7 percent lower than the average per capita income of the state at $21,525. Similarly, as of 2000 the Median Household Income in Kauai county, at $45,020 was 9.6 percent lower than that of the state at $49,820. Kauai experienced an annual unemployment level of 7.0 percent in 2001, having increased from 6.5 percent in 2000. These rates contrast markedly with that of the state with rates of 4.6 percent in 2001 and 4.6 percent in 2000.

Table 3.4.5-1 shows the number of individuals employed within the main sectors of the economy of Kauai. Retail and service industries dominate the profile, employing more than 60 percent of the workforce at the county level. Tourism, tourism-related services, and government have continued to be the main employment generators since the 1992 hurricane. Currently, the three largest employers on Kauai are the County of Kauai, PMRF, and Wilcox Health Systems.

Table 3.4.5-1: Employment in Kauai By Sector, 2000

Employment Sector	Employees	Percent
Agriculture, forestry and fishing and mining	1,227	4.6
Construction	2,083	7.8
Manufacturing	652	2.4
Transportation and public utilities	1,497	5.6
Wholesale trade	456	1.7
Retail trade	3,341	12.5
Finance insurance and real estate	1,667	6.2
Information	426	1.6
Public administration	1,598	6.0
Services	27,684	51.7
Professional, managerial, scientific, administrative	2,505	9.4
Education, health, and social services	4,372	16.3

Source: U.S. Census Bureau, 2001.

The visitor industry is of high importance to the economy of Kauai. During 2001, Kauai attracted approximately 1 million visitors. Kauai's share of the Hawaii visitor market was 13.9 percent in 1995 representing a relatively rapid recovery from 1992, when the impact of Hurricane Iniki reduced Kauai's share to 3 percent. Hotel jobs are the heart of the visitor industry. The average monthly employee count for hotel workers numbered 3,693 in 2001 (Hawaii Data Books, 2003a). The local economy also continues to benefit from feature film, television, and commercial production. Since 1992, the film and television industry has contributed an average of $7 million dollars annually to the island's economy. In 2001 the total was $11 million (Hawaii Data Books, 2003b).

Government is the largest single employer on the island, and has remained the least affected by natural disasters or by physical or economic pressures (Hawaii Data Books, 2003a). The number of government employees has grown relatively evenly since 1991. Between 1991 and 2000, the number of federal, state, and local government employees on Kauai grew from 3,450 to 4,100. Of that growth, 77 percent consisted of state employees.

PMRF is the largest federal government employer on Kauai. In September 1997, it employed a total of 870 personnel. Of those, 290 worked directly for PMRF, while the remaining were employed by tenant organizations and subcontractors. The PMRF workforce is composed of 183 DoD civilian personnel, 107 military personnel, 477 contractor personnel, and 103 tenants. The direct economic impact on Hawaii of PMRF, its tenant organizations, contractors and visitors, was $116.6 million in 1996. The PMRF operating budget in 1996 was $109 million, of which $45 million was payroll. PMRF expenditures in 1996 included $8.2 million for construction projects throughout the Hawaiian Islands and $56 million for other purchases. Visitors to PMRF were estimated to have spent $7.5 million in the Kauai economy in 1996.

The major shift in agricultural land use over the last 10 years has been a marked reduction in the cultivation of sugarcane fields across Hawaii, mainly as a result of lowered world prices from foreign sources. On Kauai, the sugarcane downturn resulted in the closure of several significant local operations. In 1994, over 28 percent of Hawaii's sugar cane acreage was located in the five sugar cane plantations of Kauai County. By early 1998, the number of plantations had been reduced to two, and as a result, Kauai has been pursuing a policy of increasing agricultural diversification.

3.5 VANDENBERG AIR FORCE BASE

The existing environment at Vandenberg AFB was described in the Theater Ballistic Missile Targets EA (U.S. Department of the Air Force, 1997b), Booster Verification EA (U.S. Department of the Air Force, 1999), the Evolved Expendable Launch Vehicle Program Supplemental EIS (U.S. Department of the Air Force, 2000), and the Alternate Boost Vehicle Verification Test EA (U.S. Army Space and Missile Defense Command, 2002c). For the most part, those descriptions are still accurate and are not repeated in this document. Rather, for resources that may be affected by ETR activities at Vandenberg AFB, the pertinent resource discussions are summarized and any differences in existing environmental conditions, including new facilities or infrastructure, are noted. The more detailed discussion in the Final EAs and EIS are incorporated by reference and will be made available for review by those who wish more information concerning the existing environment at Vandenberg AFB.

The proposed ETR activities could have an effect on air quality, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, and water resources at Vandenberg AFB. These resource areas are summarized below.

Areas that are not expected to be affected sufficiently at Vandenberg AFB to warrant further discussion in this section include airspace, utilities, visual and aesthetic resources, and environmental justice. Airspace impacts would be minimal as described and analyzed in the earlier EAs and EIS cited above. These documents concluded that close coordination with the FAA would result in no adverse effects to airspace from missile flight tests. The use of the required scheduling and coordination process for international airspace and adherence to applicable DoD directives, U.S. Air Force and U.S. Army regulations concerning issuance of NOTAMs, and selection of missile firing areas and trajectories reduces the potential for impacts to airspace. Utility requirements are minimal and would not exceed existing commercial power supplies.

Although the visual resources on Vandenberg AFB may be considered significant by some viewers, much of the area is already developed with the types of structures and activities that are being considered in the Proposed Action. The construction of the IDT along with the supporting infrastructure (fencing, lighting, etc.) would occupy a very small area within the base. In addition, the facilities would be located in areas with a limited number of viewers. The Proposed Action would result in a minor incremental impact to the overall aesthetic value of the potential Proposed Action locations on Vandenberg AFB. Therefore, visual and aesthetic resources will not be analyzed further for Vandenberg AFB. Vandenberg AFB personnel suggested that Environmental Justice could be an issue if the potential exists for disproportionate effects on local Native Americans from the proposed project. However, initial analysis of the Environmental Justice issues, with respect to Chumash Indian uses of cultural areas in the vicinity of the proposed project locations, indicate that there should be no disproportionate impacts. Chumash use of the areas in question should be affected no more than that of other groups who access the base for recreation, fishing, etc. Furthermore, the proposed project requires only infrequent closures of the areas in question. Therefore, Environmental Justice is not an issue warranting in-depth analysis at Vandenberg AFB.

3.5.1 AIR QUALITY—VANDENBERG AIR FORCE BASE

Appendix B includes a definition of air quality and the main regulations and laws that govern it.

3.5.1.1 Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending no more than a few kilometers downwind from the source.

The ROI for ozone may extend much further downwind than the ROI for inert pollutants: however, as the project area has no heavy industry and very few automobiles, tropospheric ozone and its precursors are not of concern. Consequently, for the air quality analysis, the ROI for project operational activities is the Santa Barbara Air Basin, which is part of the South Central Coast Air Basin.

Remote telemetry sites in California would include the use of mobile telemetry support equipment in central California. Activities at these locations would utilize existing paved or graveled areas and be short-term temporary activities. The potential for impacts to air quality is minimal and, therefore, is not discussed further in this document.

3.5.1.2 Affected Environment

Climate

Vandenberg AFB experiences moderate seasonal and daily variation in temperature and humidity due to its coastal location. The temperatures range from 4ºC to 24ºC (39ºF to 75ºF) with an annual mean temperature of 14ºC (58ºF). The rainy season extends from November to April. Average annual precipitation is 33 centimeters (13 inches).

Regional Air Quality

The California Air Resources Board classifies areas of the state in attainment or nonattainment of the California AAQS. In California, air quality is assessed on a county and regional basis. Vandenberg AFB is in Santa Barbara County, which is part of the South Central Coast Air Basin. Santa Barbara County is considered to be in attainment for all AAQS except for state ozone and PM-10 standards. Santa Barbara County has recently met the federal standard for ozone and is in the process of being redesignated by the EPA as being in attainment. Vandenberg AFB has been designated by the EPA to be unclassified for PM-10 but has been designated by California Air Resources Board to be in nonattainment for California AAQS for PM-10. (Santa Barbra County Air Pollution Control District, 2003)

The Santa Barbara County Air Pollution Control District administers regulations for nonvehicular air pollution sources, and is required to monitor air pollution levels to ensure federal and state AAQS are met or develop a plan to meet them (Air Force Center for Environmental Excellence, 1999). The air monitoring station located on Vandenberg AFB is in the south portion of the base.

The ROI for lower-atmosphere air quality resources may extend beyond the project boundaries to include those areas significantly affected by air dispersion and/or commuter traffic. This could include an area as large as the regional air quality basin (South Central Coast Air Basin)

and may affect the maintenance of the NAAQS and the California AAQS for the Vandenberg AFB area.

Existing Emission Sources

Prior Vandenberg AFB emission inventory results show that missile launch missions account for less than 1 percent of the total PM-10 and total of carbon monoxide. Since 1991, all new stationary sources of emissions (and modifications) at Vandenberg AFB have applied best available current technology and offset emissions at a 1.2 to 1.0 ratio. Table 3.5.1-1 lists emissions from Vandenberg AFB and Santa Barbara County.

Table 3.5.1-1: Vandenberg AFB and Santa Barbara County Emissions

	Volatile Organic Compounds	Oxides of Nitrogen	Carbon Monoxide	Sulfur Dioxide	PM-10
	metric tons (tons)/year	metric tons (tons)/year	metric tons (tons)/year	metric tons (tons)/year	metric tons (tons)/year
Estimated 2001 Emissions from Vandenberg AFB	4.5 (5.0)	17.8 (19.6)	47.0 (51.8)	1.0 (1.1)	58.6 (64.6)
1996 Santa Barbara County Annual	40, 333 (44,460)	15,049 (16,589)	93,774 (103,369)	785 (865)	12,295 (13,553)

Source: U.S. Department of the Air Force, 2000

3.5.2 BIOLOGICAL RESOURCES—VANDENBERG AIR FORCE BASE

A definition of biological resources and the main regulations and laws that govern their protection are provided in appendix B.

3.5.2.1 Region of Influence

The ROI includes areas on Vandenberg AFB and offshore that may be affected by target and interceptor launches from existing and upgraded launch sites, the use of existing sensors, and construction and operation of an IDT site.

Activities at remote telemetry sites in California, such as Pillar Point, would utilize existing paved or graveled areas and be short-term temporary activities. The potential for impacts to biological resources is minimal and therefore will not be discussed further in this document.

3.5.2.2 Affected Environment

Vegetation

Fourteen major vegetation and habitat types have been described and mapped on Vandenberg AFB. Among these vegetation types, coastal sage scrub and native and non-native grasslands are the major communities found in the proposed project area.

Threatened and Endangered Plant Species

Threatened and endangered plant species with the potential to occur within the ROI are listed in table 3.5.2-1.

Table 3.5.2-1: Listed Species Known or Expected to Occur in the Vicinity of the Proposed Action

		Status	
Scientific Name	**Common Name**	**State**	**Federal**
Plants			
Eriodictyon capitatum	Lompoc yerba santa	R	E
Hemizonia increscens ssp. *villosa*	Gaviota tarplant	E	E
Fish			
Eucyclogobius newberryi	Tidewater goby	--	E
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	E	E
Amphibians			
Rana aurora draytoni	California red-legged frog	CSC	T
Birds			
Charadrius alexandrinus nivosus	Western snowy plover	CSC	T
Pelecanus occidentalis californicus	California brown pelican	E	E
Sterna antillarum browni	California least tern	E	E
Mammals			
Enhydra lutris nereis	Southern sea otter	Fully Protected	T

Source: Vandenberg Air Force Base, 1996; 2003.

CSC California Species of Concern R Rare

E Endangered T Threatened

The four known locations of Lompoc yerba santa (*Eriodictyon capitatum*), a federal endangered plant species, occur in western Santa Barbara County. Two of these locations, composed of three groups, are on Vandenberg AFB approximately 12 kilometers (7 miles) south of LF-21 and LF-23. This plant is associated with the central maritime (Burton Mesa) chaparral and bishop pine forest, which are threatened habitat types with limited distribution. (U.S. Environmental Protection Agency, 2001a)

The USFWS has listed the Gaviota tarplant (*Hemizonia increscens* ssp. *villosa*) as endangered. It occurs within a narrow band of coastal terrace grassland between Gaviota and Santa Barbara (U.S. Environmental Protection Agency, 2001a), southeast of LF-06 (Vandenberg Air Force Base, 2000). It has recently been identified as occurring in two locations on Vandenberg AFB south of and along Point Sal Road (U.S. Department of the Air Force, 1999).

Wildlife

Vandenberg AFB plant communities provide habitat for many resident and migratory animals. The Western fence lizard, garter snake, pocket gopher, California ground squirrel, and deer mouse are typical examples of smaller wildlife species. Also common are brush rabbit, badger, and mule deer. Birds such as ring-billed, Heerman's, and glaucous-winged gulls, as well as the western wood-pewee, rhinoceros auklet, red-winged blackbird, red-tailed hawk, great horned

owl, and golden eagle have also been sighted. (U.S. Department of the Air Force, 1997b; Vandenberg Air Force Base, 2000)

Because Vandenberg AFB is near the southern limit of the breeding ranges for many seabird species, a long-term program was begun in 1999 to annually monitor population dynamics and breeding biology of seabirds breeding on Vandenberg AFB. An estimated total of 1,200 seabirds were identified that year. (Point Reyes Bird Observatory, 1999)

The loggerhead shrike (*Lanius ludovicianus*) and the western burrowing owl (*Speotyto cunicularia hypugea*) could potentially be present in the project area. Both species are listed as federal and California Species of Concern.

The Pacific harbor seal (*Phoca vitulina*) is a resident species of Lion's Head and Point Sal. Counts of harbor seals performed at nine main haul out sites along the coast of Vandenberg AFB average 327 seals. Lion's Head, the closest site to the proposed project launch sites (figure 3.5.2-1), has been documented as a haul out area and recently as a pupping area for a small number of Pacific harbor seals. The largest number of harbor seals are found at Lion's Head between September and January. Most harbor seal pupping occurs in March with a 4- to 6-week weaning period. (U.S. Department of the Air Force, 1999)

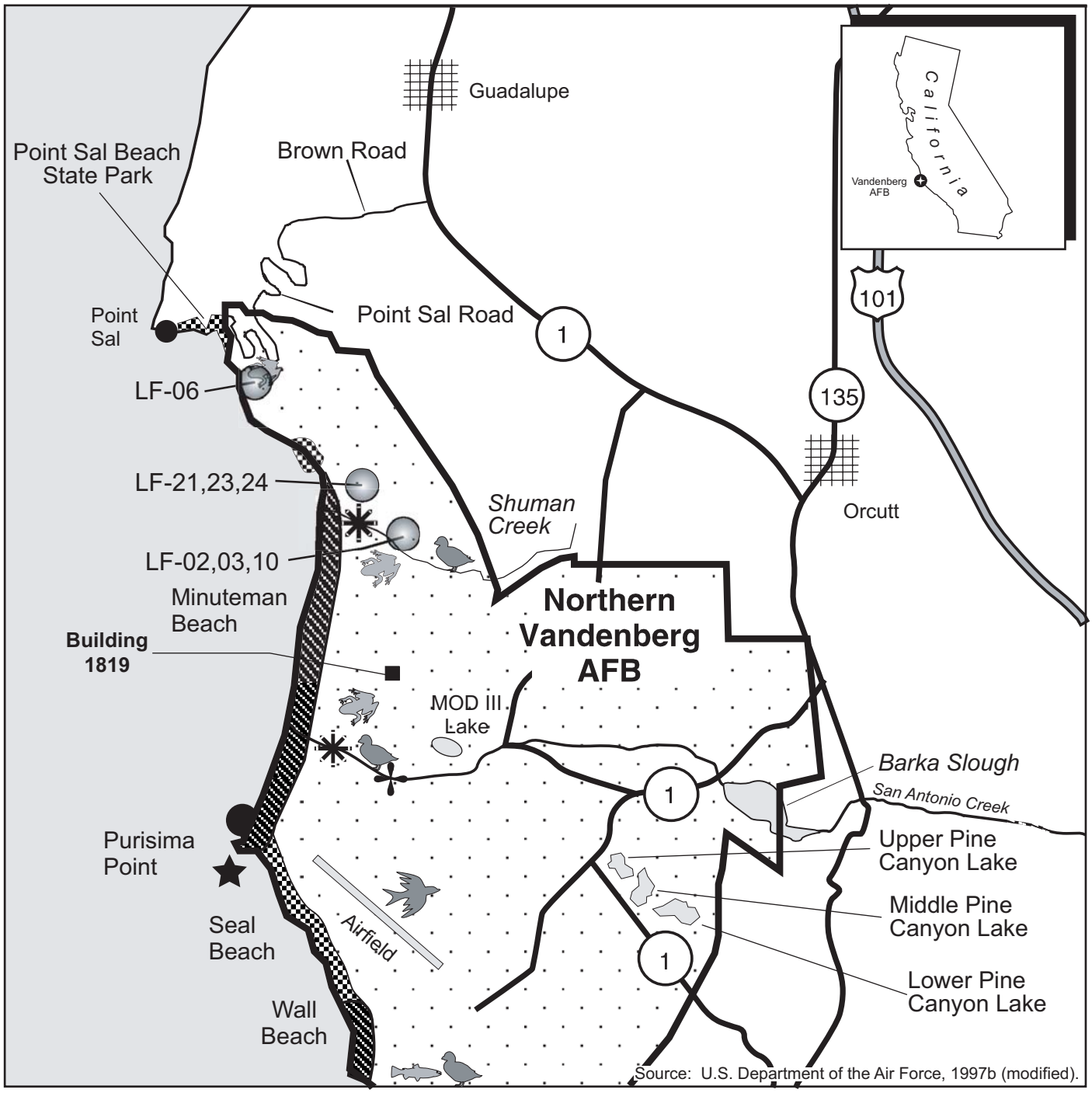
The California sea lion (*Zalophus californianus californianus*) does not breed on Vandenberg AFB, but is found along the coastline during the summer (U.S. Department of the Air Force, 1999). Point Sal, which is north of the Base boundary, is the closest area used as a haulout by the California sea lion. Other pinnipeds such as the elephant seal and northern fur seal are observed periodically on the base and can be found in nearby haulout/rookery areas, preferring undisturbed sections of mainland coast and offshore islands or rocks. One such area is just south of Minuteman Beach, which is approximately 3 kilometers (2 miles) from the proposed launch site.

Essential Fish Habitat

Essential Fish Habitat includes those waters and substrate (sediment, hard bottom) necessary to the complete life cycle of fish, from spawning to maturity. The east-west boundary for coastal pelagic species (Pacific sardine and mackerel, northern anchovy, jack mackerel, and squid), groundfish (including species of rockfish, shark, and cod), and highly migratory fish (tunas, marlin, and swordfish) includes all marine and estuary waters from the coast of California to the limits of the Exclusive Economic Zone (the 322-kilometer [200-mile] limit) where the United States has exclusive authority over management of fisheries. Fishing regulations are enforced by Vandenberg AFB security police game wardens.

Threatened and Endangered Wildlife Species

Vandenberg AFB's diverse habitats support a wide variety of listed species. Those with the potential to occur within the ROI are shown in figure 3.5.2-1 and table 3.5.2-1. A resident population of the federally threatened southern sea otter (*Enhydra lutris nereis*) has been observed off Purisima Point, typically foraging and rafting in kelp beds; however, semi-migratory individuals may be found all along the coastline. Otters found near the Point Sal area (Friends of the Sea Otter, 2002) are the nearest to the proposed launch site.



EXPLANATION

- Nesting Location of California Least Tern/ Western Snowy Plover (Least Terns Have Nested Only at Purisima Point in Recent Years)
- Haulout Location of California Sea Lion, Northern Elephant Seal, and Pacific Harbor Seal
- Tidewater Goby
- Unarmored Threespined Stickleback
- Roosting Location of California Brown Pelican
- Southern Sea Otters
- Building

LF = Launch Facility

- California Least Tern Foraging Areas
- California Red-legged Frog (Wide Distribution Also Includes Ponds and Vernal Pools)
- Steelhead Trout
- Mountain Plover (Winters Only)

NORTH

Scale
0 2.4 4.8 kilometers
0 1.5 3 miles

06-09-03 Sensitive Habitat ABV

Sensitive Habitat for Listed Wildlife Species on Vandenberg AFB

Northern Vandenberg Air Force Base, California

Figure 3.5.2-1

The California brown pelican (*Pelecanus occidentalis californicus*), a federal and state endangered subspecies, and the western snowy plover (*Charadrius alexandrinus nivosus*), a federal threatened shorebird, are commonly observed in the Vandenberg AFB area, which provides roosting for the former and nesting and roosting sites for the latter (U.S. Department of the Air Force, 1991). The pelicans roost at Point Sal, northwest of the proposed project launch sites. LF-23 is approximately 1 kilometer (0.6 mile) east of the nearest snowy plover nesting habitat on Minuteman Beach. Other launch sites identified as potential sites for the program are within 1.4 to 5.6 kilometers (0.9 to 3.5 miles) northwest (LF-06), northeast (LF-21), and east (LF-03) of snowy plover nesting habitat. (Wiskowski and Francine, 2002) California brown pelicans and western snowy plovers are also known to use areas near Purisima Point.

Shuman Creek is the main water body closest to the proposed project launch sites. It offers foraging areas for the federally and state endangered California least tern (*Sterna antillarum browni*). The beach at the mouth of Shuman Creek is also occasionally used by the California brown pelican (Vandenberg Air Force Base, 2003). The federally endangered tidewater goby (*Eucyclogobius newberry*) occurs in Shuman Creek. The federally threatened California red-legged frog (*Rana aurora draytoni*) is found in riparian wetland areas in the northwestern Vandenberg AFB portion. It prefers freshwater pools and ponds associated with arroyo willow, cattails, and other thickets of emergent aquatic vegetation. (U.S. Department of the Air Force, 1997b)

San Antonio Creek, located south of Building 1819, is one of the largest streams on base. Several freshwater marshes have been recorded along the San Antonio that, along with the creek itself and the lagoon at its mouth, support both common and rare Vandenberg species (U.S. Department of the Air Force, 1991); the unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) and the tidewater goby, federal and state endangered fish, can be found there. This may represent the northern limit for the unarmored threespine stickleback, which uses adjoining feeder streams during the wet season (Pacific Pipeline System, Inc., 1996).

The federally threatened California red-legged frog occurs in the San Antonio Creek and the man-made Mod III Lake located south of Building 1819 on the southern edge of San Antonio Terrace. This lake's fish, such as gambusia, are all introduced species. The California red-legged frog is found in surrounding riparian areas, as well as in freshwater ponds neighboring the area and Barka Slough. The California red-legged frog is also found in riparian wetland areas in the northwestern Vandenberg AFB portion near Minuteman Beach, and shows a preference for freshwater pools and ponds associated with arroyo willow, cattails, and other thickets of emergent aquatic vegetation. (U.S. Department of the Air Force, 1997b) In March 2001, the USFWS designated 1.6 million hectares (4.1 million acres) in 28 California counties as critical habitat for the threatened California red-legged frog, but excluded Vandenberg AFB since its integrated natural resource management plan provided adequate management for the on-base population (Jumping Frog Research Institute, 2001).

Historical sightings of the recently federally delisted and state endangered American peregrine falcon (*Falco peregrinus*) in the Point Sal area have been reported (U.S. Department of the Air Force, 1999). This raptor has been the subject of an active state reintroduction program since the 1970s (U.S. Department of the Air Force, 1990a).

Environmentally Sensitive Habitat

Dune Systems

The installation envelops one of the major southern California coastal dune systems, with areas still resembling their original condition, and occupies one of the state's six remaining coastal dune systems. Extensive central foredunes and coastal dune scrub are located on the North Vandenberg coast (U.S. Department of the Air Force, 1991).

Wetlands

Along with a network of swales, several wetlands (including two man-made) occur near Building 1819; the closest is approximately 1.6 kilometers (1 mile) to the northwest. These wetlands, ranging between 0.8 and 2.8 hectares (2 and 7 acres) in size, support such typical species as arroyo willow, wide-leaf cattail, California bulrush, water smartweed, and bog rush.

Critical Habitat

The USFWS recently designated approximately 2,590 hectares (6,401 acres) and 3,929 hectares (9,709 acres) of critical habitat for the Lompoc yerba santa and the Gaviota tarplant, respectively. These endangered plants are only found in coastal areas of Santa Barbara County. Approximately 2,126 hectares (5,253 acres) of critical habitat for these two plants at Vandenberg AFB was excluded. The decision was based on the commitment of Vandenberg AFB to develop and implement protective measures agreed to in its Integrated Natural Resources Management Plan. These measures include establishing Sensitive Resource Protection Areas for the plants in the areas proposed for critical habitat designation and monitoring, survey, enhancement, and restoration activities. (U.S. Fish and Wildlife Service, 2002c)

The USFWS has also designated critical habitat for nesting snowy plovers along the beaches of Vandenberg AFB. Vandenberg AFB is developing a management plan in coordination with USFWS for beach closures during the snowy plover nesting season (1 March through 30 September).

Channel Islands National Marine Sanctuary

In 1980, a 4,294-square kilometer (1,252-square nautical mile) portion of the Santa Barbara Channel was designated as the Channel Islands National Marine Sanctuary. The sanctuary is an area of national significance that encompasses the waters that surround Anacapa, Santa Cruz, Santa Rosa, San Miguel and Santa Barbara Islands and extends from mean high tide to 11 kilometers (6 nautical miles) offshore around each of the five islands. The sanctuary's primary goal is the protection of natural and cultural resources contained within its boundaries. The National Oceanographic and Atmospheric Administration plans to expand the Channel Islands National Marine Sanctuary off the coast of Vandenberg AFB. The study area for this expansion includes an area off the coast of California from south of Point Mugu to north of Point Sal. (National Oceanic and Atmospheric Administration, Channel Islands National Marine Sanctuary, 2002)

3.5.3 CULTURAL RESOURCES—VANDENBERG AIR FORCE BASE

Appendix B includes a definition of cultural resources and the laws and regulations protecting them.

3.5.3.1 Region of Influence

In general, the ROI for cultural resources encompasses areas requiring ground disturbance (e.g., areas of new facility or utility construction) and all buildings or structures requiring modification, renovation, demolition, or abandonment. At Vandenberg AFB this includes the use of existing target launch facilities from existing sites; the use of existing Minuteman launch facilities from existing sites as modified to GBI booster verification test requirements; single and dual launches of GBIs and targets; construction and operation of one IDT; and upgrade of existing facilities, all utilities, and infrastructure to support operations.

Remote telemetry sites in California would include the use of mobile telemetry support equipment in central California. Activities at these locations would utilize existing paved or graveled areas and be short-term temporary activities. The potential for impacts to cultural resources is minimal and, therefore, is not discussed further in this document.

3.5.3.2 Affected Environment

The *Integrated Cultural Resources Management Plan* (U.S. Air Force, 1997) for Vandenberg AFB is used in part to support the management of the cultural resources found at Vandenberg AFB. This document is used to assist in the preservation of historic buildings, structures, objects, landscapes, and archaeological resources for Vandenberg AFB.

Prehistoric and Historic Archaeological Resources

Numerous archaeological surveys at Vandenberg AFB have identified approximately 2,200 prehistoric and historic cultural sites (Carucci, 2002). Prehistoric sites include dense shell middens, stone tools, village sites, stone quarries, and temporary encampments. Historic artifacts include those typically used in mission establishment, ranching, and military activities. Cultural resource sites located in this area include the site of the former Rancho Guadalupe, which dates from the mission period.

Historic Buildings and Structures

In 1941, the U.S. Army in support of the World War II effort acquired much of the area. Named Camp Cooke, the area served as a training area for armored and infantry units. In 1950 the base was re-activated in support of the Korean War. In 1957, the U.S. Air Force took over the northern 26,305 hectares (65,000 acres) of Camp Cooke and renamed it Cooke AFB. In 1958, the Strategic Air Command took control of the base and renamed it Vandenberg AFB.

Vandenberg AFB has primarily been used to develop several types of intermediate and long-range ballistic missiles and has been largely associated with the launch of military and civilian payloads since the mid-1950s. The 30th Space Wing (30 SW) is currently the host command at Vandenberg AFB and controls the Western Test Range, which conducts military and civilian space and missile launch operations.

Vandenberg AFB currently manages 110 early historic structures and 77 historic Cold War-era facilities. The latter Cold War sites have been determined eligible for listing on the National Register of Historic Places as the result of a recently concluded consultation with the State Historic Preservation Officer. (Carucci, 2002)

Native Populations/Traditional Resources

At the time of European contact, the Vandenberg AFB area was occupied by inhabitants who spoke one of the major languages of the Chumashan branch of the Hokan language family. Villages were numerous and typically consisted of domed houses, granaries, ceremonial areas, game fields, and a burial ground. Several villages were located in the area that is now northern Vandenberg AFB.

Even after the first Europeans made contact, the Chumash life and culture continued without the explorers' influence. It was not until the mid-1700s that the Spanish began to colonize the area and establish missions. In 1901, the Chumash received 30 hectares (75 acres) of reserved land from the U.S. Government, which is presently the only land held by the Chumash people. This reservation is located approximately 32 kilometers (20 miles) east of Vandenberg AFB. The base has maintained a cooperative relationship with the Chumash reservation for several years.

Vandenberg AFB manages approximately 140 Native American traditional cultural properties (Carucci, 2002). Several Chumash-related traditional resources sites have been identified at Vandenberg AFB including villages and campsites, rock art panels, and burial grounds. Among these is Joe's Pond on the San Antonio Terrace, which is considered to be a traditional resource area by the Santa Ynez Band of Mission Indians (Chumash).

Paleontological Resources

The Miocene Monterey Formation and Later Miocene (13 to 25 million years before present) deposits identified at northern Vandenberg AFB have yielded imprints of algae, fish fragments, coprolite, and whalebone. Fossils of both vertebrate and invertebrate animals have been found in the vicinity of Vandenberg AFB (U.S. Army Space and Missile Defense Command, 2002a).

3.5.4 GEOLOGY AND SOILS—VANDENBERG AIR FORCE BASE

Appendix B includes a definition of geology and soils and the main regulations and laws that govern them.

3.5.4.1 Region of Influence

The ROI is the footprint of the target and GBI launch pads, and soil areas encompassed by each LHA that might be subject to contamination from launch exhaust emissions and/or potential contamination from unburned fuel in the event of a terminated launch. Construction areas for an IDT and associated trenching for a connecting fiber optic cable are also areas within the ROI.

Remote telemetry sites in California would include Pillar Point. Activities at this location would utilize existing paved or graveled areas and would be a short-term temporary activity. The potential for impacts to geology and soils at this location is expected to be minimal.

3.5.4.2 Affected Environment

Physiography

Vandenberg AFB is located in the Santa Maria Basin, which is bounded on the northeast by the San Raphael Mountains of the Southern Coast Ranges, on the south by the Santa Ynez Mountains of the Western Transverse Ranges, and on the west by the Pacific Ocean. Most proposed system elements are located in the northern portion of Vandenberg. Major physiographic features on the base include, from north to south, the Casmalia and Purisima Hills, San Antonio Terrace, Barka Slough, Lompoc Valley, and Burton Mesa, as well as beaches, rocky headlands, and points. (U.S. Department of the Air Force, 2000)

Geology

Vandenberg AFB is underlain by marine sedimentary rocks of Late Mesozoic age and Cenozoic age. The basal unit underlying the entire area is the Franciscan Assemblage of upper Jurassic age (Dibblee, 1950). The Franciscan Assemblage consists of pervasively sheared marine sedimentary rock and metamorphosed igneous rock with numerous serpentine intrusions (Dibblee, 1988). Extensive folding and faulting throughout the Vandenberg AFB area has created four structural regions; the Santa Ynez Range, the Lompoc lowland, the Los Alamos syncline, and the San Rafael Mountain uplift. (U.S. Department of the Air Force, 1999)

Soils

Surficial deposits at the proposed and alternate facility sites are highly variable and range from weathered bedrock to stream terrace, alluvial fan, and aeolian sheet sands.

Geologic Hazards

Numerous onshore and offshore faults have been mapped within the vicinity of Vandenberg AFB; most are inactive and not capable of surface fault rupture or of generating earthquakes (U.S. Department of the Air Force, 1998a). Four potentially active faults have been mapped on Vandenberg AFB: the Lion's Head, Hosgri, Santa Ynez River, and Honda (Jennings, 1994) (figure 3.5.4-1). The Lion's Head fault runs through North Vandenberg AFB, and the Hosgri, Santa Ynez, and Honda faults transect or run adjacent to South Vandenberg AFB. The Lion's Head, Santa Ynez ,and Honda faults show evidence of displacement during the late Quaternary (cut strata of Pleistocene age), and the Hosgri fault has shown evidence of Holocene displacement (less than 10,000 years). (California Department of Conservation, Division of Mines and Geology, 1996)

Table 3.5.4-1: Selected Seismic Sources in Vandenberg AFB Vicinity

Fault Name	Length (km)	Style	Slip Rate (mm/year)	Maximum Magnitude
Hosgri Fault	172	Right Lateral/Strike Slip	2.50	7.3
Santa Ynez (and Honda)	65	Left Lateral/Strike Slip	2.00	6.9
Lions Head	41	Reverse	0.02	6.6
Casmalia (north of Vandenberg AFB)	29	Reverse	0.25	6.5

Source: California Division of Mines and Geology, Open File Report 96-08

Source: U.S. Department of the Air Force, 1998b (modified); Jennings, 1994.

EXPLANATION

- Base Boundary
- 101 U.S. Highway
- 135 State Route
- Railroad
- Fault Trace
- Approximate Fault Location
- Concealed Fault

Scale
0 2.9 5.8 kilometers
0 1.8 3.6 miles
NORTH

Principal Faults in Vandenberg Air Force Base Area

Vandenberg Air Force Base, California

Figure 3.5.4-1

06-09-03 VAFB Faultlines

The secondary effects of fault rupture are earthquake ground motions, or seismicity. The Western Transverse Ranges, inclusive of the continental borderlands, have historically been in a moderately high seismic region. Within a 32-kilometer (20-mile) radius of the project area, there have been over 90 earthquakes with magnitudes ranging from 3.0 to 7.3 since 1900 (U.S. Department of the Air Force 1998a). Two earthquakes were notable, one in 1812 (M7.1), most likely epicentered in the Santa Barbara Channel, and the other in 1927 (M7.3), offshore near Point Arguello. The 1927 event may have occurred approximately 40 kilometers (24.8 miles) west of Lompoc. (California Department of Conservation, California Geological Survey, 2003) The Hosgri, Lion's Head, Santa Ynez, and Honda faults are considered by California Geologic Survey to be class B faults, or those lacking paleoseismic data necessary to constrain the recurrence intervals of large events. (California Department of Conservation, Division of Mines and Geology, 1996) Vandenberg AFB is located in a Seismic Zone IV, as defined by the Uniform Building Code (International Conference of Building Officials, 1991), characterized by areas likely to sustain major damage from earthquakes, and corresponds to intensities of VIII or higher on the Modified Mercalli Scale. (U.S. Department of the Air Force, 1998a)

3.5.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—VANDENBERG AIR FORCE BASE

The relevant aspects of hazardous materials/waste management include the applicable regulations and procedures for hazardous materials usage and hazardous waste generation, and management programs for existing hazardous waste-contaminated sites within the ROIs.

Appendix B includes a general description of hazardous materials and waste.

3.5.5.1 Region of Influence

The ROI for potential impacts related to hazardous materials/wastes includes areas of north Vandenberg AFB to be used for launch activities, pre-launch site preparation, and in areas where liquid propellant would be stored and handled.

3.5.5.2 Affected Environment

Hazardous Materials and Hazardous Waste

In 1991, the State of California developed a state EPA called Cal/EPA. This agency regulates air, water, pesticides, integrated wastes, toxic substances and environmental health hazard assessments. Although the federal regulations still are enforced, California has developed far more stringent environmental regulations than has been promulgated federally.

Hazardous Materials Management

Hazardous materials use at Vandenberg AFB must conform to applicable federal, state and local laws and regulations. Hazardous materials obtained from off base suppliers are coordinated through Vandenberg AFB's Hazmart Pharmacy. A base supply contractor runs the Hazmart Pharmacy and (in accordance with U.S. Air Force Instructions) inventories all hazardous materials, whether purchased by the U.S. Air Force or its contractors. Hazardous materials are tracked using Environmental Management System software. These procedures are in accordance with the 30 SW Hazardous Materials Management Plan.

Most hazardous materials fall into two use categories: materials used in base maintenance activities and those used in various launch operations. Numerous types of hazardous materials are used to support the various missions and general maintenance operations at Vandenberg AFB. Categories of hazardous materials used during current launch activities include POL, volatile organic compounds, corrosives, refrigerants, adhesives, sealants, epoxies, and propellants.

Spills of hazardous materials are covered under the Hazardous Materials Emergency Response Plan. This plan ensures that adequate and appropriate guidance, policies, and protocols regarding hazardous material incidents and associated emergency response are available to all installation personnel.

Hazardous Waste Management

Hazardous wastes at Vandenberg AFB are regulated by the Resource Conservation and Recovery Act (RCRA) (Title 40 CFR 260-280) and the California EPA Department of Toxic Substances Control, under the California Health and Safety Code, Title 22, Division 20, Chapter 6.5, Sections 25100 through 25159, and the California Administrative Code, Sections 25100 through 67188. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled.

The Vandenberg AFB Hazardous Waste Management Plan (dated 15 November 2000), describes procedures for packaging, handling, transporting, and disposing of hazardous waste. Hazardous wastes generated during Vandenberg AFB activities are initially collected at the point of generation and, if not reused or recycled, transported to the collection-accumulation point managed by the base Environmental Flight. Here it is containerized and segregated by type. Following initial containerization, waste may remain at the collection-accumulation point for up to 90 days, at which point all hazardous waste must be transported to the off-site Treatment, Storage, and Disposal Facility (Vandenberg Air Force Base, 2001).

Pollution Prevention/Recycling/Waste Minimization

The Vandenberg AFB Pollution Prevention Management Plan (PPMP), 30 SW Plan 32-7080, satisfies requirements of the Pollution Prevention Act of 1990 (U.S. Air Force, 1996b). The PPMP also complies with requirements in DoD Directive 4210.15, AFI 32-7080, and the U.S. Air Force Installation Policy, Procedure, Process Guideline. The PPMP establishes the overall strategy, delineates responsibilities, and sets specific objectives for reducing pollution of the ground, air, surface water, and groundwater. (National Aeronautics and Space Administration, 2002)

Installation Restoration Program

Vandenberg AFB is not listed on the National Priorities List. IRP sites at Vandenberg AFB are being addressed in a manner generally consistent with the Comprehensive Environmental Response, Compensation, and Liability Act process. As of the end of 1996, 36 IRP sites were in the remedial investigation/ feasibility study stage including those undergoing Interim Remedial Actions. In addition, 40 sites are in the Remedial Action phase. Sixty sites have been recommended for No Further Remedial Action Planned, with state concurrence.

Underground and Aboveground Storage Tanks

USTs and ASTs at Vandenberg AFB are installed and maintained in compliance with appropriate local, state, and federal standards and regulatory requirements.

Any installation, modification or removal of USTs or ASTs must be approved by the base Storage Tank Manager in the Environmental Flight.

Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls

Disposal of friable asbestos is not permitted on Vandenberg AFB. Asbestos management and abatement at Vandenberg AFB is in compliance with appropriate local, state, and federal standards and regulatory requirements.

The Vandenberg AFB *Hazardous Waste Management Plan* (dated 15 November 2000), specify all procedures for sampling, handling and disposing of lead-based paint and PCBs.

Liquid Propellants and Other Toxic Fuels

Existing procedures assure safe handling of liquid propellants and other toxic materials. Current operations include storage and handling of GBI and EKV propellants.

3.5.6 HEALTH AND SAFETY—VANDENBERG AIR FORCE BASE

Appendix B includes a general description of health and safety.

3.5.6.1 Region of Influence

The ROI for potential impact related to the health and safety of workers includes the work areas associated with transportation of missile components, pre-launch storage and handling, missile launch, and post-launch activities. The population of concern would predominantly consist of the contractor, military, and government civilian personnel directly involved with GMD ETR program operations.

The ROI for potential impact related to public health and safety includes any areas affected by transport of missile components and immediately bordering Vandenberg AFB that may be affected by launch hazard areas.

Remote telemetry sites in California would include Pillar Point. Activities at this location would utilize existing paved or graveled areas and be short-term temporary activities. Because of the type of emissions and the limited power output, the potential for impacts to health and safety is expected to be minimal and, therefore, is not discussed further in this document.

3.5.6.2 Affected Environment

Range Safety

Vandenberg AFB is involved in the ongoing test and evaluation of various missiles and space launch vehicles, with safe procedural practices as a primary objective. To accomplish this, an

aggressive safety evaluation and control system has been implemented, based on more than 40 years experience in test and evaluation.

Proposed on-base program operations must receive prior approval, accomplished by the user through presentation of the program to Space Wing/Safety Office (30 SW/SE). All safety analyses, SOPs, and other safety documentation applicable to those operations affecting Vandenberg AFB, or the Western Range Area and its controlled range space, must be provided, along with an overview of mission objectives, support requirements, and schedule. The 30 SW/SE evaluates this information, ensuring that all Western Range Area safety requirements are met.

Vandenberg AFB possesses significant emergency response capabilities that include its own Fire Department, Disaster Control Group, and Security Police Force, in addition to contracted support for handling accidental releases of regulated, hypergolic propellants and other hazardous substances. The Readiness Flight (30 CES/CEX) manages the overall base emergency response program and is responsible for developing and updating the Vandenberg AFB Hazardous Material Emergency Response Plan. Additionally, the 30 CES/CEX chairs the Hazardous Materials Planning Team, ensures that follow-on elements of the Disaster Control Group are assembled as required by the On-Scene Commander in the event of a release response, and maintains training certificates for spill response team members. (U.S. Department of the Air Force, 1999)

According to the Santa Barbara County Integrated Hazardous Materials Management System Operation Agreement, the base Fire Department approves and maintains the business plans and hazardous material inventories prescribed by the California Health and Safety Code, which are developed by organizations assigned to or doing business on the base. This information can be retrieved electronically in the event of an emergency. Additionally, the base Fire Department conducts onsite facility inspections, as required, to identify potentially hazardous conditions that could lead to an accidental release. It should be noted that the Vandenberg AFB Fire Department is advised of all operations involving the transfer of hypergolic propellants on the base. During launch operations, Fire Department response elements are pre-positioned to expedite response in the event of an anomaly. (U.S. Department of the Air Force, 1999)

Preceding operations that may involve ground impact of objects within the range, an evaluation is made to ensure that populated areas, critical range assets, and civilian property susceptible to damage are outside potential impacts limits. A NOTMAR and a NOTAM are published and circulated in accordance with established procedures to provide warning to mariners and pilots (including recreational users of the range space and controlled sea areas) concerning any potential impact areas that should be avoided. Radar and visual sweeps of hazard areas are accomplished immediately before operations to ensure evacuation of non-critical personnel. Before missile flight operations, the performance of all target missiles will be evaluated by 30 SW/SE to determine whether or not a Flight Termination System is warranted; if so, its use must be in accordance with Eastern and Western Range (EWR) 127-1, *Range Safety Requirements*. In addition, proposed trajectories are analyzed and a permissible flight corridor is established. A missile that strays outside its corridor is considered to be malfunctioning and to constitute an imminent safety hazard.

As stated earlier, test mishaps for target missiles are defined in terms of three scenarios: missile failure on the launch pad, termination of a flight shortly after liftoff, and termination of a flight after the missile has exited the vicinity of the launch site.

Termination of a flight on the launch pad is characterized by either detonation of the booster or a conflagration in which the propellant burns but does not explode. An ESQD surrounding the launch pad would be calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained in the flight vehicle. For the current target systems, the ESQD is 381 meters (1,250 feet). During all launch activities, provisions will be made in accordance with EWR 127-1 to maintain a stand-by emergency response team near the launch site to ensure immediate response and rapid control in the event of an accident.

Termination of a flight on the launch pad or shortly after liftoff would result in all hazardous debris being contained within the Flight Hazard Area (FHA). Non-essential mission personnel are excluded from this area during launch operations; personnel required to work within FHA boundaries will be protected in hardened shelters, such as bunkers or blockhouses. The FHA is based on a risk of $1x10^{-5}$ to a single individual on the FHA boundary during a launch. The Flight Caution Area (FCA) is the area outside the FHA where personal injury could occur because of early flight failure or termination. The FCA is based on a risk of $1x10^{-6}$ to single person on the FCA boundary during a launch. Access to the FCA is also limited to mission-essential personnel.

In accordance with existing Vandenberg SOPs, 30 SW/SE will ensure that the debris from the termination of a flight will fall into areas verified clear before the launch (U.S. Army Space and Strategic Defense Command, 1994).

The launch scenario will be planned to ensure debris will not fall within a 4.8-kilometer (3-mile) distance of the California coast (U.S. Department of the Air Force, 1997b). Any debris falling on Vandenberg AFB land will be handled in accordance with Vandenberg emergency response plans, based upon the 1996 *North American Emergency Response Guidebook* (U.S. Department of the Air Force, 1997b).

Launch vehicle mishaps (i.e., accidents involving any launch vehicle operation) are handled by various emergency support teams on base. Some of these procedures include authorization to enter an accident area, control procedures for monitoring trains, and salvage procedures. Several distinct teams of qualified individuals are available to respond to emergencies that might occur during a launch. These teams include the Specialized Operation Support Team, the On-Scene Disaster Group, the Missile Potential Hazard Team, and the Launch Support Team. The Southern Pacific Transportation Company railroad crosses Vandenberg AFB and owns the railroad property. Most launches fly over the railroad. The 30 SW has procedures for train protection and subsequent “hold” or “proceed” decisions during launch operations.

Management of Risks due to Rocket Propellant and Motor Exhaust Constituents Exposures

The exposure criteria used in EWR Safety Programs are used to fulfill toxic hazard and risk management requirements and policies. The objective of these programs is to maximize range operability without compromising public and worker safety. The Headquarters Air Force Space Command Surgeon General (HQ AFSPC/SG) has recommended exposure criteria for some of

the current solid- and liquid-rocket propellants and their combustion by-products. HQ AFSPC/SG has also recommended that the EWRs use a risk-management based approach for developing toxic launch commit criteria consistent with current human toxic exposure criteria and coordinated with Local Emergency Planning Committees and local agencies, as needed. In an effort to comply with this recommendation, the EWR Safety offices developed a toxic risk-management based approach designed to maintain an exposure criteria less than or equal to $30x10^{-6}$ with an individual risk of $1x10^{-6}$ over the varying population densities. This approach takes into account probability of catastrophic failure, concentration, direction, dwell time, and emergency preparedness procedures. This risk level presents no greater risk to the general public for launch and flight of launch vehicles and payloads than that imposed by overflight of conventional aircraft.

For credible potential toxic emissions, tiered levels are established to fulfill Air Force requirements under U.S. Air Force Occupational and Health and Safety Standard (AFOSH) 48-8, *Controlling Exposures to Hazardous Materials,* and Local Emergency Planning Committee requirements under Executive Order 12856, *Federal Compliance with Right-to-Know Laws, Environmental Planning and Community Right-to-Know Act, and Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances* (U.S. Environmental Protection Agency, Federal Emergency Management Agency, Department of Transportation, 1987).

Vandenberg AFB has safety procedures in place, which are described below, to protect the public and sensitive receptors from potential toxic emissions.

The Western Range has a three-tiered, three-zone deterministic approach plus a probabilistic approach to protecting against harmful toxic exposures of hydrogen chloride. The Western Range implements safety measures that are designed to protect mission essential and non-mission essential persons. Before launch, the Rocket Exhaust Effluent Diffusion Model is used to locate toxic zones.

There are three zones for assessing an individual's proximity to toxic combustion products, including those that could result from a launch failure. Zone 1 is an area where airborne concentrations of any toxic product are equal to or exceed Tier 1 levels but are less than Tier 2 levels. Zone 2 is an area where airborne concentrations of any toxic product are equal to or exceed Tier 2 levels but are less than Tier 3 levels. Zone 3 is an area where airborne concentrations of any toxic product range from a low defined by Tier 3 to an unknown high. Table 3.5.6-1 describes the Tier levels.

Before launch, the Rocket Exhaust Effluent Diffusion Model is run to ensure that any mission essential persons within a Zone 2 (having predicted hydrogen chloride concentrations exceeding the Tier 2 level [see 30 SWI 91-106, 1998]) are aware of being in a Zone 2, have personnel protection equipment, and have a pre-determined route of departure. If mission essential personnel do not meet these requirements, then they are relocated out of the zone. Any non-mission essential people on-base are also moved, if feasible. If they cannot be moved, or if they are off-base and not subject to being moved, then their locations and exposure are taken into account in the risk assessment procedure.

Table 3.5.6-1: HQ AFSPC/SG-Recommended and Endorsed Exposure Criteria for Constituents in Rocket Propellant or Motor Exhaust

	Tier 1[1]	Tier 2[2]	Tier 3[3]
HCl[6]	2 ppm (60 min)[4] 10 ppm[5]	10 ppm[5]	50 ppm[5]
N_2H_4[7]	NR	2 ppm (60 min)[4]	40 ppm[5]
UDMH[7]	NR	5 ppm[5]	25 ppm[5]
A-50[7]	NR	5 ppm[5]	25 ppm[5]
MMH[7]	NR	0.52 ppm (60 min)[4]	25 ppm[5]
NO_2[6]	0.2 ppm (60 min)[4] 2 ppm[5]	2 ppm (60 min)[4] 4 ppm[5]	20 ppm (30 min)[4]
HNO_3[6]	0.3 ppm[5]	2.5 ppm (60 min)[4] 4 ppm[5]	25 ppm (30 min)[4]

Source: AFOSH 48-8; Executive Order 12856; U.S. Environmental Protection Agency, Federal Emergency Management Agency and U.S. Department of Transportation, 1987.

NOTES:

[1] Tier 1 – This exposure level and above is defined as the discomfort or mild-effect level. There is little risk to the average person. This exposure poses no hazard to normal and healthy individuals. Sensitive individuals (i.e., asthmatics and bronchitics) may experience some adverse effects, which are reversible. Tier 1 represents exposure guidelines for sensitive members of the general public (off-base) who may involuntarily and unknowingly be exposed. Recommended action, if this tier is exceeded, is similar to a Stage 3 air pollution alert: Notify the public of the release through an advertised announcement particular to an event or a published annual notice that sensitive populations should be advised that there is a possibility of exposure to the effluent and advise of mitigating precautions.

[2] Tier 2 – This exposure level and above is defined as the disability or serious-effect level. All effects are reversible. There are no serious impacts on personnel's ability to complete the mission identified. There is some risk to an average individual. Military and employees voluntarily accept exposure up to Tier 2 concentrations. The consent implies knowledge of the exposure concentrations and the consequences of possible exposure. Tier 2.represents personnel who have knowledge of the event and understand the possibility and consequences of possible exposure (on-base personnel). Personnel are advised to seek immediate protection (shelter in place) or evacuate for concentrations exceeding the Tier 2 limit.

[3] Tier 3 – This exposure level and above is defined as a life-threatening-effect level. Irreversible harm may occur with possible impact on a person's ability to complete the mission. Personnel in an area (event personnel) where Tier 3 exposure may occur have given informed consent and are trained regarding the possible life-threatening situations. Exposures up to Tier 3 concentrations permit an individual to seek shelter or don respiratory protection. Concentrations predicted in excess of Tier 3 concentrations require immediate evacuation to prevent exposure.

[4] Time-weighted average exposure concentration. The time period indicated in parentheses is the time over which the concentration measurements will be measured and averaged.

[5] Ceiling limit. A peak concentration that must not be exceeded during the exposure period.

[6] Exposure criteria recommended by HQ AFSPC/SG.

[7] Exposure criteria recommended by AL/OE and endorsed by HQ AFSPC/SG.

A-50 = Aerozine-50 (50 percent by weight unsymmetrical dimethylhydrazine and anhydrous hydrazine)
HCl = hydrochloric acid
HNO_3 = nitric acid
HQ AFSPC/SG = Headquarters Air Force Space Command/Surgeon General
min = minutes
MMH = monomethyl hydrazine
NR = no recommendation
N_2H_4 = anhydrous hydrazine
NO_2 = nitrogen dioxide
ppm = parts per million
UDMH = unsymmetrical dimethylhydrazine

The Western Range toxic risk-assessment-based recommendation to launch or not to launch is based on the results of the Launch Area Toxic Risk Analysis (LATRA) program (i.e., risk assessment program) that evaluates the risk to people, regardless of whether they are mission essential or non-mission essential. Among other criteria in determining whether to launch, the

LATRA accounts for (1) whether people are sheltered or unsheltered; (2) whether they are healthy or sensitive individuals; and (3) the probability of a catastrophic launch failure.

Regional Safety

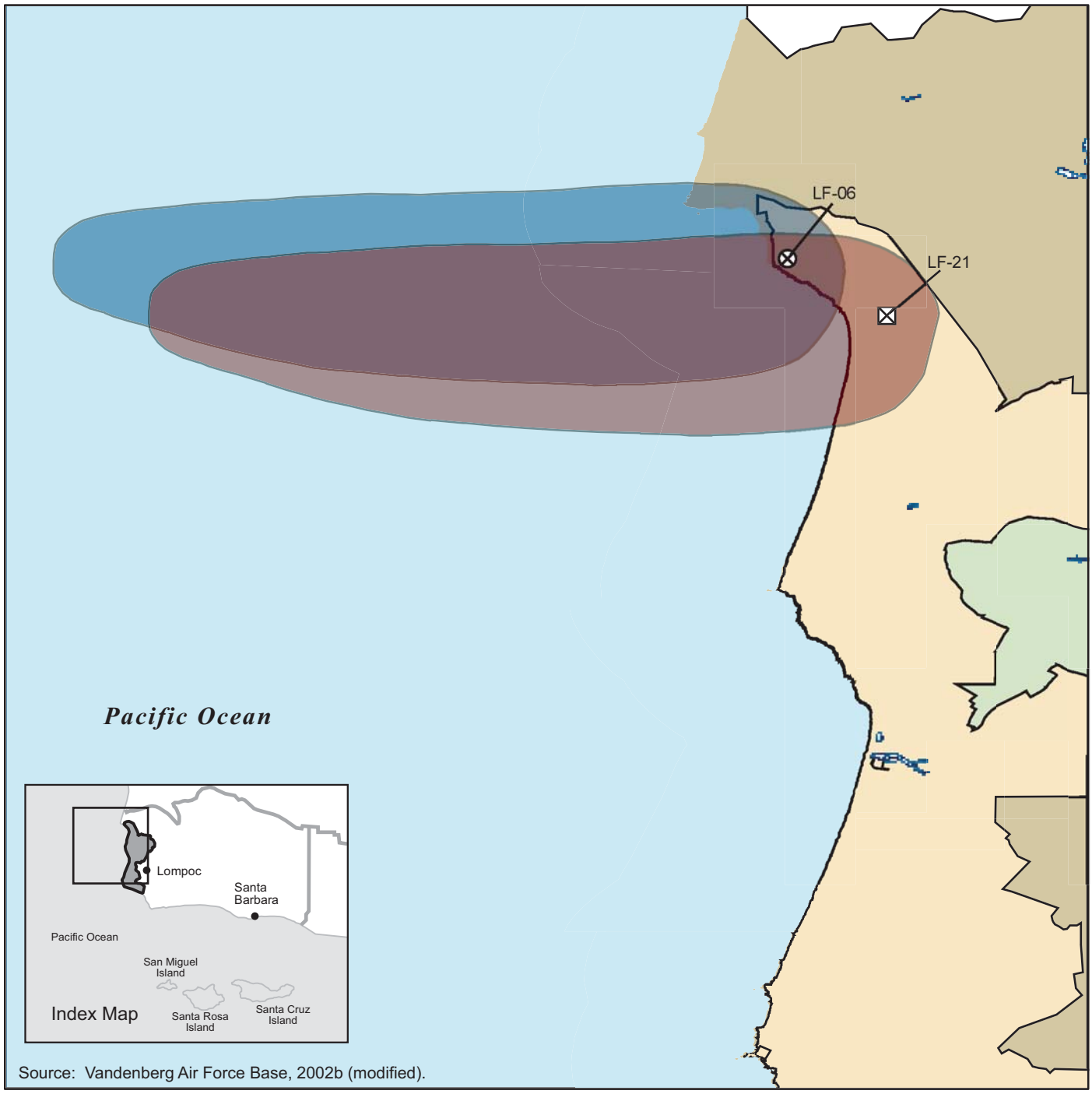
Regionally, Santa Barbara County prepared a Hazardous Material Response Plan that is used for countywide disaster response. Cities and communities in the county are required to have their own emergency response plans that were incorporated by the county into a comprehensive Multihazard Functional Plan, which specifies actions to be taken in case of a local disaster. The city of Lompoc adopted its Multihazard Functional Plan in 1989 and amended it in 1994. Because of the potential for Vandenberg AFB operations to affect off-base areas, Vandenberg AFB plays a prime role in regional emergency planning (U.S. Department of the Air Force, 1997b).

The city of Lompoc and Vandenberg AFB have entered into a mutual aid agreement, which allows emergency units from either Lompoc or Vandenberg AFB to provide each other with assistance in the event of an emergency. A "hotline" exists between the city of Lompoc and Vandenberg AFB in order to immediately notify the city in case of a major accident on the base. In the event of an emergency involving a launch mishap in Lompoc, Vandenberg AFB would assume control and could set up a national defense area if protected material were involved in the accident.

In the event of a launch vehicle impacting other areas outside Vandenberg AFB, the On-Scene Disaster Control Group from Vandenberg AFB would respond to the accident upon request of the county. County agencies would be used to help in the evacuation and possible fire control for such an incident. Military personnel would assume responsibility for disaster control in the immediate impact area.

Impact debris corridors have been established off the Santa Barbara County coast between Point Sal and Point Conception. These corridors were established to meet security requirements and reduce the hazard to persons and property during a launch-related activity. Impact debris corridors are established through the designation of debris impact areas for each specific launch as discussed in range safety procedures. These corridors are plotted for all launches. Figure 3.5.6-1 presents example impact debris corridors for a typical launch from LF-06 and LF-21.

Zone closures are announced daily over various radio frequencies and posted in harbors along the coast. The 30 SW Flight Analysis notifies the 30 Range Squadron of areas that are hazardous to aircraft (i.e., impact debris corridors) for all normally jettisoned and impacting stages by 30 working days before launch. The 30 Range Squadron notifies the FAA, Los Angeles Center or Oakland Center, so that the information can be disseminated through a NOTAM. Restricted airspace areas are active and controlled according to EWR 127-1 Range Safety Requirements, Safety Operating Instructions, 30 SW regulations, and FAA directives and regulations. Control of air traffic in FAA-designated areas around the launch head are maintained and coordinated between the Aeronautical Control Officer and FAA to ensure that aircraft shall not be endangered by launches. The Air Route Surveillance Radar surveys the restricted airspace beginning 15 minutes before the scheduled launch time and until the launch is complete.



Source: Vandenberg Air Force Base, 2002b (modified).

EXPLANATION

- Vandenberg Air Force Base
- Water
- Santa Barbara County
- Santa Barbara County Urban Areas
- LF-6 Debris Corridor
- LF-21 Debris Corridor
- ⊗ LF-06
- ⊠ LF-21

Scale

0 3 6 kilometers

0 1.85 3.7 miles

NORTH

06-09-03 VBerg Hazard Areas

Impact Debris Corridors for a Typical Launch from LF-06 and LF-21

Vandenberg Air Force Base, California

Figure 3.5.6-1

The 30 SW also ensures that a NOTMAR within the impact debris corridor is disseminated beginning 30 working days before launch. Information regarding impact debris corridors is distributed to surface vessels when the 30 SW sends written notification of impact debris corridors to be published weekly in the U.S. Coast Guard Long Beach Broadcast to Mariners. Broadcasts by U.S. Coast Guard Long Beach provide the latest available hazard information to offshore surface vessels. 30 SW has developed procedures related to evacuating or sheltering personnel on offshore oil rigs during launch operations. These procedures pertain to offshore platforms located west of 120 degrees 15 minutes longitude. The 30 SW Chief of Safety notifies 30 Range Squadron of future launches, and 30 Range Squadron notifies the Minerals Management Service, Department of the Interior, to notify oil rig personnel of a future launch. The Minerals Management Service will first notify the oil rig operator 10 to 15 days before a launch to prepare for possible sheltering or evacuation. The second notice is given 24 to 36 hours before the launch confirming the requirement to shelter or evacuate. The third notice is given by Frontier Control to provide final notice before, during, and after securing the operation. Additional notices are sent as required. Oil rig operators are notified to shelter or evacuate personnel according to the Rocket Exhaust Effluent Diffusion Model of toxic vapor plumes and potential impact of launch debris.

There are two public beaches in the ROI: Point Sal Beach State Park to the north and Ocean Beach County Park at the terminus of SR 246 near the division between North and South Vandenberg AFB.

Point Sal Beach State Park and Ocean Beach County Park are within the ROI for Minuteman and Delta missile launches from North Vandenberg. Ocean Beach County Park is also closed for Atlas and Titan launches. Access roads to both parks can be closed and visitors can be evacuated under an agreement between Vandenberg AFB and Santa Barbara County. Currently closure procedures occur an average of 9 to 10 times per year. All closure and evacuation agreements have been consolidated under an Evacuation Agreement, giving Vandenberg AFB the right to evacuate and close the beaches up to 48 hours before a launch. (U.S. Department of Air Force, 1997b)

Base flight safety requires that there be no overflight of civilian property on the coastline, and that there be no overflight of any of the Channel Islands, except San Miguel Island. Although direct overflight of the beaches does not occur, there is the possibility of debris from a launch anomaly impacting the beaches. In order to protect park visitors, Vandenberg AFB, the County Parks Department, the County Sheriff, and the California Highway Patrol have agreed to close the parks upon request during launches affecting the beaches.

3.5.7 LAND USE—VANDENBERG AIR FORCE BASE

Appendix B includes a definition of land use and the main federal land management responsibilities that govern its protection.

3.5.7.1 Region of Influence

The ROI for the land use generally includes Northern Santa Barbara County region within and adjacent to the boundaries of Vandenberg AFB that are potentially affected by the launch of target and GBI missiles and the construction, modification, and operation of support facilities associated with the Proposed Action.

Remote telemetry sites in California would include Pillar Point. Activities at this location would utilize existing paved or graveled areas and would be a short-term temporary activity. The potential for impacts to land use at Pillar Point is expected to be minimal and, therefore, is not discussed further in this document.

3.5.7.2 Affected Environment

Vandenberg AFB, located in western Santa Barbara County in south central California, is approximately 88 kilometers (55 miles) northwest of Santa Barbara, and 225 kilometers (140 miles) northwest of Los Angeles. The base's 39,821 hectares (98,400 acres) are approximately 6 percent of the total land area of Santa Barbara County. Numerous communities are located within 16 kilometers (10 miles) of the base but are separated by wide buffers of agricultural areas. These buffer lands are the result of efforts between the nearby cities of Lompoc and Santa Maria and the Santa Barbara County functioning as local planning authorities for lands adjoining the base. (U.S. Department of the Air Force, 1997b) Their general plans include the designation of compatible land uses between adjacent lands and Vandenberg AFB. Neither the county nor neighboring cities have any land use authority over Vandenberg AFB land because of its federal land status. Furthermore, Vandenberg AFB determines its own land use and zoning regulations. (U.S. Department of the Air Force, 1998a)

Approximately 5 percent of the base has been disturbed, leaving the remainder in its natural state (U.S. Department of the Air Force, 1997b). According to Vandenberg AFB's Comprehensive Plan, the base has allocated the following land use areas: airfield operations and maintenance/space and missile launch, industrial, outdoor recreation, open space, airfield, and cantonment. The cantonment area includes residential, administrative, industrial, recreational, open space, airfield, and community land uses. Approximately 90 percent of the land use on Vandenberg AFB is open space, followed by industrial (approximately 6 percent) and airfield operations and maintenance/space and missile launch (approximately 2 percent). (U.S. Department of the Air Force, 1998a)

Vandenberg AFB is divided into northern and southern regions by the Santa Ynez River and West Ocean Avenue. Development has occurred primarily on the northern region of the base whereas the southern portions remain primarily undeveloped. (U.S. Department of the Air Force, 1998a) The primary ROI for the proposed activities is North Vandenberg AFB.

Vandenberg AFB's 56 kilometers (35 miles) of undeveloped coastline exist as a fraction the 840 mile long California Coastal National Monument composed of small, federally owned islands, rocks, and exposed reefs. Currently the Bureau of Land Management has begun the process to prepare a Resource Management Plan for the California Coastal National Monument (U.S. Environmental Protection Agency, 2002).

As of November of 1999 Congress directed the National Park Service to conduct a resource feasibility study to determine whether the Gaviota Coast or any portion of it is eligible and/or suitable to be managed as an entity of the National Park System (National Park Service, 2002). The Gaviota Coast is composed of 80,937 hectares (200,000 acres) from Coal Oil Point on the University of California Santa Barbara campus in Isla Vista to Point Sal at the northern boundary of Vandenberg AFB. The Park Service study focuses on private lands, four state parks, parts of Los Padres National Forest, and all of Vandenberg AFB. (U.S. Air Force Headquarters, 2002)

The feasibility study, its release for public review and recommendation to the U.S. Congress are expected in early 2003 (National Park Service, 2002).

Limited public access to North Vandenberg AFB's shoreline provides various opportunities for recreational activities in the vicinity. Two public access parks that exist on or immediately adjacent to the base include Point Sal Beach State Park, which borders the northern most boundaries, and Ocean Beach County Park located approximately midway along the coast edge of Vandenberg AFB. Both provide opportunities for picnicking, surf fishing, and general beach activities (U.S. Department of the Air Force, 1998a).

All public access closures and evacuation agreements allow the base the right to evacuate and close the beaches days before launch (U.S. Department of the Air Force, 1997b). Most park closures only occur for 3 to 4 hours. However, unstable weather conditions, or any mechanical problems, resulting in an abort launch or launch rescheduling may prolong a closure (U.S. Department of the Air Force, 1998a).

Coastal Zone Management

A federal activity in or affecting a coastal zone requires preparation of a Coastal Zone Consistency Determination by the proponent in coordination with the Vandenberg AFB Environmental Division. The area along the western coast of Vandenberg AFB is within the North Coast Planning Area. The base's coastal zone extends inland from about 1.2 kilometers (0.75 mile) at the northern boundary to 7.2 kilometers (4.5 miles) at the southern end. The widest portion of the coastal zone occurs at San Antonio Creek and south of Cañada Honda Creek to the southern boundary. (U.S. Department of the Air Force, 1998)

3.5.8 NOISE—VANDENBERG AIR FORCE BASE

Appendix B includes a definition of noise and the main regulations and laws that govern it.

3.5.8.1 Region of Influence

The area immediately surrounding Vandenberg AFB is mainly undeveloped and rural, with some unincorporated residential areas within the Lompoc and Santa Maria valleys. The two urban areas in the region are the cities of Lompoc and Santa Maria, which support a few localized industrial areas. Sound levels measured for most of the region are normally low, with higher levels appearing in industrial areas and along transportation corridors. The minimum ROI for noise analysis is the area within the maximum sound level (L_{max}) = 85 dB contours generated by program activities.

Remote telemetry sites in California would include Pillar Point. Activities at this location would be short-term temporary activities that include the operation of generators as primary or backup power. Although specific locations have not been identified, the noise from the generators would dissipate to minimal levels. The potential for noise impacts is expected to be minimal and, therefore, is not discussed further in this document.

3.5.8.2 Affected Environment

The immediate area surrounding Vandenberg AFB is largely composed of undeveloped and rural land, with some unincorporated residential areas in the Lompoc and Santa Maria valleys and Northern Santa Barbara County. The cities of Lompoc and Santa Maria, which make up the two urban areas in the region, support a small number of localized industrial areas. Sound levels measured for the area are typically low, except for higher levels in the industrial areas and along transportation corridors. The rural areas of the Lompoc and Santa Maria valleys typically have a low over all noise levels, 40 to 45 dBA. Infrequent aircraft flyovers and missile launches from Vandenberg AFB increase noise levels for a short period of time (U.S. Army Space and Missile Defense Command, 2002a).

Noise at Vandenberg AFB is typically produced by automobile and truck traffic, aircraft landings and takeoffs, and space vehicle launches. Railroad traffic is also a significant source of noise. Existing noise levels on Vandenberg AFB are typically low; the higher levels occur near industrial facilities and transportation routes. Vandenberg AFB follows state regulations concerning noise, and maintains a Community Noise Equivalent Level (CNEL) equivalent to 65 dBA for off-base areas (U.S. Army Space and Missile Defense Command, 2002a).

Missile launches from Vandenberg AFB produce less frequent but more intense sources of noise in the region. Current launches include Minuteman missiles and Delta II rockets launched from the North Base and Titan and Atlas missiles from the South Base. Typical noise levels for familiar sources and Vandenberg AFB launch vehicles, such as the Minuteman, are summarized in table 3.5.8-1 and discussed below (U.S. Army Space and Missile Defense Command, 2002a).

Table 3.5.8-1: Typical Noise Levels at Vandenberg AFB

Source	Noise Level (dBA)	Comment
Sonic Boom	140	
Minuteman launch	Approx. 125	At 3 kilometers (1.8 miles)
Air raid siren	120	At 15.2 meters (50 feet) (threshold of pain)
Minuteman launch	98	At 4.2 kilometers (2.6 miles)
Airplane, 747	102.5	At 304.3 meters (1,000 feet)
Minuteman launch	80	At 12.7 kilometers (7.9 miles)
Long range airplane	80–70	Inside
Typical aircraft traffic	70	Maximum any location in flight path

Source: U.S. Army Space and Missile Defense Command, 2002a

Noise levels in Lompoc and Santa Maria from Minutemen missile launches would be expected to be a maximum of 49 dBA and 74 dBA, respectively. Noise from a Titan IV launched from Space Launch Complex (SLC)-4 in August 1993 was measured at six locations. The Titan IV is the largest launch vehicle in the U.S. military inventory and has the greatest potential for noise impacts. Measurement sites were located downrange at nominal distances from the launch pad. Data were tape recorded at all sites and processed into appropriate sound levels. Direct sound level meter measurements were made as shown in table 3.5.8-2. Of interest is the measurement at the 13,146-meter (43,129-foot) site in the city of Lompoc: A-weighted sound pressure level was 88.0 dB, A-weighted sound exposure level was 93.7 dB, and output sound pressure level was 112.8 dB. Because launches from all of these facilities would occur

intermittently, the resulting noise would not cause an increase in the average (equivalent sound level [L_{eq}], day-night average sound level [L_{dn}], or CNEL) noise levels in nearby areas. The cumulative quantities L_{dn} and CNEL are based on sounds that occur on a regular basis, at least every day, and usually many times per day. Missile launches are relatively infrequent, at rates well below those needed for L_{dn} or CNEL to be meaningful (U.S. Department of the Air Force, 1998a).

Table 3.5.8-2: Measured Titan IV Sound Level, August 1993

Distance from Pad (meters [feet])	Noise Levels (dB)			
	Measured Maximum Output Sound Pressure Level	Sound Level Meter Measured Output Sound Pressure Level	Measured Maximum A-Weighted Sound Pressure Level	Measured A-weighted Sound Exposure Level
823 (2,700)	141.7	141	124.4	133
2,036 (6,680)	131.4	-	112.4	121.9
3,414 (11,200)	129	129.9	110.6	116.2
5,791 (19,000)	122.1	127.6	99	109
13,146 (43,129)	112.8	-	88	93.7

Source: U.S. Department of the Air Force, 1998a

3.5.9 SOCIOECONOMICS—VANDENBERG AIR FORCE BASE

Appendix B includes a general definition of socioeconomics.

3.5.9.1 Region of Influence

The ROI for socioeconomics is defined as the communities and areas surrounding Vandenberg AFB. Primary areas of analysis will concern the larger, more populous communities, including the cities of Lompoc and Santa Maria, as well as wider Santa Barbara County.

3.5.9.2 Affected Environment

Vandenberg AFB is in the western part of unincorporated Santa Barbara County, California. The Santa Ynez River and State Route (SR)-246 divide the base into North and South Vandenberg AFB. North Vandenberg AFB generally includes the developed portions of the base, whereas South Vandenberg AFB includes primarily open space. The city of Lompoc lies to the east, the city of Santa Maria to the northeast, and the city of Guadalupe to the north. Two unincorporated communities, Vandenberg Village and Mission Hills, are north of the city of Lompoc. Also, Vandenberg AFB is considered a Census Designated Place and data regarding Vandenberg AFB via the 2000 census has been examined.

Population and Housing

The total population of Santa Barbara County increased from 369,608 persons in 1990 to 399,347 persons as of 2000 (8.04 percent) (U.S. Census Bureau, 2003b). The city of Santa Barbara, with a population of 92,325 people as of 2000, was the largest city in the county and contained 23.1 percent of the county population. Of the communities adjacent to Vandenberg

AFB, the city of Santa Maria, with 77,423 persons is the most populous, followed by the city of Lompoc with 41,103 people. (County of Santa Barbara, 2003) Casmalia is a much smaller community with less than 200 people as of 2000. Vandenberg AFB itself showed a larger population than the unincorporated communities immediately adjacent to the base (County of Santa Barbara, 2003).

As of 2000, there were an estimated 142,901 housing units within Santa Barbara County (U.S. Census Bureau, 2003b) of which 37,076 housing units were located within the City of Santa Barbara and 22,847 and 13,621 units were located in Santa Maria and Lompoc respectively (County of Santa Barbara, Department of Planning and Development, 2003). As of 2000, 1,992 units were located within Vandenberg AFB and 2,366 and 1,072 units were located in the communities of Vandenberg Village and Mission Hills respectively.

In addition, the Bureau of the Census reported that vacancy rates of rental housing within Santa Barbara County and city averaged 2.8 percent and 2.3 percent respectively during 2000 (U.S. Census Bureau, 2003b). These were marginally lower than the average vacancy rates of 4.0 percent and 3.1 percent for the cities of Lompoc and Santa Maria respectively. While Vandenberg Village showed a 3.6 percent vacancy rate, vacancy rates within Vandenberg AFB and Mission Hills, at 2.2 percent, and 2.1 percent respectively, more closely resembled the county average levels.

Income and Employment

The U.S. Bureau of the Census reported that the per capita income in Santa Barbara County, as of 2000, was $23,059, only slightly higher (1.5 percent) than the average per capita income of the state at $22,711 (U.S. Census Bureau, 2003c). Conversely, as of 2000 the median household income in Santa Barbara County, at $46,677 was only slightly lower (1.6 percent) than that of the state, at $47,443 (U.S. Census Bureau, 2003c). Table 3.5.9-1 shows the number of individuals employed within the main sectors of the economy of Santa Barbara County. Retail and service industries dominate the profile, employing approximately 60 percent of the workforce within the county.

Santa Barbara County's economic growth has been driven by the expansion of local telecommunications, computer and software, medical devices, and electronics firms (Cumulus Media, Inc., 1999). Major employers include the University of California, Vandenberg AFB, Lockheed Martin, Vons/Williams Brothers Stores, and Raytheon Systems (Cumulus Media, Inc., 1999). The University of California, Santa Barbara has an enrollment of 19,000 students and is the area's largest employer with 8,660 employees. The University of California, Santa Barbara has an annual budget of $400 million, with $240 million being spent locally. In addition, the student population adds over $131 million annually to the local economy. Vandenberg AFB employs over 1,500 civilian workers and has a military population of 3,600. (Cumulus Media, Inc., 1999)

Table 3.5.9-1: Employment By Sector, Santa Barbara County, 2000

Employment Sector	Employees	Percent
Agriculture, forestry, fishing and hunting, and mining	12,094	6.7
Construction	10,773	6.0
Manufacturing	17,482	9.7
Transportation and warehousing, and utilities	5,214	2.9
Wholesale trade	5,912	3.3
Retail trade	20,347	11.3
Finance, insurance, real estate, and rental and leasing	9,755	5.4
Information	5,347	3.0
Public administration	7,647	4.2
Other services (except public administration)	9,823	5.4
Arts, entertainment, recreation, and accommodation and food services	18,409	10.2
Professional, managerial, scientific, administrative, and waste management services	19,514	10.8
Education, health, and social services	38,399	21.2

Source: U.S. Census Bureau, 2003c.

3.5.10 TRANSPORTATION—VANDENBERG AIR FORCE BASE

Appendix B includes a general description of transportation.

3.5.10.1 Region of Influence

The ROI for the resources addressed in this EIS is the ground, ocean, and aviation transport systems within or immediately adjacent to Vandenberg AFB and the flight test corridor that has been established.

3.5.10.2 Affected Environment

Aviation Transportation

There are four airports within the surrounding area of Vandenberg AFB. These include Santa Barbara Municipal, Santa Ynez, Lompoc, and Santa Maria Public airports. Vandenberg AFB also maintains its own runway, which is capable of handling large aircraft (U.S. Army Space and Missile Defense Command, 2002a).

Ground Transportation

Regional

Vandenberg AFB is accessible by U.S. 101, which connects the base with San Francisco to the north and Santa Barbara to the south. SR-1, SR-135, and SR-246 provide access to the base from U.S. 101. (U.S. Department of the Air Force, 1998a)

Local

The majority of the workers and other related support services providers for Vandenberg AFB reside within the unincorporated areas of Santa Barbara County and in the cities of Lompoc, Santa Maria, Guadalupe, Buellton, Solvang, and Santa Barbara. The key local roads providing access to Vandenberg AFB include SR-1, SR-135, Santa Lucia Canyon Road, SR-246, U.S. 101, and Central Avenue (U.S. Department of the Air Force, 1998a).

Peak-Hour Volumes and existing Level of Service for key roads on Vandenberg AFB are presented in table 3.5.10-1 (U.S. Department of the Air Force, 1998a).

Table 3.5.10-1: Peak-Hour Traffic Volumes and Levels of Service on Key Roads—Vandenberg AFB

Roadway	Segment/No. of Lanes	Capacity Vehicles Per Hour	1996 Peak-Hour Volume	Level of Service
Coast Road	Between LLC-6 and Bear Creek Road; two-lane	2,800	350	A
Bear Creek Road	Between Coast Road and Ocean Avenue; two-lane	2,800	350	A
13th Street	Between Ocean Avenue and Santa Maria Gate; two-lane	2,800	1,550	D
Ocean Avenue	Between Bear Creek Road and SR 1; 4-lane	8,000	250	A
SR 1	Between Santa Maria Gate and SR 135; 4-lane	8,000	1,550	B

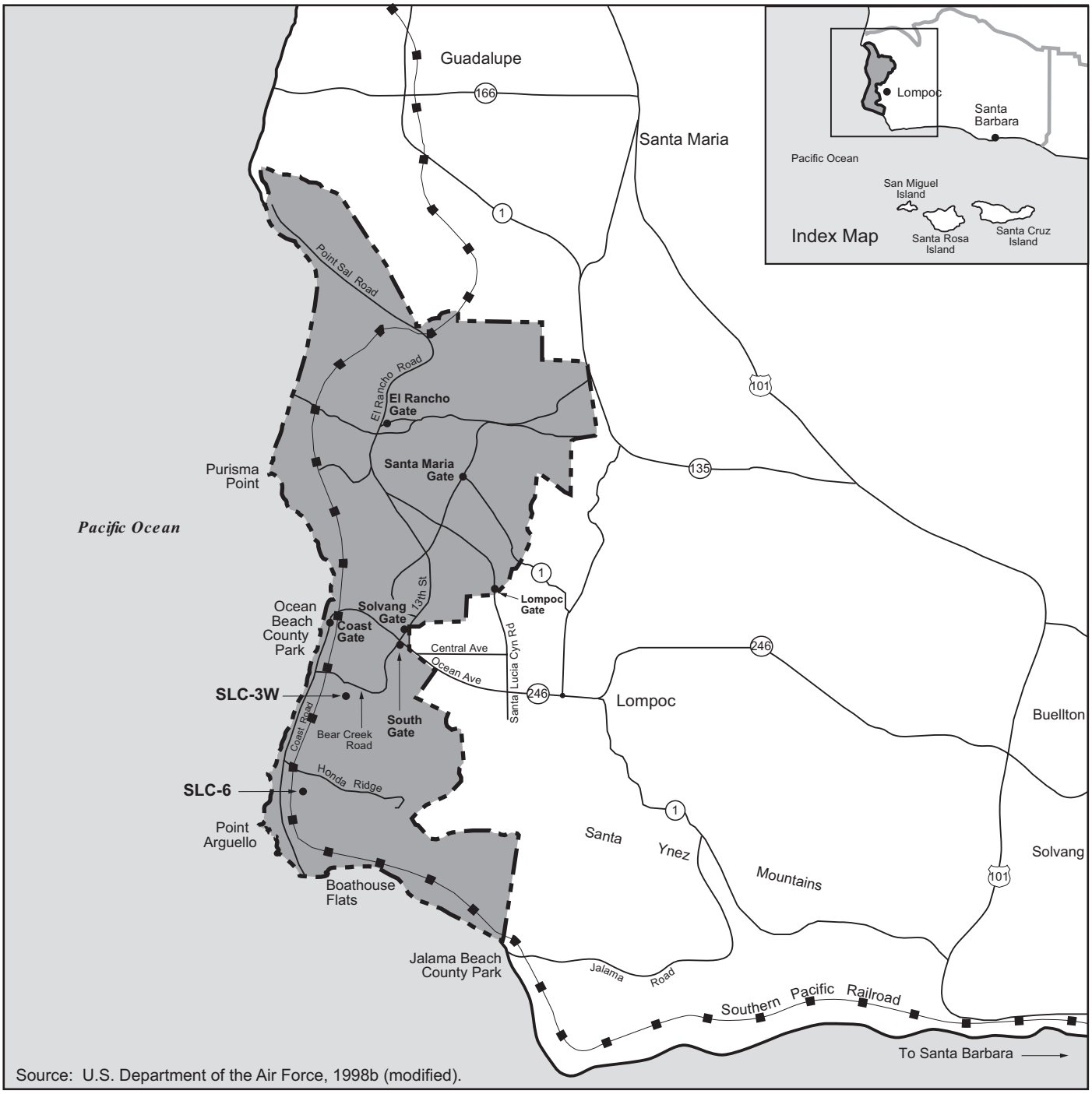
Source: U.S. Department of the Air Force, 1998a.

On-Site

The major roads on Vandenberg AFB that provide access to the project sites are Coast Road, Bear Creek Road, 13th Street, and Ocean Avenue (figure 3.5.10-1). Coast Road is a two-lane undivided roadway providing access to SLC-6. Coast Road connects to Bear Creek Road, north of SLC-6. Bear Creek Road is a two-lane arterial that provides access to the launch site location SLC-3W. Bear Creek Road is accessible through 13th Street from the north or Ocean Avenue from the east. The Solvang Gate, Santa Maria Gate, and El Rancho Gate are connected to 13th Street, a two-lane arterial that runs north south on the base. Ocean Avenue is an east-west road that bisects Vandenberg AFB and connects with Bear Creek and Coast roads. The Solvang and South Vandenberg AFB gates are located just north and south, respectively, of Ocean Avenue (U.S. Department of the Air Force, 1998a).

Rail Lines

The ROI for railways includes the Southern Pacific, Santa Maria Valley, and the Ventura County Railroad companies, which provide services to the cities of Santa Maria, Lompoc, Santa Barbara, San Luis Obispo, and Ventura. Three branch lines connect Vandenberg AFB to the Southern Pacific Railroad main line. Approximately four passenger trains and eight freight trains pass through Vandenberg AFB daily. The railroad tracks pass between the Pacific Ocean and the launch facilities and must be overflown during launches; however, trains are never overflown during launches due to the potential risk to people and property. An electronic surveillance system, posted railroad schedules, and close coordination, including radio



Source: U.S. Department of the Air Force, 1998b (modified).

EXPLANATION

- Base Boundary
- 101 U.S. Highway
- 135 State Route
- Railroad

NORTH

Scale
0 3.2 6.4 kilometers
0 2 4 miles

Regional and Local Road System

Vandenberg Air Force Base, California

Figure 3.5.10-1

06-09-03 Roads VAFB

communication, between train engineers and Vandenberg AFB launch personnel, are used to minimize the possibility of an overflight.

3.5.11 WATER RESOURCES—VANDENBERG AIR FORCE BASE

Appendix B includes a brief overview of water resources and the related federal regulatory framework.

3.5.11.1 Region of Influence

The water resource ROI for the Vandenberg AFB study area includes those freshwater and saltwater resources that could be affected by the construction and operation of launching and support facilities. These resources are within, and adjacent to, the boundaries of Vandenberg AFB and are further described in the next section. The affected environment related to remote telemetry sites is not addressed because activities at these locations would be limited to the use of existing paved and gravel areas. Therefore, the potential for adverse water resource impacts is minimal.

3.5.11.2 Affected Environment

Surface Water and Groundwater Resources

Rainfall at Vandenberg AFB is relatively light, ranging from approximately 29 centimeters (11.5 inches) per year along the coast to about 32 centimeters (12.5 inches) per year further inland near Lompoc (U.S. Department of the Air Force, 1997b). Seven drainages are found in the Vandenberg AFB region, with the major streams being the Santa Ynez River and San Antonio Creek. Smaller streams include Caňada Tortuga, Shuman, Caňada Honda, Bear and Jalama Creeks. These streams and their smaller tributaries drain large areas, with many of the streams only having flows during or shortly after rain storms. Numerous ponds and man-made lakes are found on Vandenberg AFB including MOD III and Pine Canyon Lakes along with Lompoc Casmalia Pond, Joe's Pond, ABRES-A Lake, and El Rancho Pond (figure 3.5.11-1).

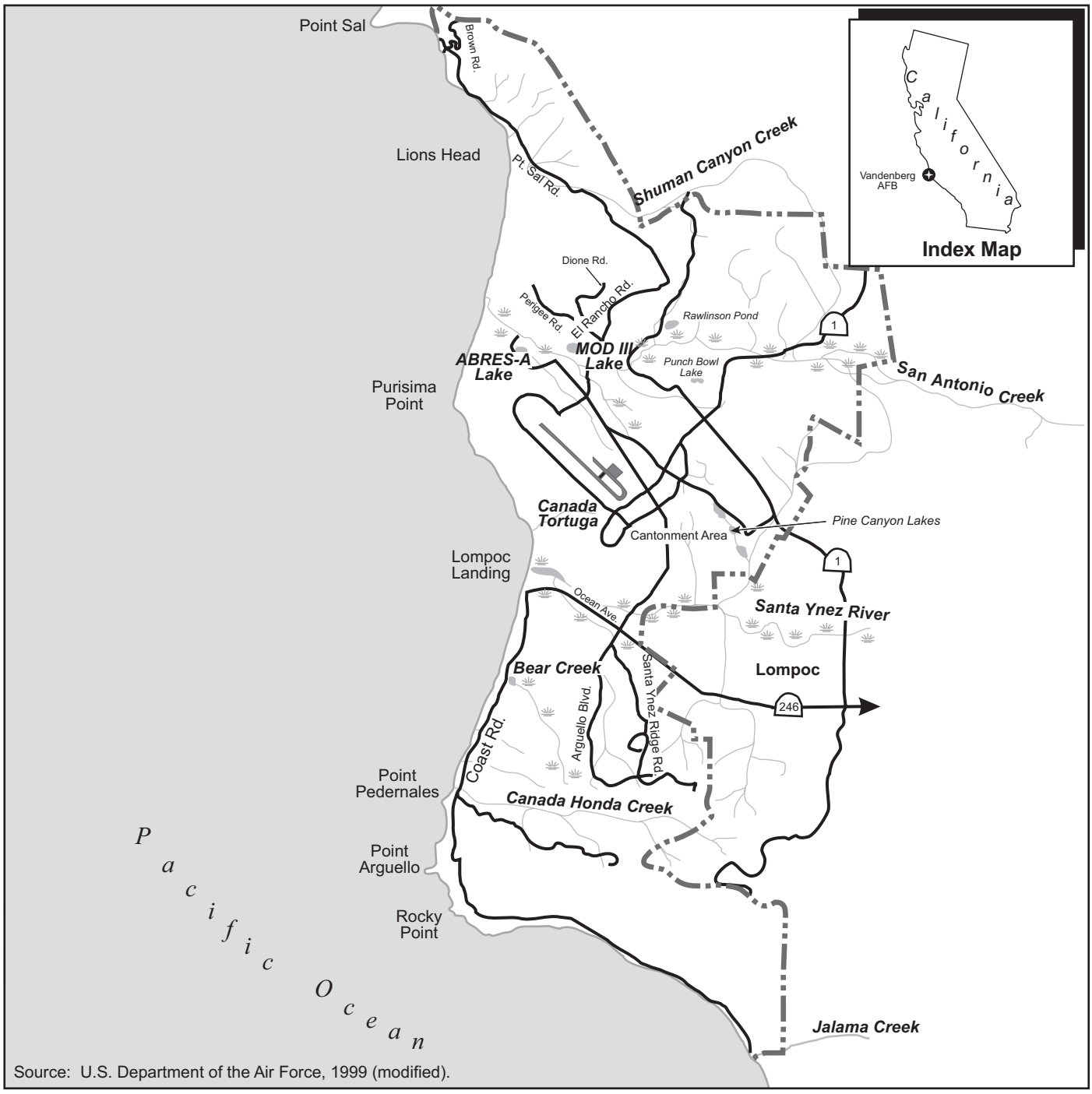
Groundwater in the vicinity of Vandenberg AFB is found in three different groundwater basins. The southern portion of the Vandenberg AFB includes a portion of the Lompoc Terrace Basin and the Lompoc Plain Basin. The San Antonio Creek groundwater basin underlies the northern portion of Vandenberg AFB. Smaller, isolated aquifers are found beneath alluvial fans on the base or in perched aquifers at higher elevations.

Water Quality

Some surface water quality sampling was conducted on the base by the U.S. Air Force in 1991. As reported in the 1998 Final EIS Evolved Expendable Launch Vehicle (U.S. Department of the Air Force, 1998a), this sampling determined that off-base agricultural runoff has led to elevated total dissolved solids, phosphates, and nitrates. Water quality is maintained through adherence to the 30 SW Water Quality Plan, Wastewater Management Plan, and Stormwater Pollution Prevention Plan, all updated in August 2000.

Water Use

The Vandenberg AFB water supply primarily comes from surface water purchased from the California Department of Water Resource's State Water Project. Four wells that tap the San Antonio Creek groundwater basin are only used as a supplemental supply.



EXPLANATION

- Land Area
- Water Area
- Vandenberg Air Force Base Boundary
- Road
- River / Creek
- Wetlands

NORTH

Scale
0 3.42 6.84 kilometers
0 2.13 4.25 miles

06-09-03 Vandenberg AFB 01

Major Streams and Ponds

Vandenberg Air Force Base, California

Figure 3.5.11-1

3.6 PEARL HARBOR—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE

The proposed GMD ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, utilities, and visual and aesthetic resources at Pearl Harbor. These resource areas are summarized in the following sections.

By nature of its marine mission and use of existing homeport facilities, SBX support and operational activities would not result in any adverse effects to cultural resources, geology and soils, land use, noise, socioeconomics, transportation, and water resources. Consequently, this section will not include further analysis of these resources other than the summary in the following paragraphs.

Cultural

There are not expected to be any ground disturbing activities within areas where cultural resources are located. While some mooring locations may have traditional importance, such as native fishing grounds, the SBX would occupy a very small area on a temporary basis. The remaining time the area would remain open.

Geology

While potential warehouse and administration facility construction activities could result in limited clearing and excavation for building foundations, it is not expected to create any adverse erosion effects to geology or soils. Construction activities would follow standard guidelines.

Land Use

Land use impact would be minimal since the proposed activities would occur on the water at the pier or near an existing mooring location and would not produce a change in the type of utilization. Land utilization in surrounding areas would not change.

Noise

No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels would to be below OSHA workplace standards.

Socioeconomics

As a result of its isolation, limited population, and local economic activity, only minor positive socioeconomic impacts would occur.

Transportation

The few additional personnel would not affect transportation. Shipping of project-related materials, as well as transportation of personnel, would utilize air, roadway, and shipping/ferrying routes that are equipped to handle both the loads and frequency of project demands. Any increase in daily trips by support personnel would utilize existing transportation infrastructure. Shared vehicle and/or off-peak hour travel would further serve to minimize effects on transportation levels.

Water Resources

Impacts to water resources would be negligible, similar to other large marine vessels.

3.6.1 AIR QUALITY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

3.6.1.1 Region of Influence

The ROI areas that may potentially be affected by the use of Pearl Harbor for the SBX include Pier Victor 3 and the mooring sites as identified in section 2.3.1.6.

3.6.1.2 Affected Environment

Climate

Temperatures in the Pearl Harbor region vary greatly season to season and during a 24-hour period. Highs of 30.5 to 32˚C (87 to 89˚F) are not unusual during midsummer afternoons, while temperatures of 22 to 24˚C (72 to 76˚F) are typical night temperatures during the same season. Winter and early spring temperatures range from 22 to 26˚C (76 to 78˚F) during the day to the mid-teens ˚C (low 60's ˚F) during the evenings. Relative humidity varies between lows of 58 to 60 percent to highs of over 80 percent.

Rainfall is typically light. However, occasional heavy rains can be caused by times of southerly winds. Monthly median peak rainfall occurs between November and February, with the lowest occurring between March and September. The mean annual rainfall for the region lies between 100 to 230 centimeters (40 to 90 inches) per year.

Prevalent for approximately nine months of the year, the prevailing winds tend to be northeast tradewinds. The remainder of the year sees south to southwest winds and mild offshore breezes prevailing. Winds up to 64 kilometers per hour (40 miles per hour) may occasionally strike from the north or northeast, but seldom reach gale velocities. (Department of the Navy Pacific Missile Range Facility, Hawaii, 2001)

Regional Air Quality

The state of Hawaii is in attainment of the NAAQS established for carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matters, ozone, and lead. (State of Hawaii Department of Health, Clean Air Branch, 2001)

Existing Emissions

According to the 2001 Annual Summary of Hawaii Air Quality Data, the entire state of Hawaii is in attainment. Table 3.6.1-1 lists the emissions recorded at two points near Barbers Point; West Beach, which is approximately 43 kilometers (27 miles) west of downtown Honolulu and Kapolei, approximately 40 kilometers (25 miles) west of downtown Honolulu. All levels recorded were well within the NAAQS and state AAQS. (State of Hawaii Department of Health, Clean Air Branch, 2001)

Table 3.6.1-1: Emissions Recorded Near Barbers Point

	Averaging Time	Hawaii Standards ($\mu g/m^3$)	Federal Primary Standards ($\mu g/m^3$)	West Beach Monitoring Station ($\mu g/m^3$)	Kapolei Monitoring Station ($\mu g/m^3$)
PM-10	24-hour	150	150	21	121
	Annual (arithmetic)	50	50	13	19
Sulfur Dioxide	3-hour	1,300	-	12	24
	24-hour	365	365	5	7
	Annual (arithmetic)	80	80	0.1	2
Carbon Monoxide	1-hour	10,000	40,000	1,026	2,280
	8-hour	5,000	10,000	456	1,596
Nitrogen Dioxide	Annual (arithmetic)	70	100	6	8

Source: State of Hawaii Department of Health, Clean Air Branch, 2001

3.6.2 AIRSPACE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

Appendix B includes a general description of airspace.

3.6.2.1 Region of Influence

The ROI for airspace at Pearl Harbor includes the airspace over and surrounding the potential SBX interference areas that extend from the mooring location off the coast of Barbers Point, Hawaii (figure 3.6.2-1).

3.6.2.2 Affected Environment

Controlled and Uncontrolled Airspace

The Honolulu ARTCC regulates air traffic in the Hawaiian Islands. Class B airspace is in effect at Honolulu International Airport and above the Kalaeloa (Rodgers) Airport. Class D airspace surrounds the Kalaeola Airport.

Special Use Airspace

Special use airspace is located north of the ROI (Schofield—Makua and Wheeler AFB restricted areas) and south of the ROI (Warning Areas W192 and W193).

EXPLANATION

- Low Altitude Special Use Airways
- High Altitude Special Use Airspace
- Low Altitude Air Routes
- High Altitude Air Routes
- Land
- SBX Mooring Site

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note:
- Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

NORTH

Scale
0 3.8 7.6 kilometers
0 2.4 4.7 miles

06-09-03 SBX Airways Oahu

Airspace Over the Potential SBX Mooring Area at Barbers Point, Hawaii

Oahu, Hawaii

Figure 3.6.2-1

En Route Airways and Jet Routes

Several low altitude airways are located within the ROI. V15 and V12 are in the north central part of the ROI, V4 crosses through the missile of the ROI, and V16 crosses the southern portion of the ROI. V2, V20, and V21 are located on the eastern edge of the ROI.

Airports/Airfields

Airports include Honolulu International, Kalaeloa (Rodgers) Airport, and Wheeler Army Airfield.

3.6.3 BIOLOGICAL RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

Appendix B contains a general description of biological resources and the main regulations and laws that govern their protection.

3.6.3.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Pearl Harbor for the SBX, including Pier Victor 3 and the mooring sites as identified in section 2.3.1.6.

3.6.3.2 Affected Environment

Terrestrial biological resources are not addressed since those areas (Pier Victor 3) where elements of the Proposed Action would take place onshore are already developed and disturbed.

Nine marine wildlife species listed as federal and state threatened or endangered species are known or suspected to occur in Hawaiian waters. These species, which are listed in table 3.4.2-1, include the Hawaiian monk seal, whales, and sea turtles. More than 20 species of dolphins and toothed whales are known to exist around the islands. On Oahu, whales are normally sighted consistently beginning in January, and are moderately abundant in adjacent waters until April (Hawaii State Department of Transportation, Harbors Division, 2001). Coral coverage in the area ranges from 80 to 90 percent at depths between 18 and 24 meters (58 and 78 feet) to less than 1 percent in water depths from 24 to 36 meters (78 to 120 feet). Lobe corals, cauliflower corals, and finger corals dominate the coral community. Diverse and abundant fish species are associated with areas greater than 40 meters (120 feet) in depth with vertical relief that contain coral coverage. Fifty-nine species of fish have been identified in the vicinity of Barbers Point. The most common species include sturgeon fish, butterfly fish, damselfish, wrass, and triggerfish. A commercial net pen cage aquaculture site is located north of the proposed site. (U.S. Department of the Navy, 2002a)

Of the 18 whale pods observed during recent surveys associated with proposed Kalaeloa Barbers Point Harbor, 12, or 67 percent, were seen near Barbers Point. The two species of cetaceans most frequently observed during daytime surveys are humpback whales and spinner dolphins. (Hawaii State Department of Transportation, Harbors Division, 2001)

3.6.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

3.6.4.1 Region of Influence

The ROI for hazardous materials and hazardous waste includes those areas that may potentially be affected by the proposed deployment of the SBX to Pearl Harbor. The ROI includes fueling areas, support and maintenance operations and waste storage and disposal. Appendix B includes a detailed discussion of maritime and other laws, regulations and standards concerning hazardous materials and hazardous waste.

3.6.4.2 Affected Environment

The Coast Guard 14th District Marine Safety Office (MSO) Honolulu is responsible for the enforcement of hazardous material and hazardous waste regulations and policies for navigable waterways and adjoining shorelines and for response to spills and releases. An Area Committee composed of industry, federal, state, and local regulatory representatives serves as a regional spill preparedness and planning group. In compliance with the National Contingency Plan (40 CFR Part 300) and the Oil Pollution Act of 1990, the Committee, with assistance and oversight from the Coast Guard, developed an Area Contingency Plan outlining regional spill response procedures.

Shipboard Hazardous Materials Management

Environmental compliance policies and procedures applicable to shipboard operations are defined in OPNAVINST 5090.1B (1999), Chapter 19. These instructions reinforce the Clean Water Act's prohibition against discharge of harmful quantities of hazardous substances into or upon U.S. waters out to 370 kilometers (200 nautical miles). Navy ships are required to conduct operations at sea in such a manner as to minimize or eliminate any adverse impacts on the marine environment. This includes stringent hazardous waste discharge, storage, dumping, and pollution prevention requirements. Table 3.6.4-1 summarizes pollution control discharge restrictions for U.S. Navy vessels at sea.

Table 3.6.4-1: Pollution Control Discharge Restrictions for Navy Ships

Area	Type of Waste		
	Blackwater (Sewage)	Greywater	Oily Waste
U.S. Waters (0 to 5.5 kilometers [0 to 3 nautical miles])	No discharge	If vessel is equipped to collect greywater, pump out when in port. If no collection capability exists, direct discharge permitted	Discharge allowed if waste has no visible sheen. If equipped with Oil Content Monitor (OCM), discharge < 15 ppm oil
U.S. Contiguous Zone (5.5 to 22 kilometers [3 to 12 nautical miles])	Direct discharge permitted	Direct discharge permitted	Same as 0 to 5.5 kilometers (0 to 3 nautical miles)
22 to 46.3 kilometers (12 to 25 nautical miles) from shore	Direct discharge permitted	Direct discharge permitted	If equipped with OCM, discharge <15 ppm oil. Ships with an oil/water separator (OWS) but no OCM must process all bilge water through the OWS

Table 3.6.4-1: Pollution Control Discharge Restrictions for Navy Ships (Continued)

Area	Type of Waste		
	Garbage (Non-plastic)	**Garbage (Plastic) (Non-food Contaminated)**	**Garbage (Plastic) (Food contaminated)**
>46.3 kilometers (25 nautical miles) from shore	Direct discharge permitted	Direct discharge permitted	Same as 22 to 46.3 kilometers (12 to 25 nautical miles)
>92.6 kilometers (50 nautical miles) from shore	Direct discharge permitted	Direct discharge permitted	Same as 22 to 46.3 kilometers (12 to 25 nautical miles)
U.S. Waters (0 to 5.5 kilometers [0 to 3 nautical miles])	No discharge	No discharge	No discharge
U.S. Contiguous Zone (5.5 to 22 kilometers [3 to 12 nautical miles])	Pulped garbage may be discharged	No discharge	No discharge
22 to 46.3 kilometers (12 to 25 nautical miles) from shore	Bagged shredded glass and metal waste may be discharged >22 kilometers (12 nautical miles)	No discharge	No discharge
>46.3 kilometers (25 nautical miles) from shore	Direct discharge permitted	No discharge	No discharge
>92.6 kilometers (50 nautical miles) from shore	Direct discharge permitted	No discharge	No discharge
	Hazardous Materials	**Medical Wastes**	
U.S. Waters (0 to 5.5 kilometers [0 to 3 nautical miles])	No discharge	No discharge	
U.S. Contiguous Zone (5.5 to 22 kilometers [3 to 12 nautical miles])	No discharge	No discharge	
22 to 46.3 kilometers (12 to 25 nautical miles) from shore	No discharge	No discharge	
>46.3 kilometers (25 nautical miles) from shore	No discharge	No discharge	
>92.6 kilometers (50 nautical miles) from shore	No discharge	If health and safety is threatened, discharge of negatively buoyant sterilized waste packages is permitted	
>370.4 kilometers (200 nautical miles) from shore	Discharge permitted under certain circumstances; however, to the maximum extent practicable, ships shall retain hazardous materials onboard for shore disposal	Same as Hazardous Materials restrictions	

Source: Department of the Navy, Office of the Chief of Naval Operations, 1999.

Hazardous Waste Management

Hazardous waste and nonhazardous waste generated during routine operations at Pearl Harbor may include contaminated jet fuel, waste rags, paint, spent solvents, spill residues and absorbent materials, corrosion prevention compound in aerosol cans, ethylene glycol, batteries, antifreeze, hydraulic fluid, waste oil, photo processing waste materials, cleaning compounds, spill cleanup materials, and empty containers.

Naval Station Pearl Harbor Victor Pier 3

Hazardous material use and disposal are managed in such a way as to minimize impacts to the environment.

Barbers Point Mooring Location

The mooring location is located approximately 5 kilometers (3 miles) south of Barbers Point. Barbers Point Deep Draft Harbor is one of three commercial harbors on the island of Oahu and the State's second busiest harbor. The approximately 37-hectare (92-acre) inshore harbor basin includes ship berthing areas, an approximately 12-hectare (30-acre) cargo handling yard, a 488-meter (1,600-foot) pier and petroleum product pipelines. Containment booms are located on site. Initial spill/emergency response equipment is stored at Tesoro Hawaii Corporation with additional equipment available from Honolulu Harbor. (U.S. Coast Guard, Marine Safety Office, Honolulu, 2002)

An explosive anchorage is located east/southeast of Barbers Point, approximately 2.4 kilometers (1.5 miles) from the Kalihi Channel along the 11-fathom line.

3.6.5 HEALTH AND SAFETY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

3.6.5.1 Region of Influence

The ROI for health and safety includes those areas that may potentially be affected by the proposed deployment of the SBX to Pearl Harbor. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment (military and nonmilitary), fuels and any existing EMR at Pearl Harbor may occur by the use of an XBR. Table 2.1.4-2 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the radar. Appendix B includes a general description of the health and safety resource area and a detailed discussion of the laws, regulations and standards concerning maritime safety and EMR.

3.6.5.2 Affected Environment

Regional

The Coast Guard enforces marine safety regulations implemented to reduce or eliminate death, injury, economic loss, and environmental damage associated with commercial marine and military vessels. MSO responsibilities include inspecting commercial vessels and marine facilities, supervising the transfer of oil, hazardous materials and explosive and military cargoes, investigating and remediating oil spills and hazardous materials releases, investigating vessel casualties and licensing of merchant vessels.

Coast Guard/MSO areas of responsibility include the following safety and operating areas:

- Oahu's Anchorage Grounds, as defined and listed in 33 CFR Parts 110.235, 110.236 and 110.237, including Barbers Point Deep Draft Harbor and Offshore of Barbers Point. Nonanchorage Areas have also been established offshore of Barbers Point to protect submerged pipelines.
- Pearl Harbor Naval Defensive Sea Area as established by Executive Order 8681 in 1941. MSO coordinates with the military Commanding Officer who is given authority, as defined by 33 CFR Part 761.7(a)(1), to control boating activity in the Naval Defensive Sea Area.
- Oahu's Restricted Areas and Danger Zones, as defined and listed in 33 CFR Parts 334.1340 to 334.1400 and 334.1410, to protect public from hazardous activities occurring in designated areas such as weapons training and missile launches.
- Submerged Submarine Operating Areas off the southwest coast of Oahu, off of Diamond Head Crater and Ala Moana Beach Park.
- Navy Small Arms Firing Area located west of the entrance channel to Pearl Harbor.
- Temporary Safety, Permanent Safety and Security Zones – Subsequent to 11 September 2001, the Coast Guard established temporary security zones in designated waters adjacent to the islands of Oahu, Maui, Hawaii, and Kauai, Hawaii. These security zones extend from the surface of the water to the ocean floor and were determined necessary by the Coast Guard to protect personnel, vessels and facilities from acts of sabotage or other subversive acts, accidents, or other causes of a similar nature during port and waterway operations.
- The Kaiwi Channel Voluntary Tanker Avoidance Zone established in response to OPA 90 to reduce the potential of a worst-case oil spill disaster. The maritime industry has voluntarily agreed that all tankers will use the Kauai Channel.

MSO facilitated the establishment of the Hawaii Operational Safety Team (HOST) in 1997. HOST is a non-regulatory group represented by the marine industry, public, state and federal agencies concerned with operational safety in the state's ports and waterways. HOST has developed SOPs for vessel maintenance and repair, voluntary commercial towing vessel examinations, minimal under-keel clearance (in commercial ports), commercial VHF/FM communication procedures, explosive handling in Oahu ports, and Submerged Submarine Operating Areas (Diamond Head Crater and Ala Moana Beach Park), among others. Once approved, SOPs are listed in the HOST Handbook and posted on the MSO website.

The Coast Guard is also responsible for developing and issuing local NOTMARs.

The World-Wide Navigational Warning Service also provides long range and coastal warning messages as well as special warnings of potential political or military hazards that may affect safety of U.S. shipping lanes to U.S. Navy and merchant ships through a worldwide radio and satellite broadcast system.

The Navy, Barbers Point Deep Draft Harbor, Offshore Barbers Point, and tenants of Campbell Industrial Park have entered into a mutual aid agreement to provide assistance, equipment and manpower, in the event of fire or other emergencies (U.S. Coast Guard, Marine Safety Office, Honolulu, 2002).

Pier Victor 3 and Barbers Point

A Navy point of contact outlines the guidelines for safety procedures at Pearl Harbor.

Electromagnetic Radiation Environment

Radiation is regulated under 11 Hawaii Administrative Rules 41, 42, 44, and 45.

Communications–Electronics Frequency Related Interference. Section 3.6.2 provides an overview of the airspace and airports in the Pier Victor 3 and Barbers Point ROI.

3.6.6 UTILITIES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

3.6.6.1 Region of Influence

The ROI areas that may potentially be affected by the use of Pearl Harbor for the SBX include Pier Victor 3 and the potential mooring locations as previously identified off Barbers Point.

3.6.6.2 Affected Environment

At Pearl Harbor, the Utilities Department provides electricity, potable water distribution and wastewater collection/treatment as well as steam, salt water, boiler feedwater and compressed air. It also offers operating, maintenance and repair services for customer-owned utility systems on a cost-reimbursable basis. In addition, the department provides ship services which connect utilities systems to ships berthed at Pearl Harbor piers. (Navy Public Works Center, Pearl Harbor, 2002b)

Energy

The Utilities Department provides electricity at Pearl Harbor. Although there is no shore power (dock outlets), power lines run near Pier Victor 3, allowing for relatively easy modifications to provide the platform with power. Power is typically provided by linking to nearby buildings; however, tying a temporary transformer into a primary line is another option (Noborikawa, 2002).

Water

The Utilities Department provides potable water as well as salt water. Pier Victor 3, on Pearl City Peninsula, is currently supplied with potable water via a 15-centimeter (6-inch) water line (Noborikawa, 2002).

Wastewater

The Utilities Department provides wastewater collection/treatment. Additionally, the department services such as the Ship Wastewater Collection Ashore Abatement System (Navy Public Works Center, Pearl Harbor, 2002b). The Bilge Water Branch of Environmental Services provides treatment/disposal of bilge water (with less than 5 percent oil) from ships and submarines. Currently, the waste is collected by tank trucks, but an ongoing construction project will allow ships to discharge directly into risers at the pier. (Navy Public Works Center, Pearl Harbor, 2002a) Current regulations prevent running a wastewater line at Pier Victor 3,

due to the possibility of cross-contamination (Noborikawa, 2002), and wastewater at the pier would be containerized, requiring that arrangements be made for disposal.

Solid Waste

Solid wastes are handled by the Solid Waste Branch of the Navy Public Works Center. It operates a biosolids (sewage sludge) composting facility which converts military-generated sewage sludge and green waste into a reusable topsoil; the branch also remediates petroleum-contaminated soil and oily waste (Navy Public Works Center, Pearl Harbor, 2002a) The industrial waste facility treats a variety of hazardous and nonhazardous liquids (Navy Public Works Center, Pearl Harbor, 2002a).

3.6.7 VISUAL AND AESTHETIC RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PEARL HARBOR

Appendix B includes a description of visual and aesthetic resources and the analysis of the potential impacts from the Proposed Action.

3.6.7.1 Region of Influence

The Proposed site is offshore of Barbers Point near Pearl Harbor on the island of Oahu in Hawaii. The ROI for visual and aesthetic resources includes the beach at Barbers Point, which consists of the James Campbell Industrial Park, Kalaeloa (Rodgers) Airport, and state- and city-maintained land.

3.6.7.2 Affected Environment

Primarily, Barbers Point is occupied by the James Campbell Industrial Park, which consists of several industrial corporations along with Hawaii State- and Honolulu City-owned properties. The industrial park consists of conventional industrial buildings including smokestacks, office areas, parking lots, etc. The state- and city-owned properties are typically sandy beaches sparsely vegetated with tropical flora and primarily used for recreational purposes. The area also includes a lighthouse. The remainder of Barbers Point consists of the Kalaeloa (Rodgers) Airport, the Barbers Point Beach Park, and a small area owned and maintained by the State of Hawaii. This area also consists of several resorts and golf courses.

The ocean area adjacent to Barbers Point generally has a sea state of 3 to 4, small waves with frequent whitecaps to larger than moderate waves with many whitecaps. This area is primarily used as a recreation site for surfing, fishing, swimming, and other beach activities.

The ROI is frequented by workers from the industrial park, boaters, surfers, fishermen, and other beachgoers. Visitors that would be considered sensitive among these groups would be tourists and other recreational visitors, as well as everyday users.

3.7 NBVC PORT HUENEME—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE

The proposed GMD ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, and utilities at Port Hueneme. These resource areas are summarized in the following sections.

By nature of its marine mission and use of existing homeport facilities, SBX support and operational activities will not result in any adverse effects to cultural resources, geology and soils, land use, noise, socioeconomics, transportation, visual and aesthetic resources, and water resources. Consequently, this section will not include further analysis of these resources other than the summary in the following paragraphs.

Cultural

There are not expected to be any ground disturbing activities within areas where cultural resources are located. While some mooring locations may have traditional importance, such as native fishing grounds, the SBX would occupy a very small area on a temporary basis.

Geology

While potential warehouse and administration facility construction activities could result in limited clearing and excavation for building foundations, it is not expected to create any adverse erosion effects to geology or soils. Construction activities would follow standard guidelines.

Land Use

Land use impact would be minimal since the proposed activities would occur on the water at the pier or near an existing mooring location and would not produce a change in the type of utilization. Land utilization in surrounding areas would not change.

Noise

No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels would to be below OSHA workplace standards.

Socioeconomics

As a result of its isolation, limited population, and local economic activity, only minor positive socioeconomic impacts would occur.

Transportation

The few additional personnel would not affect transportation. Shipping of project-related materials, as well as transportation of personnel, would utilize air, roadway, and shipping/ferrying routes that are equipped to handle both the loads and frequency of project demands. Any increase in daily trips by support personnel would utilize existing transportation infrastructure. Shared vehicle and/or off-peak hour travel would further serve to minimize effects on transportation levels.

Visual and Aesthetic Resources

No effects to visual and aesthetic resources are expected. San Nicolas Island is a military installation and while the visual resources on San Nicolas may be considered significant by some viewers, the proposed action is consistent with that of a military installation. The proposed site is approximately 105 kilometers (65 miles) from the affected population and would not be visible from Port Hueneme.

Water Resources

Impacts to water resources would be negligible, similar to other large marine vessels.

3.7.1 AIR QUALITY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

3.7.1.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of NBVC Port Hueneme/San Nicolas Island for the SBX, including the mooring sites identified in section 2.3.1.7.

3.7.1.2 Affected Environment

Climate

NBVC Port Hueneme and San Nicolas Island are located in Ventura County, which is located within the South Central Coast Air Basin. The area experiences the mild Mediterranean climate typical of southern California. For NBVC Port Hueneme temperatures are moderate with average daily summer highs of 21˚C (70˚F) and average daily winter lows of 4˚C (40˚F). Most precipitation occurs during the months of November through April, with average annual rainfall ranging from 25 to 46 centimeters (10 to 18 inches) along the coast. Along the coast, prevailing winds come from the west/northwest during the day at about 11 to 19 kilometers (7 to 12 miles) per hour. While evening winds stem from the east.

On San Nicolas Island total annual precipitation averages 21.3 centimeters (8.4 inches). The dry season occurs between May and September, with the rainy season November to March. During the rainy season the island receives about 87 percent of its rainfall. The average mean monthly temperature on land is 15˚C (59˚F). Prevailing winds tend to come from the northwest, at an average speed of 24.1 kilometers (13.3 miles) per hour. (Department of the Navy, Naval Air Warfare Center, Weapons Division, 2002)

Regional Air Quality

Ventura County is considered to be a severe nonattainment area for federal and state 1-hour ozone standards. And while ozone levels have been declining significantly in recent years, the county as a whole still experiences frequent violations of the federal and state ozone standards. Inland areas tend to exceed ozone stands more frequently than the coast areas. Ventura County is also considered to be in nonattainment for the state standard for PM-10. Ambient levels of other pollutants in Ventura County do not violate state or federal standards. (Ventura County Air Pollution Control District, Air Quality Planning and Evaluation Division, 2000)

San Nicolas Island is considered to be in attainment/unclassifiable as to air quality by the EPA. (Department of the Navy, Naval Air Warfare Center, Weapons Division, 2002)

Existing Emission Sources

San Nicolas Island is considered to be part of the Point Mugu Sea Range, and within the Sea Range emission sources include aircraft operations, missile and target operations, and marine vessel operations. Table 3.7.1-1 lists a summary of Sea Range Emissions at San Nicolas Island.

Table 3.7.1-1: Summary of San Nicolas Island Emissions

Carbon Monoxide metric tons (tons)/year	Oxides of Nitrogen metric tons (tons)/year	Reactive Organic Compounds/HC metric tons (tons)/year	Oxides of Sulfur metric tons (tons)/year	PM-10 metric tons (tons)/year
30.77 (33.92)	137.67 (151.75)	10.39 (11.45)	4.69 (5.170)	10.57 (11.65)

Source: Department of the Navy, Naval Air Warfare Center, Weapons Division, 2002

3.7.2 AIRSPACE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

Appendix B includes a general description of airspace.

3.7.2.1 Region of Influence

The ROI for airspace at NBVC Port Hueneme includes the airspace over and surrounding the potential SBX interference areas at San Nicolas Island (figure 3.7.2-1).

3.7.2.2 Affected Environment

Controlled and Uncontrolled Airspace

San Nicolas Island is located in international airspace. Therefore, the procedures of the ICAO (outlined in ICAO Document 444, Rules of the Air and Air Traffic Services) are followed (International Civil Aviation Organization, 1996; 1997). The ICAO is a specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the ROI is managed by the Los Angeles ARTCC.

Special Use Airspace

The airspace over San Nicolas Island is within the Point Mugu Sea Range, which is controlled by NAWCWD. When the Sea Range is not being used, NAWCWD turns over the airspace to the FAA. (NAVAIR) The Point Mugu Sea Range includes warning areas and restricted airspace R-2535 A and B above San Nicolas Island.

En Route Airways and Jet Routes

Aircraft operating on Instrument Flight Rules (IFR) clearances under control of the Los Angeles ARTCC normally fly on formal airway route structures. In the vicinity of NBVC Port Hueneme,

Source: National Imagery and Mapping Agency, 2002; U.S. Department of Transportation, 2002h.

EXPLANATION

- Land
- Water
- Major Roads
- Port Hueneme
- Airports
- SBX Mooring Site
- Warning Areas (Pont Mugu Sea Range)
- Low Altitude Air Routes (V,J)
- High Altitude Air Routes (C)
- Low Altitude Special Use Airways
- High Altitude Special Use Airspace

Scale

NORTH

0 12.5 25 kilometers

0 8 16 miles

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note: - Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

Airspace Over the Potential SBX Mooring Area at San Nicolas Island

Port Hueneme, California

Figure 3.7.2-1

06-09-03 SBX Air San Nicolas

these airways run along the coastline and to the east. Special airways, Control Area Extensions (CAEs), cross the Point Mugu Sea Range to the west and can be opened or closed by the FAA at the request of the Navy in order to facilitate activities on the Sea Range. One CAE, 1177, is located south of San Nicolas Island, along the southern border of the Point Mugu Sea Range. CAE 1177 is the most important of the CAEs in the ROI and is rarely closed. Two other CAEs, 1316 and 1318, are located north of San Nicolas Island.

CAEs 1316 and 1318 are closed daily during daylight hours and occasionally on weekends. The FAA does not record the numbers of IFR flights through the Sea Range on the CAEs. However, general estimates of traffic through the Sea Range on all the CAEs are about 20 arrivals and departures daily. This is only IFR traffic and does not include aircraft flying under Visual Flight Rules (VFR).

Memoranda of Agreement exist between NAWCWD and the FAA which address the usage of the Warning Areas and stipulate the conditions under which the CAEs can be closed to civil traffic. Under most circumstances at least one CAE must remain available for use by general aviation and commercial air carriers. NAWCWD has established procedures to minimize the disruption of other air traffic due to operations on the range.

Since most of the Sea Range is over international waters, aircraft operate under VFR or without clearance from Air Traffic Control. Flight under these conditions is conducted under a see-and-avoid concept and flown clear of clouds or other limited-visibility conditions such as rain or fog.

Airports/Airfields

There is a runway on San Nicolas Island. Other runways in the ROI include Naval Air Station (NAS) Point Mugu, Oxnard, Camarillo, and Santa Barbara Municipal.

3.7.3 BIOLOGICAL RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

Appendix B contains a general description of biological resources and the main regulations and laws that govern their protection.

3.7.3.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of NBVC Port Hueneme/San Nicolas Island for the SBX, including the mooring sites identified in section 2.3.1.7.

3.7.3.2 Affected Environment

Most common southern California seabirds and shorebirds nest or are seasonally present on San Nicolas Island. Western gull, Brandt's cormorant, double-crested cormorant, western sandpiper, Pacific golden plover, and sooty shearwater are examples of these species. Resident and migratory terrestrial species include the American kestrel, horned lark, rock wren, and house finch. (U.S. Army Space and Strategic Defense Command, 1994)

The Point Mugu Sea Range includes the ocean depths out to 322 kilometers (200 miles), an area including the water offshore of NBVC Port Hueneme and the shallow waters around the Channel Islands. Threatened and endangered species in the water offshore of NBVC Port Hueneme include blue, fin, sei, humpback, sperm, and northern right whales and the southern sea otter. The gray whale migrates from December through April south along the California coast including the area offshore of NBVC Port Hueneme. The waters surrounding San Nicolas Island support species of seals and whales. Approximately 75 percent of the sea lions and seals that inhabit southern California spend some portion of time in the northern Channel Islands. A small number of federally threatened Guadalupe fur seals (*Arctocephalus townsendi*) have been observed on San Nicolas Island (National Marine Fisheries Service, 2002). San Nicolas Island contains significant breeding populations of California sea lions and northern elephant seals. The principal breeding grounds for these species are on the southern and western shoreline of the island. California sea lions can be found throughout the year on Southern California offshore islands, with yearly peaks in summer (breeding). The breeding period for the northern elephant seal is from December to March. Harbor seals, which breed in September, also occur on the island. Killer whales are seen occasionally around the Channel Islands, predominantly during the gray whale migration. The federally threatened sea otter also occurs in the area. The Channel Islands National Marine Sanctuary is discussed above under the environmentally sensitive habitat of Vandenberg AFB. (U.S. Army Space and Strategic Defense Command, 1994)

3.7.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

3.7.4.1 Region of Influence

The ROI for hazardous materials and hazardous waste includes those areas that may potentially be affected by the proposed deployment and use of the SBX to NBVC Port Hueneme/San Nicolas Island for the SBX. The ROI includes fueling areas, support and maintenance operations and waste storage and disposal.

3.7.4.2 Affected Environment

Hazardous Materials Management

Hazardous materials are transported to San Nicolas Island by barge or aircraft from NAS Point Mugu. The largest volume of hazardous material transported to and stored at San Nicolas is aviation jet fuel and unleaded gasoline. Approximately 680,000 gallons (2.6 million liters) of jet fuel and 52,000 gallons (198,000 liters) of unleaded gasoline are shipped to San Nicolas yearly. The unleaded gasoline is primarily used by ground vehicles. Various other hazardous materials such as oils and hydraulic fuels are also used to support maintenance of aircraft and vehicles. Minimal quantities of maintenance support materials are ordered and stored in order to reduce risk of leaks/spills and prevent disposal of excess material or waste.

Hazardous Waste Management

There are eight satellite hazardous waste storage areas on San Nicolas. Hazardous wastes are stored at these satellite accumulation areas prior to being transported to the less-than-90-day accumulation area on the Island. From the less than 90-day accumulation area, the waste is shipped by barge to Port Hueneme. After arrival at Port Hueneme, the waste is transported to an approved Treatment, Storage, and Disposal facility. Approximately 65,689 pounds (29,813 kilograms) of hazardous waste are shipped yearly from San Nicolas to Port Hueneme.

3.7.5 HEATH AND SAFETY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

3.7.5.1 Region of Influence

The ROI for health and safety includes those areas that may potentially be affected by the proposed deployment and use of the SBX to NBVC Port Hueneme/San Nicolas Island. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment (military and nonmilitary), fuels and any existing EMR at San Nicolas Island may occur by the use of an XBR. Table 2.1.4-2 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the radar. Appendix B includes a general description of the health and safety resource area and a detailed discussion of the laws, regulations, and standards concerning maritime safety and EMR.

3.7.5.2 Affected Environment

Electromagnectic Radiation

The U.S. Navy operates a variety of equipment and facilities, including radar, communication facilities, and power utility lines, at San Nicolas Island which generate EMR. The on-base hazards of EMR to personnel (HERP), ordnance (HERO), and fuel (HERF) have been determined using information supplied by the NAS Point Mugu Weapons Department. HERF constraints are considered to be negligible and are not depicted. The HERO arcs are large enough to extend beyond base boundaries; however, these arcs only affect ordnance on-base, and strict EMR control procedures are used when HERO-susceptible ordnance is transported or present in the open.

Explosive Safety Quantity–Distance Arcs

Various munitions and targets are stored and maintained at San Nicolas Island that are susceptible to the effects of EMR. These include missile warheads, rocket motors, high explosives and other similar type ordnances which are used in testing or training activities occurring on the Sea Range. Munitions arrive on the Island either by surface ship or by air transport. ESQD arcs for the safety of personnel and equipment have been established around the munitions storage and assembly areas.

Section 3.7.2 provides an overview of the airspace in the NBVC Port Hueneme/San Nicolas Island ROI.

Sea Range

The Sea Range safety policy, procedures, and guidance are covered in NAWCWD Instruction 5100.2 dated 9 July 1993. The safety policy of NAWCWD is to observe every reasonable precaution in the planning and execution of all operations which occur on the Sea Range to prevent injury to people and damage to property. Although the Commander of NAWCWD has the ultimate responsibility for range safety, the authority for execution of these safety programs is delegated to the Sea Range Safety Officer in the Range Safety Office.

Access to San Nicolas Island is strictly controlled and limited to pre-approved military personnel or non-military personnel conducting scientific studies. A scheduled contract aircraft shuttle operates between NAS Point Magu and San Nicolas.

There are three surface restricted areas located around San Nicolas Island and two airspace restricted areas over San Nicolas. Section 3.7.2 provides an overview of the airspace in the NBVC Port Hueneme/San Nicolas Island ROI.

NAWCWD has an extensive surveillance system to implement real-time safety clearance procedures prior to initiation of any operation on the sea range. This system includes the use of land-, sea-, and air-based radar in addition to aircraft surveillance of the range which is necessary to ensure that the public remains clear of designated operational areas where they could be subjected to hazardous conditions. The range uses specially modified P-3 aircraft, the NP-3D, which provides extended Sea Range surveillance. A review of past Range Safety Office records show that accidents involving the public on the Sea Range have never occurred.

When the Sea Range is used for military testing and training operations, the Navy notifies commercial, civilian, and other military aviation through a NOTAM which provides appropriate information to the FAA and its Air Traffic Control agencies to route traffic around these Warning Areas and Restricted Areas when they are active. (Warning Areas are located over non-Territorial Waters of the United States; Restricted Areas are located over land or Territorial Waters.) Although a NOTAM does not preclude uncontrolled air traffic from entering a Warning Area even when the area is active, DoD Directive 4540.1, *Use of Airspace by U.S. Military Aircraft and Firings Over the High Seas*, provides guidance for operating within Warning Areas: non-participating aircraft are identified by radar, and contact with these aircraft is made by radio; if aircraft remain in a clearance area, even after being requested to leave, the Sea Range will delay, cancel, or move a test to a clear area.

Similar procedures exist for notification of the commercial shipping and recreational boating communities of potentially hazardous activities on the Sea Range. These notifications are made through NOTMAR and daily VHF-FM Marine Radio (Channel 16) broadcasts. The Sea Range has established procedures to ensure that non-participating surface vessels are not exposed to undue risk. The surveillance aircraft survey designated clearance areas to ensure that surface vessels are not present. Any vessels, if present, are warned that they are in an area of an impending hazardous activity and are requested to leave the area. Contact with vessels is made by marine band FM radio; however, loud speakers can be used if the boat is not radio-equipped.

3.7.6 UTILITIES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NBVC PORT HUENEME

3.7.6.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of NBVC Port Hueneme/San Nicolas Island for the SBX, including the mooring sites identified in chapter 2.0, and the area of potential construction of an environmentally controlled warehouse. This site has not been determined.

3.7.6.2 Affected Environment

Energy

The Southern California Edison Company provides NBVC Port Hueneme with electricity via a system with a 44,000-kW capacity. The Edison Company has indicated that it would be able to

provide an additional 4.5 million kW with no infrastructure-related costs being passed on to the Navy, allowing for readily available future expansion (Department of the Navy, Naval Air Warfare Center, Weapons Division, 2002).

Currently, San Nicolas Island has the capability to produce approximately 1 MW of electrical power capacity from its own generators. There is limited capacity to support additional personnel, and then only on a limited basis. San Nicolas Island also has a fuel pier available for barge-supported refueling operations.

Water

The primary source of potable water for NBVC Port Hueneme is treated groundwater from the Oxnard-Hueneme Water Delivery System under the auspices of the United Water Conservation District in Port Hueneme (United Water Conservation District, 2002). Source water is conveyed through the Oxnard-Hueneme Pipeline (Pringle, 2003) to the Port Hueneme Water Agency Brackish Water Reclamation Treatment Plant. To meet demands, the treated water is then blended with State Water Project water delivered by the Calleguas Municipal Water District (Pringle, 2003). The existing system has a capacity of 22.0 million liters (5.8 million gallons) per day, with an average demand of 20.06 million liters (5.3 million gallons) per day (Department of the Navy, Naval Air Warfare Center, Weapons Division, 2002) overall, and a current demand for NBVC Port Hueneme and NBVC Point Mugu of 6.1 million liters (1.6 million gallons) per day (Pringle, 2003).

Wastewater

The City of Oxnard sanitary sewer system serves NBVC Port Hueneme, its collection system conveying the flow to the Oxnard Wastewater Treatment Plant in the southwestern portion of the city. This plant has an average dry weather flow of 120 million liters (31.7 million gallons) per day and an ultimate design capacity of 150.3 million liters (39.7 million gallons) per day (City of Oxnard, 2003).

Solid Waste

Solid waste from NBVC Port Hueneme and surrounding communities is collected by a private contractor and taken to an offbase transfer station before being delivered to a landfill. Solid waste from the base is taken to a transfer station in Oxnard and then transported to the 65-hectare (161-acre) Toland Road Landfill, some 24 kilometers (15 miles) from base. Operated by the Ventura Regional Sanitation District, it is expected that this landfill will operate for another 30 years at the present rate of waste generation. The remaining capacity is 4 million cubic meters (30 million cubic yards).

3.8 NAVAL STATION EVERETT—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE

The proposed GMD ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, transportation, utilities, and visual and aesthetic resources at Naval Station Everett. These resource areas are summarized in the following sections.

By nature of its marine mission and use of existing homeport facilities, SBX support and operational activities will not result in any adverse effects to cultural resources, geology and soils, land use, noise, and water resources. Consequently, this section will not include further analysis of these resources, other than the summary in the following paragraphs.

Cultural

There are not expected to be any ground disturbing activities within areas where cultural resources are located. The SBX would be located at Pier Alpha or Pier Bravo.

Geology

While potential warehouse and administration facility construction activities could result in limited clearing and excavation for building foundations, it is not expected to create any adverse erosion effects to geology or soils. Construction activities would follow standard guidelines.

Land Use

Land use impact would be minimal since the proposed activities would occur on the water at the pier location and would not produce a change in the type of land utilization in the immediate or surrounding areas. Land utilization in surrounding areas would not change.

Noise

No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels would be below OSHA workplace standards.

Water Resources

Impacts to water resources would be negligible, similar to other large marine vessels.

3.8.1 AIR QUALITY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

3.8.1.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Naval Station Everett for the SBX, as identified in section 2.3.1.8.

3.8.1.2 Affected Environment

Climate

Climate at Naval Station Everett can be described as cool marine. Average annual rainfall is about 89 centimeters (35 inches). July and August are the driest months, while December and January are the wettest. Temperatures typically range from 15˚C (59˚F) to 6.7˚C (44˚F). Summer is the sunniest season and July is the hottest month with an average high of 24˚C (75˚F). January tends to be the coldest month with lows averaging 1˚C (34˚F). Prevailing winds during the summer are typically from the north, while winter winds generally come from the south.

Regional Air Quality

Snohomish County falls under the Puget Sound Clean Air Agency's jurisdiction. The area was previously designated as nonattainment for ozone and carbon monoxide. In recent years however, Snohomish County has met air quality standards and has also established a 10-year plan for continuing to meet and maintain air quality standards. With this, Snohomish County was redesignated to an attainment area and is now referred to as a maintenance area for both ozone and carbon monoxide. (Puget Sound Clean Air Agency, 1998)

Existing Emissions

The Washington Department of Ecology and the Puget Sound Clean Air Agency maintain a network of air quality and meteorological monitoring stations throughout the Puget Sound region, including Everett, Marysville, Getchell, and Lake Sammamish. Table 3.8.1-1 lists the maximum measured concentrations around Naval Station Everett.

Table 3.8.1-1: Maximum Measured Pollutant in Naval Station Everett Vicinity

Pollutant	Averaging Time	Standard	Location	2000	2001
Carbon Monoxide	8-hour	9 ppm	Everett	6.1 ppm	3.9 ppm
	1-hour	35 ppm	Everett	10.5 ppm	6.2 ppm
PM-10	Annual	50 µg/m^3	Marysville	19 µg/m^3	17.5 µg/m^3
Ozone	Maximum 1-hour	0.12 ppm	Lake Sammamish	0.094 ppm	0.079 ppm
	Maximum 8-hour	0.08 ppm	Lake Sammamish	0.073 ppm	0.065

Source: Puget Sound Clean Air Agency, 2000, 2001

3.8.2 AIRSPACE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

Appendix B includes a general description of airspace.

3.8.2.1 Region of Influence

The ROI for airspace at Naval Station Everett includes the airspace over and surrounding the potential SBX interference areas at Naval Station Everett (figure 3.8.2-1).

3.8.2.2 Affected Environment

Controlled and Uncontrolled Airspace

The Seattle ARTCC regulates air traffic in the region. Class E airspace is in effect above Naval Station Everett. Seattle International Airport Class B airspace is located above the southern edge of the ROI. The following Temporary Flight Restriction is in effect above Naval Station Everett due to national security:

> "2/0451 - WA. FLIGHT RESTRICTIONS EVERETT, WA. EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. PURSUANT TO 14 CFR SECTION 91.137A(1) TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT DUE TO NATIONAL SECURITY. ONLY RELIEF AIRCRAFT OPERATIONS UNDER THE DIRECTION OF DEPARTMENT OF DEFENSE ARE AUTHORIZED IN THE AIRSPACE AT AND BELOW 2000 FEET MSL WITHIN A 3 NAUTICAL MILES RADIUS OF (47 59 N/122 13 W) THE PAINE (PAE) VOR/DME 014 DEGREE RADIAL AT 4.53 NAUTICAL MILES. EXCLUDING THAT AIRSPACE WEST OF THE PAINE FLD RUNWAY 16R ILS LOCALIZER. UNLESS AUTHORIZED BY ATC FOR PURPOSES OF CONDUCTING ARRIVAL/DEPARTURE OPERATIONS. REGIONAL WATCH OFFICER 360-315-5123/FAX 360-315-5305 IS IN CHARGE OF THE OPERATION. SEATTLE /SEA/ AFSS 206-764-6609 IS THE FAA COORDINATION FACILITY. WIE UNTIL UFN"

Special Use Airspace

The nearest special use airspace is located approximately 40 kilometers (25 miles) west of Naval Station Everett and includes the Chinook and B Military Operating Areas, and the Admiralty Inlet Military Operating Area (figure 3.8.2-1).

En Route Airways and Jet Routes

Two Low Altitude air routes enter the ROI and terminate at Paine Field Airport. These include V-23 and V-287.

Airports/Airfields

Seattle-Tacoma International Airport is located approximately 56 kilometers (37 miles) south of Naval Station Everett. Snohomish County (Paine Field) Airport is about 5 miles southwest of Naval Station Everett. Several other airfields are located within the ROI including Harvey, Heineck, Large, Frontier, Arlington, and Whidbey.

3.8.3 BIOLOGICAL RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

Appendix B contains a general description of biological resources and the main regulations and laws that govern their protection.

3.8.3.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Naval Station Everett as a PSB for the SBX.

Source: National Imagery and Mapping Agency, 2002; U.S. Department of Transportation, 2002d; U.S. Department of Transportation, 2002i.

EXPLANATION

- Land
- Water
- Naval Station Everett
- Airfield
- Major Roads
- Low Altitude Special Use Airspace
- Low Altitude Air Routes (V)
- High Altitude Air Routes (J)

MOA = Military Operating Area

Scale

NORTH

0 6.5 13 kilometers

0 4 8 miles

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note:
- Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

Airspace Over the Potential SBX Site at Naval Station Everett

Everett, Washington

Figure 3.8.2-1

06-09-03 Everett SBX Airways_2

Affected Environment

Naval Station Everett is located approximately 40 kilometers (25 miles) north of Seattle, Washington. The primary ship berthing facilities are Pier Alpha, a previously disturbed area that has mooring available on both sides, and Pier Bravo.

Examples of seabirds that occur in northern Puget Sound are glaucous-winged gulls, cormorants, pigeon guillemots, and tufted puffins. A variety of shorebirds and the bald eagle have also been observed in the vicinity. Seventy-two percent of seabirds in Puget Sound nest on Protection Island located at the mouth of Discovery Bay in the Strait of Juan de Fuca. (U.S. Fish and Wildlife Service, Pacific Region, 2002c)

The Puget Sound distinct population segment of bull trout (*Salvelinus confluentus)* was listed as federally threatened in November 1999. Bull trout are threatened by habitat degradation and fragmentation. The federally threatened Chinook salmon (*Oncorhynchus tshawytscha)* is also found in the Puget Sound. Threats to the chinook salmon include over-fishing, increased sedimentation, and decrease in water quality. Several threatened and endangered marine species occur in areas off the coast of Washington State. These include humpback, blue, fin, sei, and sperm whales; green, leatherback, and loggerhead sea turtles; and steller sea lions. The humpback whale, steller sea lion, and leatherback sea turtle may also occur in Puget Sound. (Washington State Department of Transportation, 2002)

3.8.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

3.8.4.1 Region of Influence

The ROI for hazardous materials and hazardous waste includes those areas that may potentially be affected by the proposed deployment and use of the SBX to Naval Station Everett. The ROI includes fueling areas, support and maintenance operations and waste storage and disposal. Appendix B includes a detailed discussion of maritime and other laws, regulations, and standards concerning hazardous materials and hazardous waste.

3.8.4.2 Affected Environment

The 47.3-hectare (117-acre) site serves as homeport for a battle carrier group, including a Nimitz-class aircraft carrier, two guided missile destroyers, two destroyers and two guided missile frigates. The waterfront base is very compact and functionally oriented. Most available land is dedicated to ships' support facilities, including storage areas, maintenance, and administration.

The Fleet and Industrial Supply Center Puget Sound Detachment Everett services the battle group and all organizations/detachments assigned to Naval Station Everett. The detachment is part of the Naval Supply System Command which supplies integrated support and supply chain management to naval operating units. Fleet and Industrial Supply integrated support services include waterfront/flight line husbandry, hazardous materials, repairables management, material handling, equipment management, local purchasing, training for supply business systems tools, supply assistance teams, consultative services and supply chain integration with commodity

pipelines. Supply chain management includes the systematic infrastructure for the specification, requirements definition, acquisition, material transport, inventory management, and logistic placement of materials for each of six main commodity areas. These commodity areas are aviation/ship repair parts and spares, petrol petroleum products, ordnance, subsistence, ship's store merchandise, and postal. All U.S. Navy materials at Naval Station Everett pass through the Fleet and Industrial Supply Detachment.

Hazardous materials are stored at the Hazardous Materials Center located in the Industrial and Logistics Support Zone of the Naval Station Everett Waterfront site. Limited, periodic ordnance handling and storage occurs at three berths at the Waterfront site. ESQD ordnance arcs are established around the berths when in use.

Operations of the carrier group generate considerable quantities of hazardous wastes. Naval Supply System Command protocol and procedures ensures safe handling and disposal of hazardous materials and wastes, and compliance with all pertinent state and federal regulations.

Biohazards and other hazardous wastes generated by the installation or the ships are handled and temporarily stored in the Industrial and Logistics Support Zone of the Naval Station Everett Waterfront site. Wastes are stored for up to 90 days in specific and specially designed areas before being trucked by an appropriately licensed contractor to designated disposal facilities. (U.S. Department of the Navy, Puget Sound Naval Shipyard, 1995)

Operations of the carrier group generate considerable quantities of hazardous wastes. To ensure safe handling and disposal of hazardous materials and wastes, the Navy complies with all pertinent state and federal regulations.

3.8.5 HEALTH AND SAFETY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

3.8.5.1 Region of Influence

The ROI for health and safety includes those areas that may potentially be affected by the proposed deployment and use of the SBX to Naval Station Everett. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment (military and nonmilitary), fuels, and any existing EMR at Naval Station Everett may occur by the use of an XBR. Table 2.1.4-2 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the radar. Appendix B includes a general description of the health and safety resource area, and a detailed discussion of the laws, regulations, and standards concerning maritime safety and EMR.

3.8.5.2 Affected Environment

The Waterfront installation is located on the western limits of the City of Everett within a heavy industrial and manufacturing area. The Kimberly Clark Paper Company mill, timber loading and storage facilities, the U.S. Navy Reserve Center, the Port of Everett, and a Burlington Northern Santa Fe mainline are located east/southeast of the installation. The public Port of Everett Marina is located to the north.

Section 3.8.2 provides an overview of the airspace and airports in the Port Naval Station Everett ROI.

Base security requires that a 6.1- to 9.1-meter (20- to 30-foot) enclosure of open, undeveloped land surround the site perimeter.

Operations, maintenance and support activities at Naval Station Everett are performed in accordance with base SOPs and the Navy's Safety and Occupational Health Program. Naval Station Everett received the Chief of Naval Operations Safety and Occupational Award in 1999 for the overall quality of base safety and occupation programs, mishap prevention and recording and contributions to the Safety and Occupational Health.

3.8.6 SOCIOECONOMICS—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

General socioeconomic impacts resulting from the proposed action can lead to an economic gain or loss for the community or area. Potential socioeconomic impacts of the project stem from the construction or operational activities, the duration and extent of displacement or modification of existing activities, and the diversion or temporary suspension of access associated with the Proposed Action. Impact analysis will focus on the following broad areas of economic or social impacts: displacement of populations, residences or businesses, housing/ accommodation availability, employment/income, growth inducement and potential impacts to locally significant industries such as aerospace, shipping tourism, and retail.

3.8.6.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Naval Station Everett for the SBX. With regard to socioeconomics, this area would primarily include the City of Everett.

3.8.6.2 Affected Environment

Naval Station Everett is situated on 47 hectares (117 acres) adjacent to Port Gardner Bay within the City of Everett in Snohomish County, western Washington State. Everett, the county seat, is the largest city within the county (Puget Sound Regional Council, 2002) both in terms of population and area, covering 10,117 hectares (25,000 acres) of land and 3,884 hectares (9,600 acres) of water. Everett is situated approximately 45 kilometers (28 miles) north of Seattle, between the Cascade Mountains to the east and Puget Sound to the west, and adjacent to the mouth of the Snohomish River.

Historically an industrial city, Everett developed as a lumber and a mill town more than a century ago, and major industries have included mainly lumber, shingle mills, wood products manufacturers, ironworks, shipbuilders, fisheries, and canneries (Puget Sound Regional Council, 2002). The Port of Everett, immediately adjacent to Naval Station Everett, was created in 1918 and remains an important regional and international deep-water port. The Port of Everett Marina, with moorage for over 2000 vessels, is the second largest on the West Coast (Everett Business Journal, 2003). While the majority of the waterfront areas were claimed for industrial uses, other land uses adjacent to Naval Station Everett include commercial areas, a park, and residential areas, some of which overlook the base.

Population and Housing

The U.S. Bureau of the Census reported that the City of Everett, as of 2000, showed a population of 91,488 persons (Puget Sound Regional Council, 2002) and consisted of 15.0 percent of the county's total population (606,024 persons). Everett has shown significant population growth over the last 2 decades, having risen 30.8 percent from 1990-2000 (69,961 persons) and 28.6 percent from 1980-1990. However, this rate of growth was consistently lower than that shown by Snohomish County, at 30.2 percent between 1990 and 2000 and 37.9 percent between 1980 and 1990. Between 1990 and 2000, the population of Washington state increased by 21.1 percent, with the county comprising 10.3 percent of the state's population as of 2000.

As is shown in table 3.8.6.1, while remaining predominantly White, Everett is more racially and ethnically diverse than Snohomish County. Though proportionally small, Hispanic and Black/African American populations and persons of "some other race" within Everett are significantly elevated compared to the county. To a lesser extent, this is also the case for Asian, American Indian, and "two or more races" categories.

Table 3.8.6-1: Race and Ethnicity, Everett, Snohomish County and Washington State

	Everett	Snohomish
White	81.1%	85.6%
Black/African American	3.3%	1.7%
American Indian	1.6%	1.4 %
Asian	6.3%	5.8%
Native Hawaiian/Pacific Islander	0.4%	0.3 %
Some other race	3.1%	1.9 %
Two or more races	4.2%	3.4 %
Hispanic	7.1%	4.7%
Non-Hispanic White	77.9%	83.4%

Source: U.S. Census Bureau, 2003a.

Income and Employment

The City of Everett shows significantly lower incomes than that of the county. The U.S. Bureau of the Census reported in 2000 that the City of Everett showed a per capita income of $20,557, 12.2 percent lower than the county average of $23,417. Similarly, as of 2000, the median household income of Everett was $40,100, a total of 24.4 percent lower than that of the county, at $53,060 (Puget Sound Regional Center, 2003). Everett also showed a significantly higher poverty rate than that of the county, at 12.9 percent poverty compared with 6.9 percent, respectively, as of 2000. The unemployment rate within Everett, at 5.3 percent as of 2000, was again significantly higher compared with 3.5 percent for the county (Puget Sound Regional Center, 2003).

The economy of Everett has changed significantly over the last 50 years, with a distinct fall in the extent of the lumber industry, the rise of papermaking and related products, and, most significantly, during the 1960s, the entrance of the aerospace industry to the region. Boeing maintains a dominant presence in the economy of Everett and the region today (Snohomish County Economic Development Council, 2002) and is the area's largest employer (23,700).

There are also numerous other aerospace related companies (Everett Area Chamber of Commerce, 2003).

The Port of Everett, an internationally important deep-water facility containing 8 berths and covering approximately 40.4 hectares (100 acres) of land, handles approximately 907,184.7 metric tons (1 million tons) of cargo annually and is favored due to its proximity to the Far East and Alaska. Primary exports include lumber and agricultural goods. Major imports at the port include alumina ore and specialized aircraft parts. The Port also includes a large marina (Port of Everett, 2003).

Other major employers within Everett include John Fluke (electronic instruments), Verizon (telecommunications), and Kimberly-Clark (paper products), as well as employers in the healthcare, education, and government sectors (Snohomish County Economic Development Council, 2002). Naval Station Everett, with a full allotment of ships, including the naval aircraft carrier the *USS Abraham Lincoln,* employs approximately 6,087 personnel (Snohomish County Economic Development Council, 2002).

3.8.7 TRANSPORTATION—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

3.8.7.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Naval Station Everett for the SBX, as identified in section 2.3.1.8. No requirements for aviation or railway transportation are anticipated and thus, no impacts to those modes of transport are expected; consequently this section will predominately concern itself with ocean traffic, though roadway transportation is also addressed.

3.8.7.2 Affected Environment

Ocean Traffic

The Naval Station Everett is located next to the marina area of the city of Everett, Washington, about 40 kilometers (25 miles) north of Seattle on the northeast side of Possession Sound. Designed as a homeport for a U.S. Navy Battle Group, it accommodates the *USS Abraham Lincoln* (Aircraft Carrier, Nuclear-72), a Nimitz-class aircraft carrier, as well as several smaller surface combatants (GlobalSecurity.org, 2002a).

Access to and from Puget Sound berthing sites—including those for Naval Station Everett—is by the charted major ship travel channel, and all marine vessel traffic therein is regulated by the U.S. Coast Guard. Strict control of all shipping is maintained through a common radio channel. Ship traffic to Naval Station Everett requires sailing around the southern end of Whidbey Island and up the island's eastern side to the Naval Station Everett berthing piers. Other than the CVN and Destroyer Squadron 9 that are homeported at Naval Station Everett, the only other large ship calling there is an occasional log carrier, which calls at the piers directly east of the carrier berth, providing visual contact at all times. (Department of the Navy, 1999)

Transition from the navigation channel to the CVN berthing pier, approximately 1,372 meters (1,500 yards), is executed under pilot advice and with the assistance of tugs (Department of the

Navy, 1999). Naval Station Everett, itself, has no tugboat complement. Tugs used at the port are primarily commercial because U.S. Navy tugs must travel from Naval Submarine Base Bangor in Washington, a distance of approximately 63 kilometers (34 nautical miles). It is required that requests for tugs be directed to Senior Officer Present Afloat (Admin) Puget Sound at least 72 hours in advance of anticipated time of movement. (GlobalSecurity.org, 2002a)

The primary ship berthing facility at Naval Station Everett is one long pier, designated as Pier Alpha, with mooring available on both its sides. Pier Alpha is 494 meters (1,620 feet) in length, with a 36.5-meter (120-foot) width. Pier Alpha's alongside depths range from 8.8 meters (29 feet) at the northeast end to 19.8 meters (65 feet) at the southwest end on the east side of the pier. (GlobalSecurity.org, 2002a) Since the pier is located close to the channel and deep water is available at the pier end, there is no other shipping traffic of concern during this movement. Recreational boating in the area is unaffected by CVN movements. When the CVN departs the tugs and pilot move the ship into the channel and assist until steerage is available. With the proximity of the piers to the channel and water depth, these vessel movements are easily managed. (Department of the Navy, 1999)

A second pier is Pier Bravo. Pier Bravo's western side is of rip-rap construction and acts as a breakwater. Its eastern, moorage side is slightly shorter than Pier Alpha, with similar width. (GlobalSecurity.org, 2002a)

An exclusion zone around Naval Station Everett was created by rule making with the U.S. Army Corps of Engineers and was published in the Code of Federal Regulations. The exclusion zone varies from a no standoff along the western side of Pier Bravo to a 91 meter (300 foot) standoff along the southern end of Pier Alpha and Pier Bravo, to a 182 meter (600 foot) standoff along the eastern side of Pier Alpha. Naval Station Everett coordinates ship movement and other activities with the Coast Guard, the Port of Everett, and the Tulalip Tribes.

Maritime traffic on Puget Sound is heavy; many large commercial vessels using the Ports of Everett, Seattle, Tacoma and others, enter and depart Puget Sound each day. Additional traffic on the Sound is created by the frequent runs of large Washington State vehicle and passenger ferries as they cross the Sound on generally east-west traffic routes that are perpendicular to normal inbound and outbound maritime traffic channels. Additionally, many recreational and commercial small craft operate throughout Puget Sound and adjacent waters. (GlobalSecurity.org, 2002b)

Road Traffic

Roadway transportation includes the local street and regional highway network in and around the City of Everett, which provides access to Naval Station Everett. Regional access is provided by Interstate 5, U.S. Route 2, and SR-529. Local access is provided by a street network within the City of Everett, which is generally arranged in a grid pattern. Key east-west streets accessing the station are Everett, Hewitt, and Pacific avenues, and key north-south streets are West Marine View Drive, Rucker Avenue, Broadway Avenue, and East Marine View Drive, all located between the station and Interstate 5; SR-529 runs along Broadway and Marine View Drive. (Department of the Navy, 1999)

Access onto West Marine View Drive is provided via the station's two access gates, the Main Gate and the Service Gate. The station generates some 8,520 inbound and outbound vehicle trips per day, and an estimated 400 truck trips (Department of the Navy, 1999).

3.8.8 UTILITIES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

3.8.8.1 Region of Influence

The ROI includes areas of Naval Station Everett that may potentially be affected by the SBX activities, as well as the area of potential construction of a new, environmentally controlled warehouse. This site has not been determined.

3.8.8.2 Affected Environment

All amenities are found on the piers, except for fuel. All fuel is barged in from the nearby Manchester Navy Fuel Depot, part of the Naval Supply Center (Department of the Navy, 1999) and located on the shores of Puget Sound.

Energy

Electrical service to the Naval Station Everett waterfront site is provided by the Snohomish County Public Utility District No. 1, which operates a 115-kV transmission system in the vicinity of the waterfront with dual power redundancy from both north and south. A nearby substation was upgraded to serve the adjacent Kimberly Clark Paper Company plant. A 115-kV dedicated substation has been constructed at the waterfront site and will accommodate a potential 7-ship mix and onshore installation electrical loads. The total available capacity at the site is 80,000 kVA, with a steady load of 36,000 kVA.

Water

The City of Everett, Public Works Department, Water Division serves the Naval Station Everett waterfront site, producing some 116,000 million liters (30,700 million gallons) of water annually for citywide distribution, as well as distribution to nearby cities and water districts. The main water distribution line to the waterfront site runs along Norton Avenue. The distribution system has tested at an estimated peak flow rate of 17 million liters (4.55 million gallons) per day.

Within the installation, the potable water system consists of a looped underground distribution system and supply main serving the berthing piers. To provide ships with potable water, supply mains are located in the "utilidor" (the local utility corridor) and in the pier and wharf utility chase. These lines accommodate a wide variety of ship mixes with a 13,250-liter (3,500-gallon) per minute flow. Total available capacity is 10.2 million liters (2.7 million gallons) per day, with a typical load of 3.4 million liters (900,000 gallons) per day.

Wastewater

The City of Everett Sewer Department provides services to the city and surrounding districts. Two existing sewer and pumping systems, gravity trunk lines ranging from 30.5 to 91.4 centimeters (12 to 36 inches) in diameter, serve the waterfront site and surrounding businesses.

The installation's sanitary sewer system consists of an underground collection system, pump stations, and an attenuation tank. A main pump and pressure main delivers flows to the City of Everett sewer system. Collection pump stations are required due to the proximity to sea level elevation. The sanitary sewer system is monitored in the Steam and Air Plant, and maintains an available capacity of 11.4 million liters (3 million gallons) per day with a steady load of 3.8 million liters (990,000 gallons) per day.

Solid Waste

Refuse collection in Everett is via private contractor. Solid waste transfer facilities and services are provided by the Snohomish County Department of Public Works, Solid Waste Division. Most area refuse is trucked to the Everett Transfer Station operated by the county, which, along with the Cathcart Landfill, has limited capacity.

Solid waste generated on the waterfront site and by transient Navy ships ranges from less than 1.01 metric tons (1 ton) per day to 7.6 metric tons (7.5 tons) per day, depending on the number of ships at homeport. The average demand is 4.6 metric tons (4.5 tons) per day.

3.8.9 VISUAL AND AESTHETIC RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, NAVAL STATION EVERETT

Appendix B includes a description of visual and aesthetic resources and a methodology for assessing visual and scenic values.

3.8.9.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Naval Station Everett for the SBX as identified in section 2.3.1.8.

3.8.9.2 Affected Environment

Primarily the affected environment consists of Naval Station Everett (homeport of the *USS Abraham Lincoln*) and the surrounding properties which include a paper mill, other industrialized facilities, a park, commercial sites, and residential properties. Immediately adjacent on the south and east to the naval station are the Port of Everett's log export facility and the Kimberly Clark Paper Company mill. Parking areas, recreational facilities, and support buildings occupy the northern part of the base while the southern end is occupied by industrial facilities, piers, and ships. (U.S. Department of the Navy, Puget Sound Naval Shipyard, 1995)

Those that may be affected by the Proposed Action from a visual aspect include employees of the naval station and the other industrial sites, visitors to the naval station and surrounding areas, and in particular visitors to the park and the homeowners overlooking the site.

3.9 PORT ADAK—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE

The proposed GMD ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, utilities, and visual and aesthetic resources at Port Adak. These resource areas are summarized in the following sections.

By nature of its marine mission and use of existing homeport facilities, SBX support and operational activities will not result in any adverse effects to cultural resources, geology and soils, land use, noise, socioeconomics, transportation, and water resources. Consequently, this section will not include further analysis of these resources other than the summary in the following paragraphs.

Cultural

There are not expected to be any ground disturbing activities within areas where cultural resources are located. While some mooring locations may have traditional importance, such as native fishing grounds, the SBX would occupy a very small area on a temporary basis.

Geology

While potential warehouse and administration facility construction activities could result in limited clearing and excavation for building foundations, it is not expected to create any adverse erosion effects to geology or soils. Construction activities would follow standard guidelines.

Land Use

Land use impact would be minimal since the proposed activities would occur on the water at the pier or near an existing mooring location and would not produce a change in the type of land utilization in the immediate or surrounding areas. Land utilization in surrounding areas would not change.

Noise

No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels would to be below OSHA workplace standards.

Socioeconomics

As a result of its isolation, limited population, and local economic activity, only minor positive socioeconomic impacts would occur.

Transportation

The few additional personnel would not affect transportation. Shipping of project-related materials, as well as transportation of personnel, would utilize air, roadway, and shipping/ferrying routes that are equipped to handle both the loads and frequency of project demands. Any increase in daily trips by support personnel would utilize existing transportation infrastructure. Shared vehicle and/or off-peak hour travel would further serve to minimize effects on transportation levels.

Water Resources

Impacts to water resources would be negligible, similar to other large marine vessels.

3.9.1 AIR QUALITY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

3.9.1.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring sites identified in section 2.3.1.9.

3.9.1.2 Affected Environment

Climate

Adak Island's climate is characterized as polar maritime one with persistent overcast skies, high winds, frequent and often violent storms, and a narrow range of temperature fluctuation throughout the year. Weather on the island tends to be localized; fog, low ceilings, precipitation, and clear weather are all possible within a distance of a few miles. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2001)

Local shifts and rapid changes in velocity characterize the wind conditions on Adak. Average wind speed is 18.5 kilometers (11.5 miles) per hour, with gusts reaching 185 kilometers (115 miles) per hour during winter storms. Summer months also experience high winds, with gusts reaching up to 92.6 kilometers (57.5 miles) per hour. Winds tend to be from the southwest.

Monthly temperature varies from a low of 0.5˚C (33˚F) in February to a high of 11˚C (51˚F) in August.

Annual precipitation is about 137 centimeters (54 inches), usually in the form of rain. Average monthly precipitation varies from a high of 17.8 to 20.3 centimeters (7 to 8 inches) in November and December to a low of 3 inches in June and July. Approximately 254 centimeters (100 inches) of snow falls each year. However, due to the relatively warm temperature in Adak, snow rarely exceeds 0.31 to 0.62 meter (1 to 2 feet) in depth. (Adak Update.com, 2002)

Regional Air Quality

The entire area in and around the Aleutian chains is designated as an attainment area for ambient concentrations of air pollutants. Although there is little actual ambient air quality monitoring in the Aleutians, the climate of the islands is conducive to good air quality, except in times of very high winds and dry weather when blowing natural dust can occur. The generally wet conditions help to reduce windblown dust. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2001)

Existing Emission Sources

The Alaska Department of Environmental Conservation Division of Air and Water Quality does not maintain air monitoring activities in the area. Existing emissions surrounding Port Adak stem primarily from regional volcanic activity.

3.9.2 AIRSPACE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

Appendix B includes a general description of airspace.

3.9.2.1 Region of Influence

The ROI for airspace at Port Adak includes the airspace over and surrounding the potential SBX interference areas that extend from the mooring location at Finger Bay, east of Port Adak (figure 3.9.2-1).

3.9.2.2 Affected Environment

Controlled and Uncontrolled Airspace

The airspace in the ROI is composed of Class A airspace from 5,486 meters (18,000 feet) mean sea level up to and including FL 600 (18,288 meters or 60,000 feet). Below 5,486 meters (18,000 feet), the airspace is composed largely of Class G (uncontrolled) airspace, except for the area around Adak, which is Class E airspace. The Class E airspace extends upward from 213 meters (700 feet) above the surface within a 11-kilometer (5.9-nautical-mile) radius of Adak, and also includes that airspace extending upward from 366 meters (1,200 feet) above the surface within a 18-kilometer (9.7-nautical-mile) radius of Port Adak (see figure 3.9.2-1). The service times for the Class E airspace is Monday through Friday 1800 to 0300 Greenwich Mean Time. At other times the airspace is Class G. There is no Class B, Class C, or Class D airspace in the ROI. (National Aeronautical Charting Office, 2002)

The airspace ROI lies within the Anchorage Oceanic Control Area/Flight Information Region (CTA/FIR) and within the U.S. Alaskan Air Defense Identification Zone. Aircraft separation and safety advisories are provided by air traffic control, the Anchorage ARTCC.

Special Use Airspace

There is no special use airspace in the ROI.

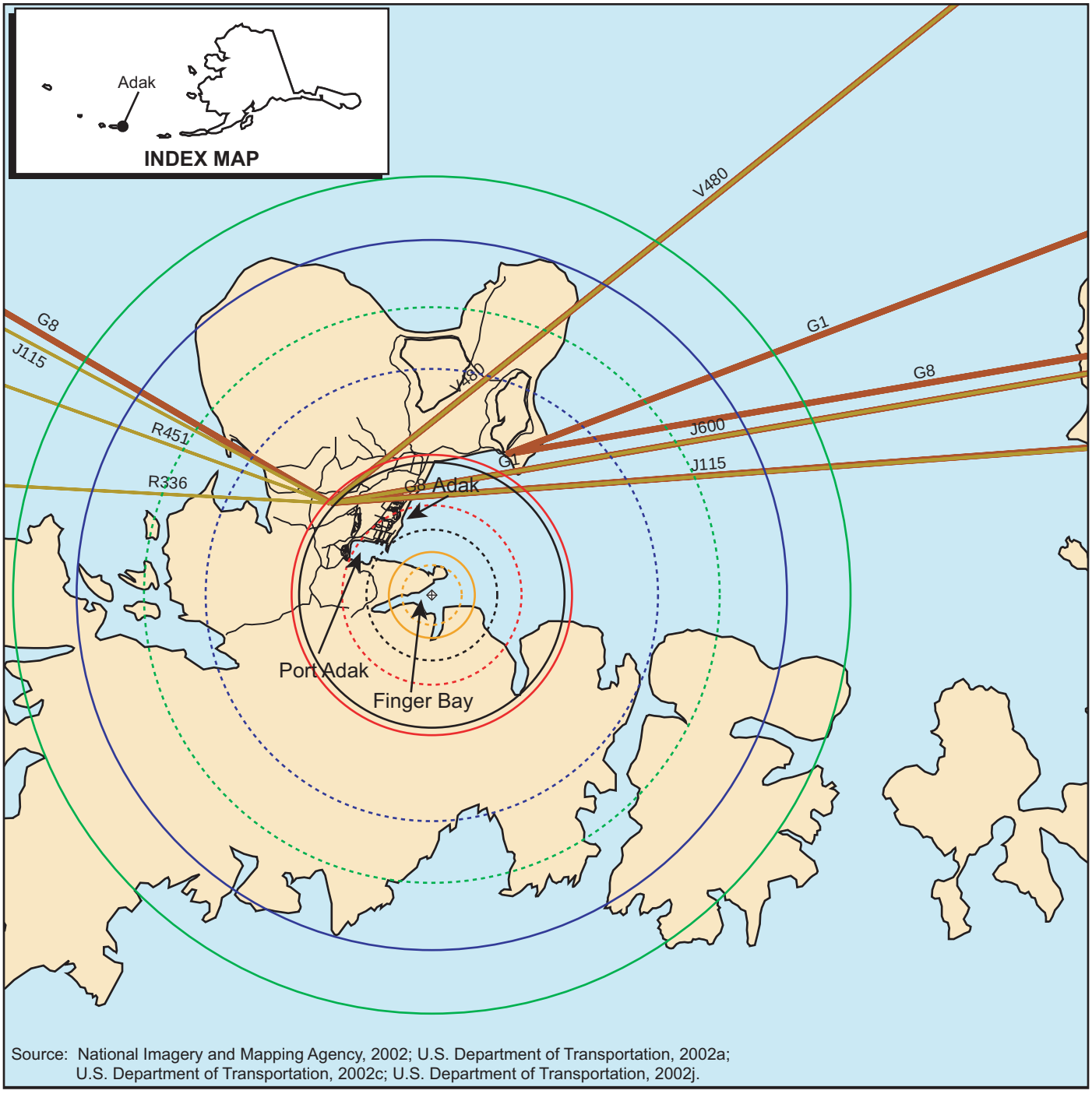
En Route Airways and Jet Routes

There is one en route low altitude airway (G8) connecting to Shemya Island to the west and Unalaska to the East. A second low altitude airway (G1) connects from Adak to Cold Bay. One high altitude jet route (V 480) runs from Adak to the northeast.

Adak is located on the southern edge of the great circle route from North America to the Far East. One of these routes (J 115) enters Adak from the east, and three routes (J 115, R 451, and R 336) enter Adak from the west.

Airports/Airfields

Adak Airport is the only airport in the ROI. It includes two runways, approximately 2,380 meters (7,800 feet) and 2,315 meters (7,600 feet) in length. The airport is attended continuously. (National Aeronautical Charting Office, 2002)



Source: National Imagery and Mapping Agency, 2002; U.S. Department of Transportation, 2002a; U.S. Department of Transportation, 2002c; U.S. Department of Transportation, 2002j.

EXPLANATION

- Land
- Water
- Roads
- Potential SBX Mooring Site
- Low Altitude Air Routes (V,G)
- High Altitude Air Routes (J,R)

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note: - Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

NORTH

Scale
0 4 8 kilometers
0 2.5 5 miles

06-09-03 SBX Air Adak

Airspace Over the Potential SBX Site at Port Adak

Adak, Alaska

Figure 3.9.2-1

3.9.3 BIOLOGICAL RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

Appendix B contains a general description of biological resources and the main regulations and laws that govern their protection.

3.9.3.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring sites as identified in section 2.3.1.9.

3.9.3.2 Affected Environment

Terrestrial biological resources are not addressed since those areas where elements of the Proposed Action would take place onshore are already developed and disturbed. The Aleutian shield fern (*Polystichum aleuticum*), which is only found on Adak Island, is located outside the ROI.

Adak is located approximately 2,092 kilometers (1,300 miles) southwest of Anchorage in the Aleutian Islands. Adak is part of the Aleutian Islands Unit of the Alaska Maritime Wildlife Refuge and is within one of the world's richest fishing regions. Currently the Adak Fisheries Development Council processes cod, crab, halibut, and other bottom fish (Alaska.net, 2002). Coho salmon, pink salmon, and Dolly Varden are known to spawn in most streams that drain into Kuluk Bay, north of the proposed SBX mooring location (Alaskan Command, 1996).

Various seabirds and water fowl overwinter around Adak Island. A few seabird nesting colonies are located in Clam Lagoon, north of the proposed SBX mooring location. Several bird species that nest on Adak Island are the mallard, pelagic and red-faced cormorant, mallard, common eider, bald eagle, Arctic and Aleutian tern, marbled murrelet, and tufted puffin (U.S. Fish and Wildlife Service, 1987).

Steller sea lions, sea otters, harbor seals, and whales occur around Adak Island. The recently delisted Aleutian Canada goose can occur in the area during migration. A Steller sea lion rookery is located on the southwestern portion of the island and a haulout area is located at Cape Moffett, northwest of the proposed SBX mooring location (Alaskan Command, 1996). Sea otter numbers have declined in Kuluk Bay recently, due perhaps to increased predation by killer whales. The population dropped by 76 percent from 1993 to 1997. (U.S. Geological Survey, 1998)

3.9.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

3.9.4.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring sites identified in section 2.3.1.9.

3.9.4.2 Affected Environment

Adak Island is approximately 45 kilometers (28 miles) long with a total land area of 725 square kilometers (280 square miles). Adak's water area totals approximately 13 square kilometers (4.9 square miles). The island's geographic location makes it a key supply and logistical support center for recreational/private, commercial, and government air and marine transport routes for the western Aleutian Islands, Bering Sea, and Pacific Ocean.

Hazardous Materials Management

The most prevalent hazardous material on Adak is fuel. Adak Fuels operates a fueling terminal on what was a naval base. The underground diesel, gasoline and jet fuel storage system at the Sweeper Cove Terminal has an approximate 83-million-liter (22-million-gallon) holding capacity. Adak Fuels also supplies petroleum lubricants and greases to the marine vessels.

Other hazardous materials support Terminal and Port operations. These materials may include, gasoline for equipment and vehicles, propane, organic solvents, heat transfer fluids, glycol-based coolants, refrigerants, protective coatings, fire suppression chemicals, and cleaning agents.

Hazardous Waste Management

Hazardous waste is generated from various routine and preventative maintenance and repair activities at the Port and Sweeper Cover Terminal. These wastes may include spent thinners, cleaning solvents, flammable paints and coatings, corrosive acids, flammable adhesives, used oils containing chlorinated compounds and spent coolants. Sludge and residues removed from equipment and sumps may also be characterized as hazardous.

3.9.5 HEALTH AND SAFETY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

3.9.5.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring sites identified in section 2.3.1.9. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment, fuels and any existing EMR at Port Adak may occur by the use of an XBR. Table 2.1.4-2 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the radar. Appendix B includes a general description of the health and safety resource area and a detailed discussion of the laws, regulations, and standards concerning maritime safety and EMR.

3.9.5.2 Affected Environment

The Coast Guard 17th District provides marine inspections, casualty investigations, fishing vessel inspections, harbor patrol, pollution response and facility contingency planning for Port Adak.

The Sweeper Cove Terminal maintains an Oil Spill Prevention and Response Plan in compliance with State of Alaska and federal requirements.

3.9.6 UTILITIES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

3.9.6.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring site, Finger Bay, identified in section 2.3.1.9.

3.9.6.2 Affected Environment

Energy

Adak Electric Utility, under the auspices of the City of Adak, provides area electricity. The electric system has excess capacity to meet future commercial and industrial development. Adak Electric Utility has the capability of handling 14.5 MW with an average daily demand of only 1 MW per day (Hines, 2002).

Water

Currently and historically, all Adak water supplies (including potable water) have been obtained from surface water. Previously, potable water was available to accommodate as many as 5,000 people via two water systems from three different sources (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2002). In March 1997, Naval Complex Adak was closed and ceased to operate as a military facility, reducing the population from 2,500 to less than 500 people. This reduction in population permitted the closure of certain of the public water systems; one of these, Nurses' Creek, is in the process of shutting down (Hines, 2002). Still in use is the Lake Bonnie Rose system, which is operated as a Class A public water system (Adak Update.com, 2002). City water is connected to all buildings and homes. The current system is capable of producing over 3.8 million liters (1.0 million gallons) per day, with an average demand of about 1.14 million liters (300,000 gallons) per day (Hines, 2002).

Wastewater

Adak Wastewater Utility maintains a wastewater treatment system which discharges its treated water through a marine outfall line to Kuluk Bay (I Love Alaska.com, 2002). Up to approximately 3.02 million liters (800,000 gallons) per day runs through this system, of which less than 1 percent is actually wastewater. Wastewater levels are not monitored directly. (Hines, 2002)

Solid Waste

The Class 3 landfill, the Husky Road Landfill, has been in use since approximately 2000, and is not expected to reach capacity until 2010 (Hines, 2002). It is estimated that 20 percent of its capacity has been used thus far. All paper products are burned (Hines, 2002), and refuse is burned or baled before disposal in the landfill.

3.9.7 VISUAL AND AESTHETIC RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT ADAK

Appendix B includes a description of visual and aesthetic resources and the analysis of the potential impacts from the Proposed Action.

3.9.7.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring site identified in section 2.3.1.9.

3.9.7.2 Affected Environment

The affected environment for Adak, Alaska consists of Port Adak and the surrounding areas; particularly those areas surrounding the potential mooring site at Finger Bay. Until recently, Port Adak has primarily been used as a naval base, and as such, there are many remaining facilities associated with naval activities within the affected environment.

Typically, the Adak climate is wet, foggy, stormy, windy, and overcast. Heavy rains and blowing snow showers inhibit much of the visibility, which usually remains below 1.6 kilometers (1 mile) horizontally.

Vegetation on the island is primarily tundra floral consisting of dwarf willows, alders, grasses, moss, and lichens. Coastal areas support beach wild rye, while offshore the sea water supports kelp and algae.

The port facilities at Adak are located on one of the largest areas of flat land on the island. There is a rolling hill (elevation: 150 meters [492 feet]) situated on the peninsula between Port Adak and the potential mooring site. (State of Alaska, Department of Community and Regional Affairs, 1996)

Although cruise ships do occupy the port occasionally, the only people that ordinarily inhabit Adak are all associated with the port facilities or other small businesses and would not be especially sensitive to scenic quality.

3.10 PORT OF VALDEZ—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE

The proposed GMD ETR activities could have an effect on air quality, airspace, biological resources, hazardous materials and waste, health and safety, transportation, utilities, and visual and aesthetic resources at Port of Valdez. These resource areas are summarized in the following sections.

By nature of its marine mission and use of existing homeport facilities, SBX support and operational activities will not result in any adverse effects to cultural resources, geology and soils, land use, noise, socioeconomics, and water resources. Consequently, this section will not include further analysis of these resources other than the summary in the following paragraphs.

Cultural

There are not expected to be any ground disturbing activities within areas where cultural resources are located. While some mooring locations may have traditional importance, such as native fishing grounds, the SBX would occupy a very small area on a temporary basis.

Geology

While potential warehouse and administration facility construction activities could result in limited clearing and excavation for building foundations, it is not expected to create any adverse erosion effects to geology or soils. Construction activities would follow standard guidelines.

Land Use

Land use impact would be minimal since the proposed activities would occur on the water at the pier or near an existing mooring location and would not produce a change in the type of land utilization in the immediate or surrounding areas. Land utilization in surrounding areas would not change.

Noise

No sensitive receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels would to be below OSHA workplace standards.

Socioeconomics

As a result of its isolation, limited population and local economic activity, only minor positive socioeconomic impacts would occur.

Transportation

The few additional personnel would not affect the transportation. Shipping of project-related materials, as well as transportation of personnel, would utilize air, roadway, and shipping/ferrying routes that are equipped to handle both the loads and frequency of project demands. Any increase in daily trips by support personnel would utilize existing transportation infrastructure. Shared vehicle and/or off-peak hour travel would further serve to minimize effects on transportation levels.

Water Resources

Impacts to water resources would be negligible, similar to other large marine vessels.

3.10.1 AIR QUALITY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

3.10.1.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites identified in section 2.3.1.10.

3.10.1.2 Affected Environment

Climate

Climate in Valdez is part of a maritime zone that includes southeastern Alaska, the south coast, and southwestern islands. Annual wind speed averages 10 kilometers (6.2 miles) per hour, typically from the east-northeast. The annual mean temperature is 3˚C (38˚F), with monthly mean averages ranging from -6˚C (21˚F) in January to 13˚C (55˚F) in July.

Annual precipitation at Valdez reaches 162.6 centimeters (64 inches), with annual snowfall of approximately 802 centimeters (316 inches). The average number of days with heavy fogs, with visibility equal to or less than 0.40 kilometer (0.25 mile), for Valdez is 15.8. (U.S. Department of the Interior, Bureau of Land Management, 2002)

Regional Air Quality

The Port of Valdez is located within the South Central Intrastate Air Quality Control Region. The area is designated as being in attainment for all NAAQS.

Existing Emission Sources

The Valdez Marine Terminal is the dominant emission source in the Valdez area; it contributes 90 percent or more of each criteria pollutant and volatile organic compound to the total emissions. Table 3.10.1-1 lists the Valdez Marine Terminal's annual emissions, as well as annual emissions for adjacent facilities.

Table 3.10.1-1: Summary of Emissions of Regulated Air Pollutants in the Port of Valdez

	PM-10 metric tons (tons)/year	Sulfur Dioxide metric tons (tons)/year	Carbon Monoxide metric tons (tons)/year	Nitrogen Dioxide metric tons (tons)/year	Volatile Organic Compounds metric tons (tons)/year
Valdez Marine Terminal	252.2 (278)	1,593.9 (1,757)	124.3 (137)	1,431.5 (1,578)	3,142.5 (3,464)
Adjacent Facilities[a]	27.2 (30)	116.1 (128)	NA	100.7 (111)	NA

Source: U.S. Department of the Interior, Bureau of Land Management, 2002
a = includes the Petro Star Refinery, the City of Valdez, and the Valdez Airport
NA = Not available

3.10.2 AIRSPACE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

Appendix B includes a general description of airspace.

3.10.2.1 Region of Influence

The ROI for airspace at Port of Valdez includes the airspace over and surrounding the potential SBX interference areas that extend from the mooring location south of the City of Valdez, Alaska (figure 3.10.2-1).

3.10.2.2 Affected Environment

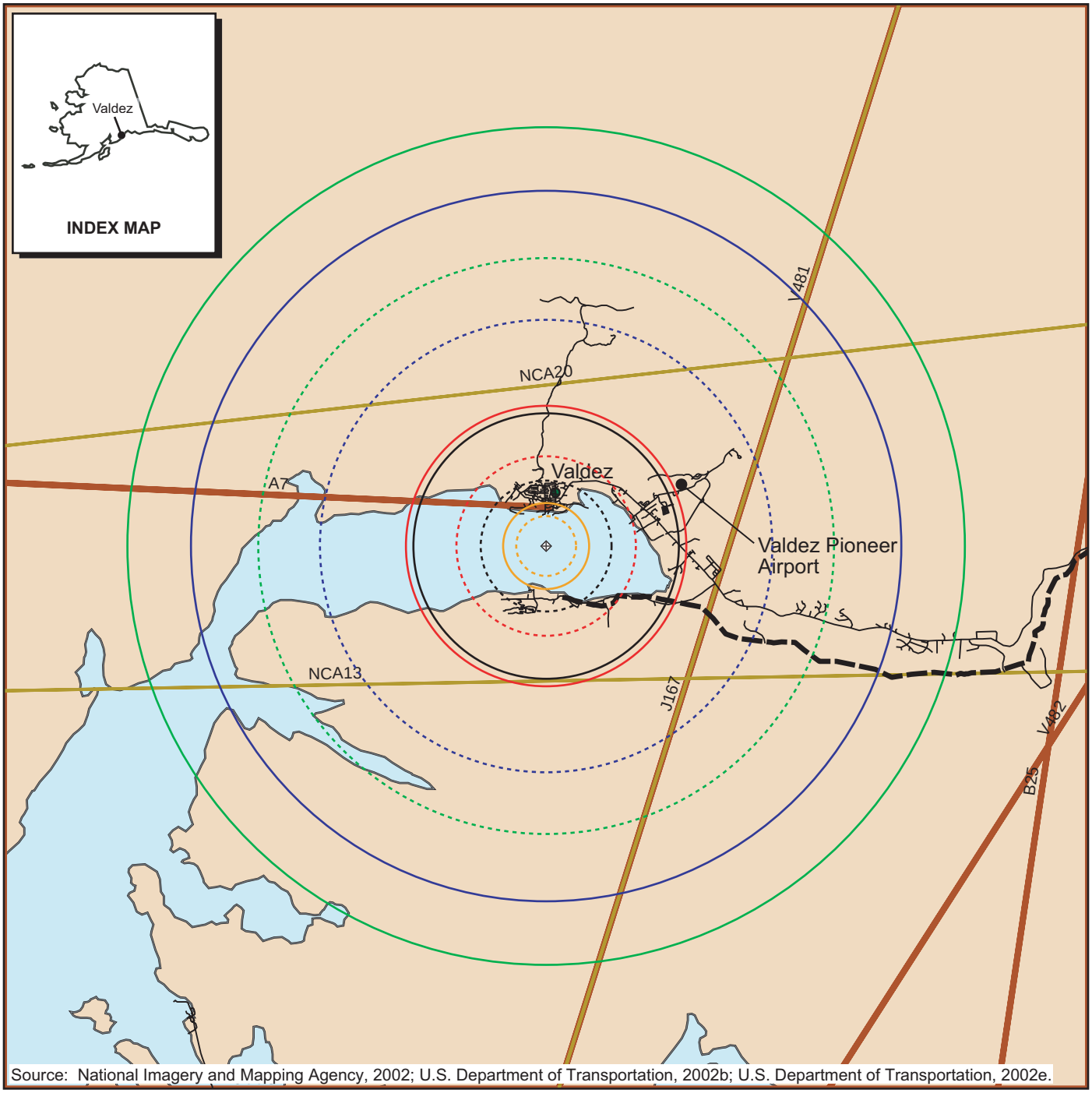
Controlled and Uncontrolled Airspace

The airspace in the ROI is composed of Class A airspace from 5,486 meters (18,000 feet) mean sea level up to and including FL 600 (18,288 meters or 60,000 feet). Below 5,486 meters (18,000 feet), the airspace is composed largely of Class G (uncontrolled) airspace, except for the area around Valdez Pioneer Airport, which is Class E airspace. The Class E airspace extends upward from 213 meters (700 feet) above the surface within a 11-kilometer (5.9-nautical-mile) radius of Valdez Pioneer Airport (see figure 3.10.2-1). There is no Class B, Class C, or Class D airspace in the ROI. (U.S. Department of Transportation, 2002i)

The airspace ROI lies within the Anchorage Oceanic CTA/FIR and within the U.S. Alaskan Air Defense Identification Zone. Aircraft separation and safety advisories are provided by air traffic control, the Anchorage ARTCC.

Temporary flight restrictions (as of May 2003) include the following:

> "1109 - PART 1 OF 2 FLIGHT RESTRICTIONS VALDEZ CLASS E AREA EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE, PURSUANT TO 14 CFR SECTION 91.137A(2), TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT FOR THE VALDEZ CLASS E AREA. THE VALDEZ CLASS E AREA IS DEPICTED AS THE ENCLOSED AREA BOUNDED BY THE MAGENTA 700 FEET BORDER ON THE ANCHORAGE AERONAUTICAL SECTIONAL CHART AND IS DEFINED AS THE 6.6 NM RADIUS OF THE VALDEZ AIRPORT AND WITHIN 3.1 NM EACH SIDE OF THE VALDEZ LOCALIZER FRONT COURSE EXTENDING FROM THE 6.6 NM RADIUS TO 21.6 NM SOUTHWEST OF THE AIRPORT. ALTITUDES: SURFACE UP TO AND INCLUDING 8,000 FEET MSL. TIMES: 24 HOURS/7 DAYS A WEEK ALL AIRCRAFT ENTERING OR DEPARTING THE VALDEZ CLASS E AREA SHALL CONTACT JUNEAU AFSS VHF 122.2, 122.4 OR 122.55 WITH THEIR CALLSIGN, POSITION, ALTITUDE, AND ROUTE OF FLIGHT. END PART 1 OF 2 WIE UNTIL UFN
>
> "PART 2 OF 2 FLIGHT RESTRICTIONS VALDEZ CLASS E AREA IN RESPONSE TO THE TERRORIST ATROCITIES OF SEPTEMBER 11, 2001, THIS FLIGHT RESTRICTION IS REQUIRED TO ESTABLISH A COMMUNICATION REQUIREMENT TO MONITOR ALL AIRCRAFT AROUND THE VALDEZ OIL TERMINAL AND TO ESTABLISH A NO FLY AREA OVER THE OIL TERMINAL AND DOCKS. THE NO FLY AREA IS DEFINED AS ONE (1) NM RADIUS CIRCLE CENTERED ON THE 651 FEET MSL (300 FEET AGL) RADIO TOWER LOCATED AT THE VALDEZ OIL TERMINAL. THIS TOWER IS DEPICTED ON THE ANCHORAGE AERONAUTICAL SECTIONAL CHART AND IS LOCATED AT LAT. 61 05" 06 N LONG. 146 23"19" W. AIRCRAFT WITH NO RADIO CAPABILITY: PRECOORDINATE WITH JUNEAU AFSS ON TIMES, ALTITUDES, AND ROUTE OF FLIGHT. THE FAA COORDINATION FACILITY IS JUNEAU AFSS, PHONE 907-586-7382. END PART 2 OF 2 WIE UNTIL UFN "



EXPLANATION

- Land
- Water
- Roads
- Potential SBX Mooring Site
- Trans-Alaska Pipeline
- Low Altitude Air Routes (A,B,V)
- High Altitude Air Routes (J, NCA)

Potential Interference Distances

- 22.4 km Full Commercial COMM
- 19 km Full Aircraft - Main Beam
- 15.4 km 65% Commercial COMM
- 12.1 km 65% Aircraft - Main Beam
- 7.5 km Full (Air) - EEDs Presence/Shipping
- 7.1 km Full Military COMM
- 4.8 km 65% (Air) - EEDs Presence/Shipping
- 3.5 km 65% Military COMM
- 2.3 km Full (Ground) - EEDs Handling
- 1.6 km 65% (Ground) - EEDs Handling

Note:
- Full = Fully Populated SBX Radar
- 65% = 65% Populated SBX Radar

Scale
0 4 8 kilometers
0 2.5 5 miles
NORTH

06-09-03 SBX Air Valdez

Airspace Over the Potential SBX Site at Port of Valdez

Valdez, Alaska

Figure 3.10.2-1

Special Use Airspace

There is no special use airspace in the ROI.

En Route Airways and Jet Routes

There is one en route low altitude airway (A7) connecting to Anchorage to the west. One low altitude airway (V 481) crosses the ROI approximately 3 kilometers (1.6 nautical miles) east of the Valdez Pioneer airport. One high altitude jet route (J167) is located directly above V481.

Valdez is located on the southern edge of the great circle route from North America to the Far East. Two of these routes (NCA 13 and NCA 20) run east–west across the ROI above Valdez. The ground trace of these routes is about 6 kilometers (3.2 nautical miles) south and 6 kilometers (3.2 nautical miles) north of Valdez Pioneer Airport, respectively.

Airports/Airfields

Valdez Pioneer Airport is the only airport in the ROI. It includes one runway, approximately 2,380 meters (6,500 feet) in length. The airport is attended from 6:00 a.m. to 8:00 p.m. (U.S. Department of Transportation, 2002j)

3.10.3 BIOLOGICAL RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

Appendix B contains a general description of biological resources and the main regulations and laws that govern their protection.

3.10.3.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites as identified in section 2.3.1.10.

3.10.3.2 Affected Environment

Terrestrial biological resources are not addressed since those areas where elements of the Proposed Action would take place onshore are already developed and disturbed.

The Port of Valdez is located in a deepwater fjord in northeast Prince William Sound. It lies 193 kilometers (120 air miles) east of Anchorage, or 490 kilometers (305 miles) by the Richardson and Glenn Highways. Large populations of marine and anadromous fish occur in Prince William Sound such as sockeye, pink, coho, Chinook, and chum salmon, Pacific herring, Pacific halibut, and sablefish. All estuarine and marine areas out to the Economic Exclusion Zone of the United States used by Alaskan Pacific salmon are designated as Essential Fish Habitat for salmon fisheries. Salmon occur in the Sound mainly from June through September as they return from the ocean to spawn (National Wildlife Federation, 2001). Essential Fish Habitat has also been designated for scallops and Gulf of Alaska ground fish in Port Valdez. (Bureau of Land Management, 2002)

Prince William Sound is an important overwintering area for sea ducks such as scoters, cormorants, harlequin duck, Barrow's goldeneye, oldsquaw, and mergansers (Bureau of Land Management, 2002). Some of the more common seabirds occurring in the sound are the murrelet, black-legged kittiwake, glaucous-winged gull, fork-tailed petrel, and mew gull (National Wildlife Federation, 2001; Alaska.net, 2002). Small groups of threatened Steller's eiders are occasionally found in Prince William Sound during the winter (Bureau of Land Management, 2002).

Prince William Sound provides habitat for humpback, killer, and minke whales, sea otters, Steller sea lions, harbor seals, and Dall and harbor porpoise. Killer and minke whales are observed year round. Humpback whales are the most abundant whale species in Prince William Sound and feed there in the summer. However, they are found primarily in the southwestern portion of the Sound, away from Port Valdez. Most of the humpback whales migrate to Hawaii and Mexico for calving in the winter (National Wildlife Federation, 2001). The population of sea otters affected by earthquakes and the Exxon Valdez oil spill appeared to be recovering by 1993. The overall population of sea otters in Prince William Sound increased during the 1990s. The Steller sea lions in Prince William Sound are part of the endangered western stock. None of the critical habitat designated for the Steller sea lion occurs in Port Valdez. Although harbor seals are abundant in Prince William Sound year round, their long-term decline there (since 1970s) has not ended. Dall and harbor porpoises are both abundant (more abundant in summer) and widespread in Prince William Sound. (Bureau of Land Management, 2002)

3.10.4 HAZARDOUS MATERIALS AND HAZARDOUS WASTE—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

3.10.4.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites as identified in section 2.3.1.10.

3.10.4.2 Affected Environment

Prince William Sound includes approximately 28,490 square kilometers (11,000 square miles) of shoreline, islands, and open water. The Port of Valdez is located in a northern deepwater fjord of Prince William Sound. Within the Port, the Valdez Container Terminal consists of a 213-meter (700-foot) floating concrete dock tied to an 8.5-hectare (21-acre) marshalling yard by two 61-meter (200-foot) ramps. The terminal is designed as a multi-purpose berth to accommodate the commercial fishing industry, seafood processing plants, a grain terminal and tourist industry.

The port also serves as the southern terminal of the Trans-Alaska Pipeline System (TAPS). The TAPS terminal occupies approximately 404.7 hectares (1,000 acres) of land owned by the Alyeska Pipeline Service Company (APSC). The TAPS Terminal serves to store and load crude oil and houses the Operations Control Center (OCC) for the TAPS. The total holding capacity in the crude oil tanks at the Valdez Terminal is approximately 9.18 billion barrels. The average working inventory of the tanks is approximately 7.8 billion barrels, or approximately 85 percent of maximum capacity. The OCC monitors and controls the movement of oil through the pipeline via a series of satellite, cable, and terrestrial microwave radio systems.

Hazardous Materials Management

The most prevalent hazardous material at the TAPS Terminal is diesel fuel, with approximately 30 million liters (8 million gallons) nominally being stored at any given time. Other hazardous materials used at the Terminal support Terminal and TAPS operations. These materials include gasoline for equipment and vehicles, propane, organic solvents, heat transfer fluids, glycol-based coolants, refrigerants, protective coatings, fire suppression chemicals, and cleaning agents.

The APSC Hazardous Materials Business Model defines the appropriate administrative procedures for management of hazardous materials at the Terminal and other locations in the APSC system. Procedures for implementing the Hazardous Materials Business Model are provided in the TAPS Environmental Protection Manual, EN-43-1. Purchase and use of hazardous materials by APSC personnel and TAPS contractors are centrally controlled through the APSC systemwide Hazardous Materials Consolidation and Redistribution (HAZCORE) Program. In addition to procurement and inventory management, HAZCORE databases allow access to MSDS and ensure that employee hazardous material training is current and compliant with OSHA and State of Alaska requirements.

Hazardous materials are typically delivered to a central APSC warehouse in Anchorage, Alaska and shipped by truck (commercial carrier of APSC vehicle) to the terminal, maintenance or equipment yards, or pump station. Hazardous materials delivered to the terminal are stored in dedicated areas within designated buildings. Fuels are delivered in bulk by commercial carriers and transferred to above ground storage tanks at the terminal or other appropriate location. Limited quantities of hazardous materials and fuels may occasionally be stored in temporary facilities or portable tanks at a designated location for specific jobs.

APSC submits annual Emergency Planning and Community Right-to-Know Act Tier II reports to state and federal authorities. The terminal has an SPCC Plan and works with local emergency planning authorities in developing site specific contingency plans for hazardous material storage and usage locations.

Hazardous Waste Management

The Valdez Marine Terminal is considered a large quantity generator. Hazardous waste is generated from various routine and preventative maintenance and repair activities at the terminal. These wastes include spent thinners, cleaning solvents, flammable paints and coatings, corrosive acids, flammable adhesives, used oils containing chlorinated compounds, spent coolants, spent aerosol cans and crushed fluorescent lights. Sludge and residues removed from equipment and sumps may also be characterized as hazardous. The largest quantity of potentially hazardous waste is from tank bottoms and “materials in process” that are periodically removed from equipment and storage tanks. Some spill debris and containment media may also be characterized as hazardous.

The TAPS Environmental Protection Manual, EN-43-2 also establishes procedures for management of hazardous waste. Hazardous waste generated at the terminal is accumulated in a designated waste accumulation area within dedicated buildings. All hazardous waste accumulation areas have secondary containment features. A licensed contractor collects and transports the waste via truck to a terminal in Anchorage, Alaska where the waste is then shipped via barge or rail to permitted Treatment, Storage, Disposal, and Recycling Facilities outside of Alaska. All wastes are transported in accordance with appropriate DOT and state specifications.

Limited quantities of special wastes could potentially be generated from TAPS operations. Such wastes would include PCB wastes (contained in the dielectric fluids of electrical equipment), asbestos wastes, pesticide wastes, drag reducing agent wastes, spent glycols, tanker garbage, asphalt, spent sandblast media, naturally occurring radioactive material, spill debris and remediation waste. Handling procedures are waste specific and in accordance with applicable state and federal specifications.

3.10.5 HEALTH AND SAFETY—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

3.10.5.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites as identified in section 2.3.1.10. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment, fuels and any existing EMR at the Port of Valdez may occur by the use of an XBR. Table 2.1.4-2 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the radar. Appendix B includes a general description of the health and safety resource area and a detailed discussion of the laws, regulations and standards concerning maritime safety and EMR.

3.10.5.2 Affected Environment

The Coast Guard 17th District MSO Valdez provides marine inspections, casualty investigations, fishing vessel inspections, harbor patrol, pollution response and facility contingency planning for Port Valdez and Prince William Sound. The MSO is composed of the Vessel Traffic Center and Public Works Department. The Vessel Traffic Center is staffed 24 hours per day, 7 days per week and tracks/coordinates marine traffic in Prince William Sound. The Vessel Traffic Center's Vessel Traffic System utilizes radar, an Automated Dependent Surveillance Shipboard System, radio and other to obtain and disseminate information regarding vessel movement. The Center is supported by Vessel Traffic Center radar at Hinchinbrook Island, Naked Island, Potato Point and the Valdez Spit. The MSO Public Works Department oversees and maintains Coast Guard owned equipment and facilities, including the remote Vessel Traffic Center radar sites.

In accordance with State of Alaska and Federal oil spill prevention and response agreements and plans, every laden tanker is escorted from the Port to Hinchinbrook Entrance by an ocean going tug and an APSC Ship Escort/Response Vessel. One of the escort vessels serves as ice scout, keeping approximately one-half mile ahead of outbound tankers to assess ice hazards. Escort is also provided for empty inbound tankers during low visibility conditions, when ice is reported or when it has been 6 hours since an ice report was issued. Radar is one of the means by which the Ship Escort/Response Vessels assess ice conditions in the Sound. Ship Escort/Response Vessel personnel are trained in advanced spill response.

The Valdez Terminal maintains an Oil Spill Contingency Plan. Tankers are surrounded with containment booms as soon as they are berthed and are inspected hourly during the 18-hour loading for any sign of a leak or spill. Loading is monitored and controlled by the OCC via a series of satellite, cable and terrestrial microwave radio systems. The terminal is equipped with workboats, self-propelled skimmers, and containment booms and an oil spill response team is on duty at all times. Spills from a tanker not at berth or transiting from the terminal are covered

under the Prince William Sound Tanker Spill Prevention and Response Plan. All transiting tankers must have individual oil spill contingency plans that incorporates the Prince William Sound Tanker Spill Prevention and Response Plan. APSC provides initial response to any spill from a transiting tanker.

An independent regional citizens advisory council comprised of representatives from the Alaska State Chamber of Commerce, Alaska Wilderness Recreation and Tourism Association, Chenega Bay Corporation, Chenega Bay IRA Council, Chugach Alaska Corporation, Cordova District Fisherman United, Kenai Peninsula Borough, Kodiak Island Borough, Kodiak Village Mayors Association, Oil Spill Region Environmental Coalition, Prince William Sound Aquaculture Association, Tatitle Corporation, Tatitle Village IRA Council and the Cities of Cordova, Homer, Kodiak, Seldovia, Seward, Valdez (2), and Whittier oversees Terminal operations and the Prince William Sound Tanker Spill Prevention and Response Plan.

A commuter airline serves the Port of Valdez. Section 3.10.2 provides an overview of the airspace and airports in the Port of Valdez ROI.

3.10.6 TRANSPORTATION—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

3.10.6.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites as identified in section 2.3.1.10. Pier-side operations can be carried out for the SBX during limited time periods. Valdez does not maintain the pier capacity to commit pier-space year round for the SBX, which would yield to cruise ships. However, there are numerous mooring locations near the container dock for long-term operations. No requirements for aviation or railway transportation are anticipated and no impacts to those modes of transport are expected; consequently this section will predominately concern itself with ocean traffic, though roadway transportation is also addressed.

3.10.6.2 Affected Environment

Ocean Traffic

Marine transportation plays an important role in the Prince William Sound area, including its role in shipping petroleum products from the Valdez Marine Terminal. The Port of Valdez is equipped with the highest level of marine infrastructure, accommodating interstate and international cargo receipt and shipment, while providing a minimum draft of 6 meters (20 feet). The Port of Valdez is an ice-free port with access to Interior Alaska, the U.S. Pacific Northwest, Northern Canada, and Pacific Rim trade routes. This deepwater port has containerized storage and containerized roll-on/roll-off and lift-on/lift-off capabilities, as well as access to the

Richardson Highway, the Valdez Airport, and the AMHS. The Port of Valdez is among those in the Prince William Sound area providing facilities for the AMHS, which provides scheduled service to the City of Valdez, as well as Cordova, Seward, Whittier, and “whistlestop” service to Chenega Bay and the renowned Tatitlek. (U.S. Department of the Interior, Bureau of Land Management, 2002) The Port of Valdez is the southern terminus of the trans-Alaska oil

pipeline; supertankers navigate the deep, ice-free waters of Valdez Arm each day, handling more than 1.5 million barrels of crude oil (City of Valdez, 2002a).

The Valdez City Dock is a 183-meter (600-foot) wharf. The Valdez Container Terminal Dock is a 213-meter (700-foot) concrete floating dock; water depth at mean low tide is 15 meters (50 feet). This dock is designed as a multi-purpose berth to handle containerized, roll on/roll off, and lift on/lift off operations. (City of Valdez, 2002a)

Road Traffic

In Fairbanks, the Richardson Highway connects to the Steese Highway that follows the pipeline for 18 kilometers (11 miles) until the intersection with the Elliot Highway. In addition, approximately 284 secondary roads provide private access to the pipeline, pump stations, and airstrips. These highways, with the exception of the Dalton Highway, are typically asphalt-paved two-lane roads. In a populated center such as Fairbanks, more than two lanes may exist.

Except near Valdez and Fairbanks, traffic congestion is not a problem, although road maintenance activities may cause traffic delays. Annual ADT counts along the Richardson Highway vary significantly between Valdez and Fairbanks from approximately 300 to 22,400 vehicles per day, depending on location (see table 3.10.6-1). Traffic during the summer can be double the annual averages and is typically higher near the communities of Valdez, Glennallen, Delta Junction, and Fairbanks. (U.S. Department of the Interior, Bureau of Land Management, 2002)

Table 3.10.6-1: Average Daily Traffic Counts on the Richardson Highway for the Year 2000

Richardson Highway Milepost	Annual ADTa	Mid-Summer ADTb
MP 3 (Valdez)	5,540	7,500
MP 62 (Ernestine Creek, near PS 12)	450	1,125
MP 118 (Gulkana Airport)	1,000	2,000
MP 218 (Trims Creek, near PS 10)	300	600
MP 345 (Moose Creek/Fairbanks)	9,100	11,000
MP 359 (Fairbanks)	22,400	26,400

Source: U.S. Department of the Interior, Bureau of Land Management, 2002

3.10.7 UTILITIES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

3.10.7.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of the Port of Valdez for the SBX, including the mooring sites as identified in section 2.3.1.10. Pier-side operations can be carried out for the SBX during limited time periods. Valdez does not maintain the pier capacity to commit pier-space year round for the SBX, which would yield to cruise ships. However, there are numerous mooring locations near the container dock for long-term operations.

3.10.7.2 Affected Environment

Energy

Copper Valley Electric Association, which provides electricity to the City of Valdez, derives much of its power from the 13-MW Solomon Gulch Hydroelectric Facility, owned by the Four Dam Pool Power Agency, and owns diesel plants in Glennallen and Valdez. Copper Valley Electric Association operates the hydroelectric plant, which is located in Valdez on Daysville Road; from here, units at all three generation facilities can be controlled. (Copper Valley Electric Association, Inc, 2003; Vacation Alaska.com, 2002) The Glennallen and Valdez plants are used for backup energy. The Valdez Diesel Plant houses three Fairbanks Morse 38D8 1/8 opposed piston units, three Enterprise DSR 46 units, and a trailer-mounted Solar Centaur turbine unit. The available generation capacity of this plant is 9.25 MW. (Copper Valley Electric Association, 2002) Currently, there is no electrical hookup at either of the two docks at Port of Valdez (Kinney, 2002).

Water

Valdez water is derived from four primary wells and is stored in two 2.8-million-liter (750,000-gallon) reservoirs before being piped for distribution throughout Valdez; over 95 percent of homes are fully plumbed, though many utilize individual wells. Water storage capacity is 8.48 million liters (2.24 million gallons). (Vacation Alaska.com, 2002) Over 6.8 million liters (1.8 million gallons) of water is provided daily to city residents (City of Valdez, 2002a). Water hookups are available at the Port of Valdez docks, which charge per 3,785-liter (1,000-gallon) units. This system is capable of servicing cruise ships of variable sizes, with records of typical demands ranging from 174,128 liters to 245,185 liters (46,000 gallons to 64,771 gallons). (Kinney, 2002)

Wastewater

The City of Valdez Wastewater Treatment Plant located on South Sawmill Road is capable of processing over 4.73 million liters (1.25 million gallons) of wastewater per day, with sewage deposited in a secondary treatment lagoon. Over 95 percent of homes are fully plumbed, though many utilize septic tanks. (Vacation Alaska.com, 2002) The average daily flow in 2001 was 3.56 million liters (0.94 million gallons) per day (U.S. Environmental Protection Agency, 2001b), but the Public Works Department of the City of Valdez cites current levels at the slightly lower rate of 3.3 million liters (0.87 million gallons) per day (City of Valdez, 2002b). Wastewater requirements at the Port of Valdez docks are handled by private contractor, and wastewater is trucked out as required, with levels on a case-by-case basis (Kinney, 2002).

Solid Waste

The Valdez Landfill, a Class 2 landfill operated by the City of Valdez on Glacier Haul Road, utilizes a bale fill system (Vacation Alaska.com, 2002). At the Port of Valdez docks, the City provides dumpsters to handle solid waste removal (Kinney, 2002).

3.10.8 VISUAL AND AESTHETIC RESOURCES—SEA-BASED TEST X-BAND RADAR PRIMARY SUPPORT BASE, PORT OF VALDEZ

Appendix B includes a description of visual and aesthetic resources and the analysis of the potential impacts from the Proposed Action.

3.10.8.1 Region of Influence

The ROI includes areas that may potentially be affected by the use of Port of Valdez for the SBX, including the mooring site identified in section 2.3.1.10.

3.10.8.2 Affected Environment

Essentially, the affected environment for Valdez, Alaska consists of the Port of Valdez and the surrounding areas of Prince William Sound. The Port of Valdez is primarily used to support the Trans-Alaska Pipeline which terminates at the Port of Valdez.

The average weather for Valdez consists of an annual temperature of 3˚C (38˚F), an annual precipitation of 163 centimeters (64 inches), an annual snowfall of 802 centimeters (316 inches), and approximately 16 days per year of heavy fog where visibility is less than 0.4 kilometer (0.25 mile).

Valdez is nestled among high mountain ranges that surround Prince William Sound. These ranges have an elevation of up to and exceeding 1,400 meters (4,600 feet).

Vegetation in and surrounding Valdez is classified as coastal forest which predominantly consists of evergreen forests coupled with deciduous forests in along the waterways and in disturbed areas. (Bureau of Land Management, 2002)

Facilities located in and around the Port of Valdez are primarily associated with the Trans-Alaska Pipeline. The city of Valdez maintains two hotels, two bed and breakfasts, a bank, and three recreational vehicle parks.

Those which may be affected by the Proposed Action visually include the sightseers and tourists, residents of Valdez and the surrounding areas, and those associated with the Trans-Alaska Pipeline.

3.11 BROAD OCEAN AREA (EXECUTIVE ORDER 12114)

Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions,* represents the U.S. Government's exclusive and complete determination of the procedural and other actions to be taken by federal agencies to further the purpose of the NEPA, with respect to the environment outside the United States, its territories and possessions. This Executive Order enables responsible officials of federal agencies to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy in making decisions regarding proposed actions. While based on independent authority, it furthers the purpose of the NEPA and the *Marine Protection Research and Sanctuaries Act of 1972* (33 USC §§ 1401 *et seq.*; 16 USC 1431 *et seq.*) and the *Deepwater Port Act of 1974,* as amended (33 USC §§ 1501-1524) consistent with the foreign policy and national security policy of the United States.

This section describes the baseline conditions within the BOA that may be affected by the GMD ETR activities. The information contained in this section is summarized from the *Theater Missile Defense Extended Test Range Supplemental Environmental Impact Statement-Eglin Gulf Test Range* (U.S. Department of the Air Force, 1998b), *Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement* (Pacific Missile Range Facility, Barking Sands, 1998), *North Pacific Targets Program Environmental Assessment* (U.S. Army Space and Missile Defense Command, 2001b), and the *Long Range Air Launch Target Environmental Assessment* (U.S. Department of Defense, Missile Defense Agency, 2002). These documents included environmental analysis of potential impacts from missile launches and other military actions in the Gulf of Mexico and the Central and North Pacific. As appropriate, additional information used to develop this section is referenced accordingly.

Airspace, biological resources, health and safety, and transportation were identified as resource areas with potential impacts in the BOA. Water quality and noise are included in the analysis, from the standpoint of potential impacts on marine life.

With the BOA being the ROI, there is no potential for impacts to air quality, cultural resources, land use, geology and soils, hazardous materials and hazardous waste, socioeconomics, utilities, visual and aesthetic resources, water resources, and environmental justice. Similarly, since the BOA is well removed from islands and population centers, no impacts to the human noise environment, socioeconomics, and utilities are anticipated. Impacts to air quality from similar missiles and mobile sources have been determined to be insignificant.

Region of Influence

The ROI includes all areas that would be potentially affected by GMD test activities beyond the territorial limits of the United States. This includes areas within the Gulf of Mexico, the Atlantic Ocean, and the Pacific Ocean that may be affected by the SBX travel and operations. The Gulf of Mexico ROI would be limited to areas for sea trials and initial full power testing of the SBX. The enroute ROI, from the Gulf of Mexico to the Pacific Ocean, would most likely follow the coast of South America toward Cape Horn, and include full power calibration and tracking along the route. The Pacific Ocean Area ROI occupies approximately 7.1 million square kilometers (2.1 million square nautical miles) in the central north Pacific Ocean, or approximately 4 percent of the Pacific Ocean's total area. The average depth of the Ocean Area ROI is 3,932 meters (12,900 feet).

3.11.1 AIRSPACE—BROAD OCEAN AREA

Appendix B includes a general description of airspace.

3.11.1.1 Affected Environment

Controlled and Uncontrolled Airspace

The airspace beyond the 22.2-kilometer (12-nautical-mile) limit is in international airspace. For this reason, the procedures of the ICAO, outlined in ICAO Document 4444-RAC/501, *Rules of the Air and Air Traffic Services,* are followed in this airspace (International Civil Aviation Organization, 1996; 1997). ICAO Document 4444-RAC/501 is the equivalent air traffic control manual to the FAA Handbook 7110.65, *Air Traffic Control.* However, the ICAO is not an active air traffic control agency, and has no authority to allow aircraft into a particular sovereign nation's Flight Information Region or Air Defense Identification Zone, and does not set international boundaries for air traffic control purposes. Rather, the ICAO is a specialized agency of the United Nations, whose objective is to develop the principles and techniques of international air navigation, and to foster planning and development of international air transport. FAA Air Traffic Service outside U.S. airspace is provided in accordance with Article 12, *Rules of the Air,* and Annex 11, *Air Traffic Regulations and Air Traffic Services,* of the ICAO Convention. The FAA acts as the United States' agent for aeronautical information to the ICAO.

3.11.1.1.1 Gulf of Mexico

The Gulf of Mexico ROI is defined as the overwater area that would be potentially affected by the Proposed Action using portions of the international airspace over the Gulf of Mexico. This includes the entire northern Gulf of Mexico within the Houston, Jacksonville, and Miami ARTCCs, and the Houston and Miami Oceanic CTA/FIR (figure 3.11.1–1).

Special Use Airspace

Special use airspace occupies a significant portion of the Gulf of Mexico ROI. Much of the eastern part of the Gulf of Mexico ROI is occupied by the Eglin Water Test Area (EWTA) (figure 3.11.1-1). The Letter of Agreement between Jacksonville ARTCC, Miami ARTCC, Houston ARTCC, U.S. Navy Training Wing 6, and the Air Force Development Test Center defines the EWTA as " . . . all airspace in Warning Areas W-151, W-155B, W-168, W-174, W-470, and the airspace divided into five (5) areas . . ." These are described in annexes to the agreement (U.S. Department of the Air Force, 1998b). EWTA 6 was added in 1996. The six EWTAs serve a similar function as Warning Areas, via the NOTAM system, providing airspace for hazardous aircraft flying operations including air-to-surface, air-to-air, and surface-to-air activities. Almost all of the EWTAs lie outside the 22.2-kilometer (12-nautical-mile) limit of the National Airspace System and include EWTAs 1, 2, 3, 4, 5, and 6. Other special use airspace in the eastern part of the ROI includes the Tortugas Military Operations Area, due west of Key West.

Special use airspace areas in the western part of the Gulf of Mexico ROI include Warning Area W-453 south of Mobile, Alabama; Warning Areas W-92, W-59, and W-147A/B south and southwest of New Orleans, Louisiana; and Warning Areas W-147C/D/E, W-228, and W-602 off the Texas coast (figure 3.11.1-1).

EXPLANATION

- Eglin Overwater Region of Influence
- ROI
- Air Route Traffic Control Center Boundary
- Special Use Airspace

ADIZ = Air Defense Identification Zone
CTA = Control Area
FIR = Flight Information Region
W = Warning Area
EWTA = Eglin Water Test Area

- Thunder Area
- Lightning Area

Scale
0 140 280 kilometers
0 87 174 miles
NORTH

06-09-03 Special Air

Special Use Airspace Over the Gulf of Mexico

Gulf of Mexico

Figure 3.11.1-1

En Route Airways and Jet Routes

The Gulf of Mexico ROI airspace is crossed by numerous airways and jet routes, especially the important Gulf Route 26 and J-58-86 jet route (figure 3.11.1-2). An airway is a control area, or portion thereof, established in the form of a corridor up to but not including 5,486.4 meters (18,000 feet) mean sea level, the centerline of which is defined by radio navigational aids. The routes are referred to as Colored Federal Airways, or very high frequency omni-directional range airways over land, and A routes, or low frequency/medium frequency airways over water, with numbering to identify the designated route. A jet route is a route designed to serve aircraft operations from 5,486.4 meters (18,000 feet) mean sea level up to and including FL 450. The jet routes are referred to as J routes with numbering to identify the designated route.

Figure 3.11.1-3 presents an Aircraft Situation Display of the Gulf of Mexico ROI on Tuesday, 7 October 1997, at 9:30 a.m. (Martin, 1997). It represents a snapshot of all aircraft in the air at that time, taken from the radar at Jacksonville ARTCC. Clearly, the number of aircraft actually en route would vary by time of day, and also by week, month, or season, but the snapshot does give a representative account of the number of aircraft in the air over the Gulf of Mexico at a moment in time. Some 32 aircraft are in the overwater ROI. The snapshot also illustrates the relative low density of en route air traffic over the Gulf of Mexico, compared to the much higher density of air traffic over the mainland, and even along the Atlantic coast. Even so, most of the ROI air traffic in this snapshot is between the central and south Florida and New Orleans, Louisiana, area (figure 3.11.1-2). Approximately 500 aircraft each day use J58-86 or GR26 to transit the Gulf of Mexico between St. Petersburg/Sarasota, Florida, and New Orleans/Leesville, Louisiana. Of these, approximately 325, or 65 percent, operate during daylight hours (7:00 a.m. to 9:00 p.m. Eastern Daylight Time) (U.S. Department of the Air Force, 1998b). This translates into a nominal average of 23 aircraft per hour, assuming an even hourly distribution.

A new jet route across the northeastern Gulf of Mexico has been proposed by the FAA and agreed to by the U.S. Air Force. Although it has not yet been formalized, the route would accommodate the increased traffic across the Gulf of Mexico that is expected with the full implementation of the North American Free Trade Agreement. It would be an extension of the existing A-758 jet route northeast directly into Tampa Bay. This new route would cut across the northwest corner of W-168A. West of the new route, W-168A would still be used at 8,534.4 meters (28,000 feet) above ground level and below. Commercial aircraft would be assigned 8,839.2 meters (29,000 feet) above ground level and above (U.S. Department of the Air Force, 1998b).

Air traffic in the ROI is managed by the Houston, Jacksonville, and Miami ARTCCs and the Houston and Miami Oceanic CTA/FIRs.

The special use airspace areas in the Gulf of Mexico ROI are managed or scheduled by several organizations. The EWTA, the largest special use airspace complex in the ROI, is managed by Eglin AFB under a letter of agreement among Jacksonville ARTCC, Miami ARTCC, Houston ARTCC, U.S. Navy Training Wing 6, and the Air Force Development Test Center (U.S. Department of the Air Force, 1998b). There are some overlaps in airspace assignment, notably that Warning Area W-155B occupies some of Eglin AFB EWTA-1, and is used on a coordinated basis. Additionally, several portions of airspace adjacent to or overlapping these areas are used by Eglin AFB assigned units, but are managed by other organizations. Fleet area control and surveillance facility, NAS Pensacola, functions as the controller for the airspace assigned to their units.

EXPLANATION

- - - - En Route High Altitude Jet Routes

——— En Route Low Altitude Airways and High Altitude Jet Routes

En Route Airways and Jet Routes over the Gulf of Mexico

Scale

0 140 280 kilometers

0 87 174 miles

NORTH

06-09-03 En route Airways

Gulf of Mexico

Figure 3.11.1-2

EXPLANATION

- Aircraft

Aircraft Situation Display of the Gulf of Mexico

NORTH

Scale

0 140 280 kilometers

0 87 174 miles

06-09-03 Aircraft

Gulf of Mexico

Figure 3.11.1-3

When a requirement exists for use of airspace beyond the Warning Areas and above FL 240 (7,315.2 meters [24,000 feet]) that would impact Gulf Route 26, the airspace may not be scheduled for longer than a 4-hour block of time when the requirement is for a hazardous use of the airspace (such as missiles or drones). At FL 240 and below, it may not be scheduled for longer than 12 hours. There must be a 3-hour period between blocks of scheduled airspace (U.S. Department of the Air Force, 1998b).

3.11.1.1.2 En Route Gulf to Pacific

Special Use Airspace

Warning Areas are established in international airspace to contain activity that may be hazardous, and to alert pilots of nonparticipating aircraft to the potential danger. Warning areas along the route to the Pacific are shown on figure 3.11.1-4.

En Route Airways and Jet Routes

En route high altitude jet routes are shown on figure 3.11.1-4.

3.11.1.1.3 Pacific Ocean

The Pacific Ocean ROI includes the overwater area that would be potentially affected by the Proposed Action using portions of the international airspace over the northern Pacific Ocean. This area includes the Los Angeles, Oakland, Anchorage, and Seattle ARTCCs.

Special Use Airspace

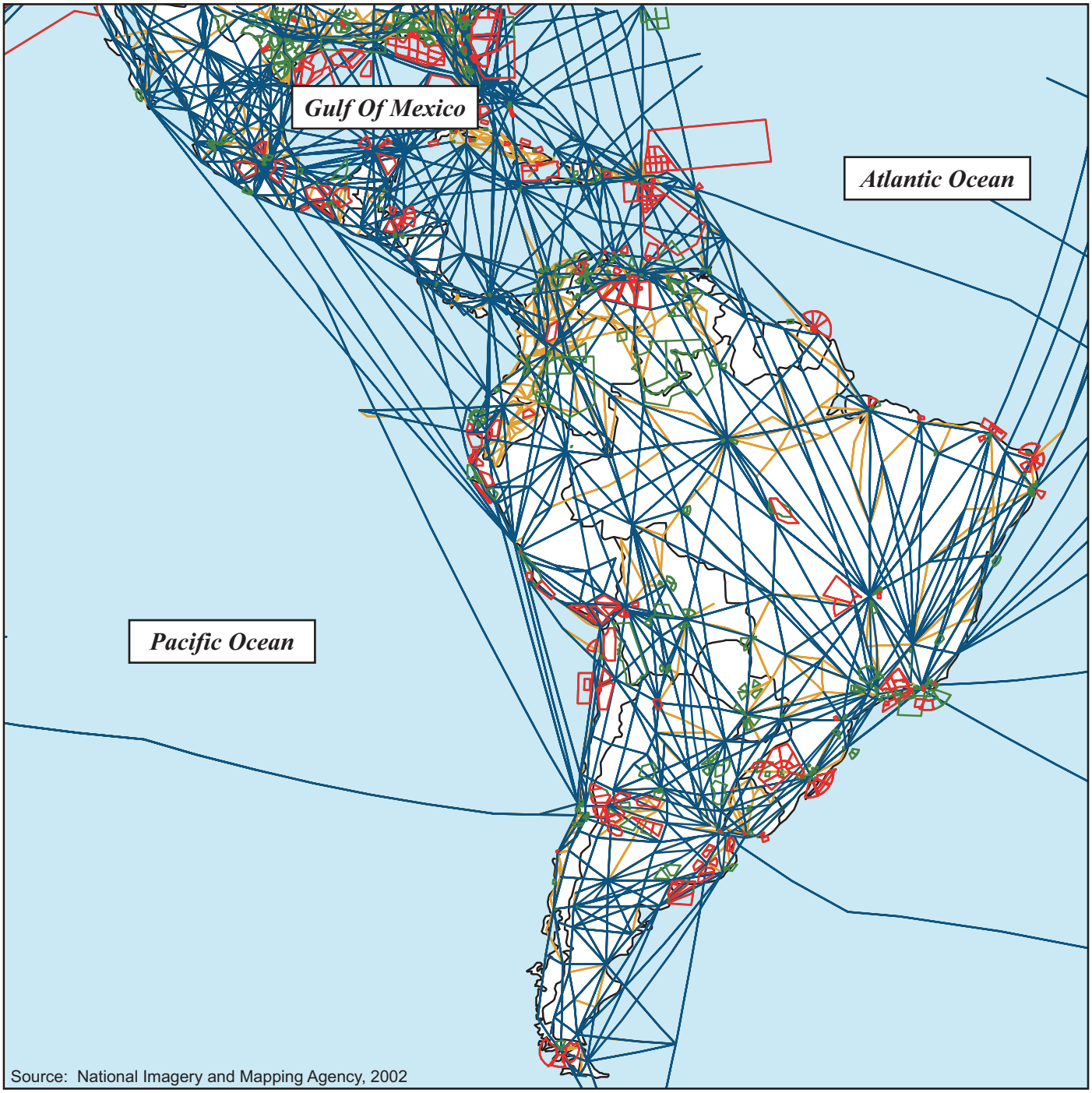
Domestic Warning Areas and Warning Areas are established in international airspace to contain activity that may be hazardous, and to alert pilots of nonparticipating aircraft to the potential danger (figure 3.11.1-5). The special use airspace PMRF includes Warning Area W-188 north of Kauai, and Warning Areas W-189 and W-190 north of Oahu. A Temporary Operating Area extends north and west of PMRF approximately 2,200 kilometers (1,367 miles). There are also numerous warning areas along the U.S. Pacific coastline.

En Route Airways and Jet Routes

Figure 3.11.1-6 shows en route high altitude jet routes.

The overseas high-altitude jet routes cross the southern part of the airspace ROI via nine CAE corridors off the California coast. These corridors can be opened or closed at the request of a user in coordination with the FAA. A Military Operations Area exists between users and the FAA to stipulate the conditions under which the CAEs can be closed to civil traffic. Under most circumstances, at least one CAE must remain available for use by general aviation and commercial air carriers.

The overseas high-altitude jet routes cross the northern part of the airspace ROI via five corridors off the California coast (see figure 3.11.1-6). These corridors and associated jet routes continue northwest to Alaska and then southwest to the orient.



EXPLANATION

- Low Altitude Airway Routes
- High Altitude Airway Routes
- Low Altitude Special Use Airspace (Includes Warning Areas)
- High Altitude Special Use Airspace (Includes Warning Areas)

Special Use Airspace and Air Routes - Gulf of Mexico to Pacific Ocean

NORTH

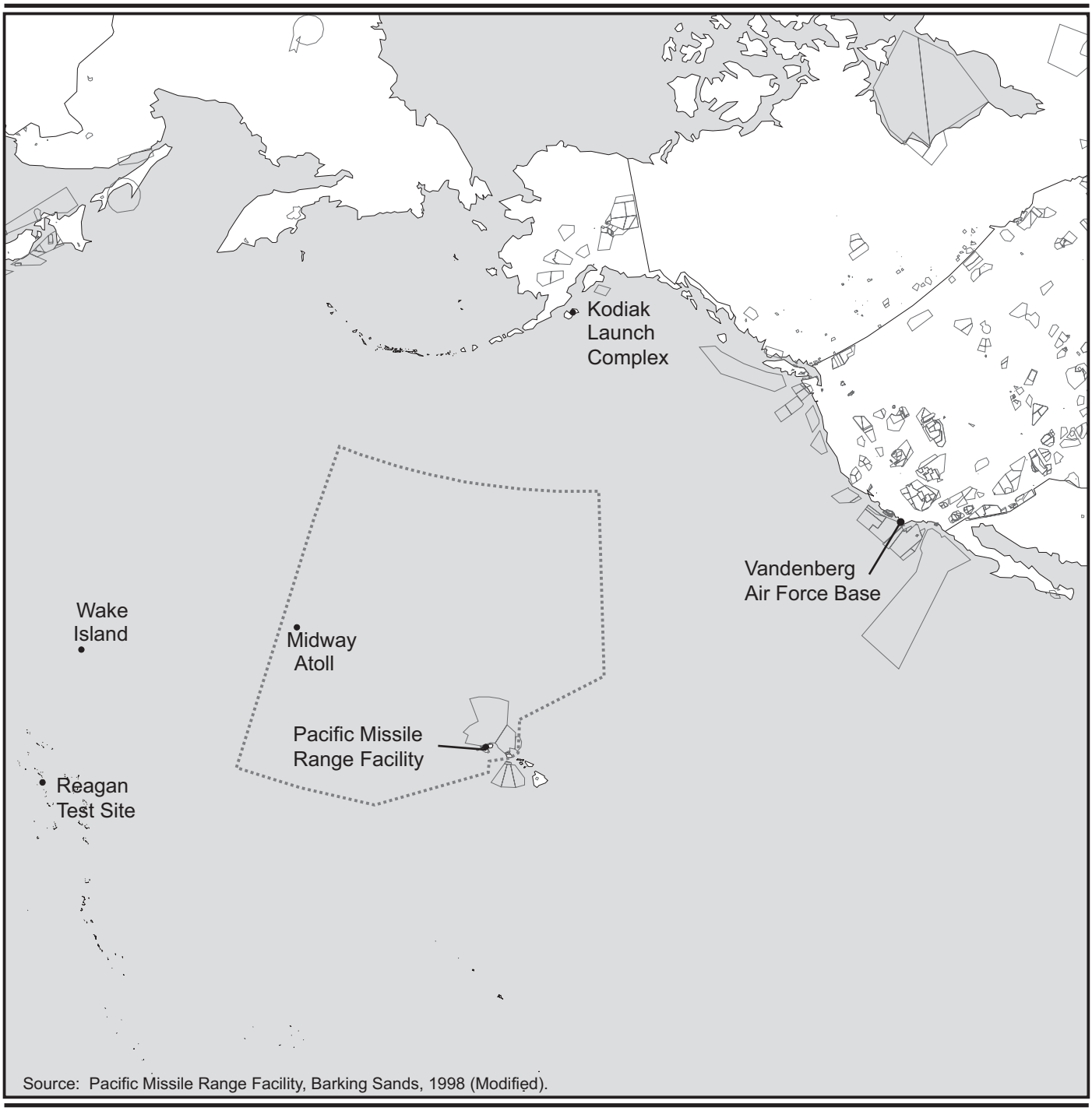
Scale

0 270 540 kilometers

0 168 336 miles

06-09-03 Gulf Airways

Figure 3.11.1-4



EXPLANATION

Temporary Operating Areas

Existing Warning Areas and Special Use Airspace

Special Use Airspace

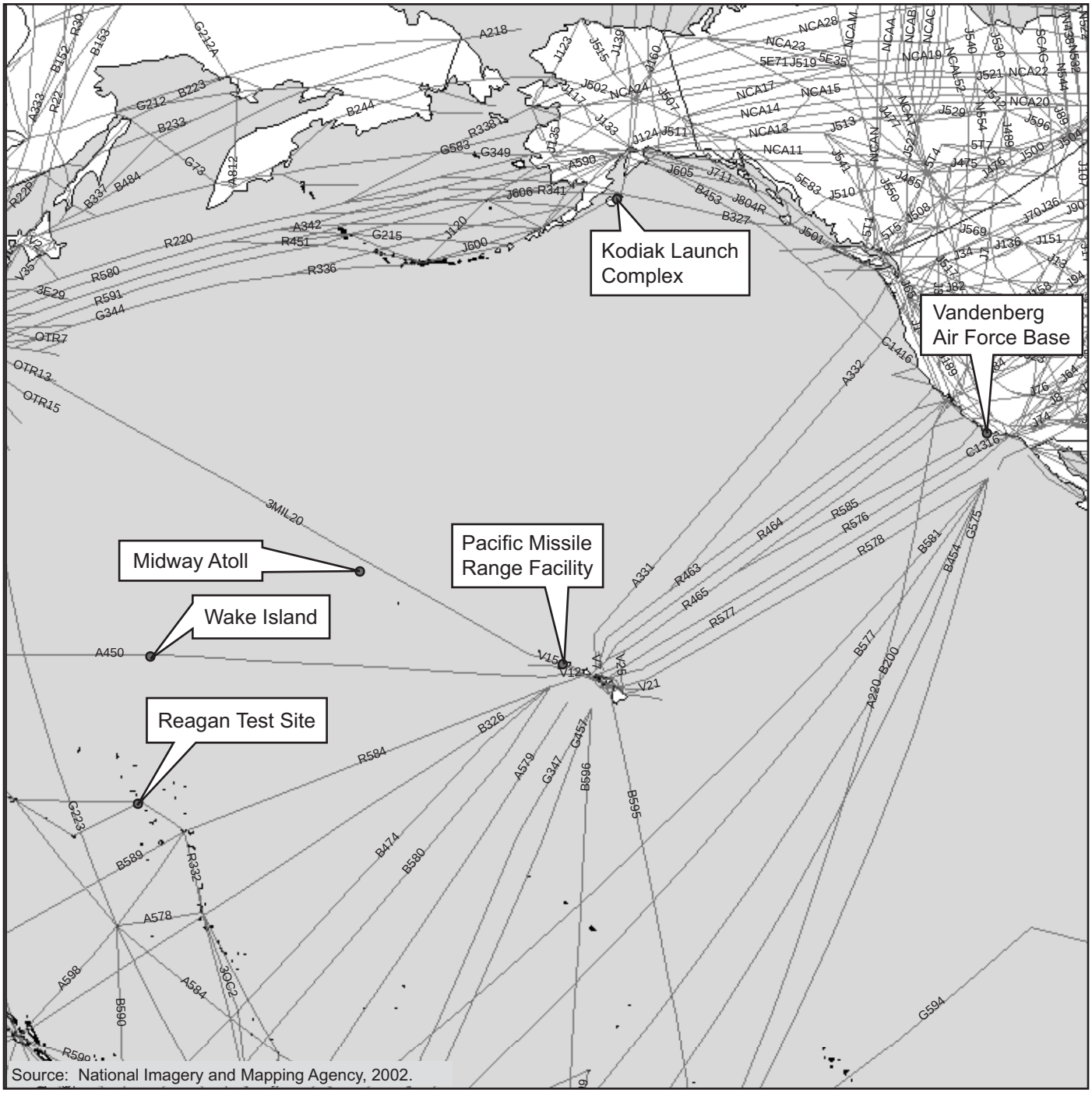
NORTH

Scale
0 675 1,350 kilometers
0 420 840 miles

06-09-03 KTF

Pacific Ocean

Figure 3.11.1-5



EXPLANATION

High Altitude Jet Routes

High Altitude Jet Routes

Pacific Ocean

Scale
0 635 1270 kilometers
0 394.5 789 miles

NORTH

Figure 3.11.1-6

06-09-03 High Alt Airways 2

As an alternative to aircraft flying above 8,839 meters (29,000 feet) following the published jet routes (figure 3.11.1-6), the FAA is gradually permitting aircraft to select their own routes as alternatives. This Free Flight program is an innovative concept designed to enhance the safety and efficiency of the National Airspace System. The concept moves the National Airspace System from a centralized command-and-control system between pilots and air traffic controllers to a distributed system that allows pilots, whenever practical, to choose their own route, and file a flight plan that follows the most efficient and economical route (Federal Aviation Administration, 1998).

Free Flight is already underway, and the plan for full implementation will occur as procedures are modified, and technologies become available and are acquired by users and service providers. This incremental approach balances the needs of the aviation community and the expected resources of both the FAA and the users. Advanced satellite voice and data communications are being used to provide faster and more reliable transmission to enable reductions in vertical, lateral, and longitudinal separation, more direct flights and tracks, and faster altitude clearances (Federal Aviation Administration, 1998). With full implementation of this program, the amount of airspace in the ROI that is likely to be clear of traffic will decrease as pilots, whenever practical, choose their own route and file a flight plan that follows the most efficient and economical route, rather than following the published jet routes.

In addition to the IFR high-altitude jet routes and low-altitude airways used by commercial aircraft, general aviation aircraft fly unrestricted in accordance with VFR within the Military Operations Areas below FL 180.

3.11.2 BIOLOGICAL RESOURCES—BROAD OCEAN AREA

Marine biology of the BOA consists of the animal and plant life that lives in and just above the surface waters of the sea and its fringes, the salient physical and chemical properties of the ocean, biological diversity, and the characteristics of its different ecosystems or communities.

3.11.2.1 Affected Environment

3.11.2.1.1 Gulf of Mexico

Vegetation

Marine vegetation such as seagrasses and benthic (bottom-dwelling) algae are attached to the bottom and are dependent on light. Therefore, they generally are found in shallow, sunlit depths of less than 18 meters (60 feet). Within the eastern Gulf of Mexico, the most common seagrasses are turtle grass, shoal grass, and manatee grass. Less common species include stargrass and paddle grass. Seagrass communities are further discussed below under sensitive habitats. (U.S. Department of the Air Force, 1998b)

Wildlife

The bottlenose dolphin is the most common marine mammal in south Florida waters and feeds on fish in seagrass beds. Fish representative of species common to the Gulf of Mexico along the north Florida shore include skipjack herring, sea catfish, spotfin mojarra, Atlantic croaker, Gulf flounder, bluefish, and Florida pompano. Fish species that are representative of species common to the Gulf of Mexico along the south Florida shore include dolphin, red grouper,

hogfish, red snapper, black grouper, cobia, king mackerel, Spanish mackerel, and greater amberjack. (U.S. Department of the Air Force, 1998b)

Pelagic seabirds can be found in the Gulf of Mexico throughout the year. Numerous migratory or nonresident birds cross the Gulf of Mexico during summer and fall migrations. Approximately-two thirds of the breeding birds of the eastern United States migrate to Central and South America, Mexico, and the Caribbean. The migratory route for many of these species includes the Gulf of Mexico. Fall migration occurs between September and October; spring migration peaks in late April. Some of the commonly observed migratory birds within the eastern Gulf of Mexico are blue-winged teal, ruby-throated hummingbird, upland sandpiper, cattle egret, black tern, storm petrel, and mourning dove. (U.S. Department of the Air Force, 1998b)

Threatened and Endangered Species

Species with Federal Status Known to Occur in the Gulf of Mexico

The Florida manatee (*Trichechus manatus*) is a federal and state endangered species. Most of the manatees are located along the Atlantic shore of Florida, with smaller numbers occurring in the Florida Keys and along the Gulf of Mexico.

The Gulf sturgeon (*Acipenser oxyrhinchus desotoi*) is a federally threatened fish that migrates from saltwater into large coastal rivers to spawn and spend the warm months. It is found predominately in the northeastern Gulf of Mexico from the Mississippi Delta east to Tampa Bay. This species is almost depleted throughout most of its range. Analysis of stomach contents of the sturgeon suggests that this species could feed as far as 32 kilometers (20 miles) offshore. (U.S. Department of the Air Force, 1998b)

Five species of sea turtles occur in the Gulf of Mexico (table 3.11.2-1). The hawksbill is seen regularly in the waters near the Florida Keys. The loggerhead is the most commonly seen sea turtle in the southeastern United States and may be found near underwater structures and reefs. Adult Kemp's Ridley sea turtles (*Lepidochelys kempii*) are usually confined to the Gulf of Mexico and have the most restricted distribution of any sea turtle. Green sea turtles occur throughout the Gulf of Mexico, but appear to be particularly common in the southern Gulf of Mexico region. Green sea turtles are frequently found in the Gulf of Mexico in areas where there is an abundance of seagrass. The leatherback sea turtle, a migratory species that nests in the tropics, has a world-wide distribution (U.S. Department of the Air Force, 1996). Loggerhead and leatherback sea turtles are the most frequently sighted species.

Most sea turtles in the Gulf of Mexico typically occur in relatively shallow nearshore waters close to coastal feeding and nesting areas. Exceptions are hatchlings that are likely to be found near Sargassum rafts and the leatherback that is known to prefer deeper water (U.S. Department of the Air Force, 1998b).

Table 3.11.2-1: Species with Federal Status Known to Occur in the Gulf of Mexico

Scientific Name	Common Name	Status	
		State	Federal
Marine Mammals			
Balaenoptera borealis	Sei whale	E	E
Balaenoptera musculus	Blue whale	E	E
Balaenoptera physalus	Fin whale	E	E
Eubalaena glacialis	Right whale	E	E
Megaptera novaeangliae	Humpback whale	E	E
Physeter catodon	Sperm whale	E	E
Trichechus manatus	Florida manatee	E	E
Turtles			
Caretta caretta	Atlantic loggerhead turtle	T	T
Chelonia mydas	Atlantic green turtle	E	E
Dermochelys coriacea	Leatherback turtle	E	E
Eretmochelys imbricata	Atlantic hawksbill turtle	E	E
Lepidochelys kempii	Kemp's Ridley turtle	E	E
Fish			
Acipenser oxyrinchus desotoi	Gulf sturgeon	SC	T

E – Endangered
T – Threatened
SC – Species of Concern
Source: U.S. Department of the Air Force, 1998.

Six endangered species of whales have the potential to occur in the Gulf of Mexico: the fin whale, Sei whale (*Balaenoptera borealis*), right whale (*Eubalaena glacialis*), humpback whale, blue whale (*Balaenoptera musculus*), and sperm whale.

Sensitive Habitats

Seagrass habitats have been declining, according to recent studies, mainly in highly developed, industrialized, or populated areas. Most causes of decline are related to habitat alteration, such as dredging, wetland filling, and removal of submergent vegetation. Boating has also contributed to the direct destruction of seagrass habitat. Much of the seafood consumed in this country is dependent on seagrass community food chains. Seagrass beds serve as nurseries for juveniles of a variety of fin and shellfish. Seagrasses also stabilize sediments by reducing water velocity and forming a complex matrix that binds sediments and retards erosion (U.S. Department of the Air Force, 1998b).

Extensive coral reefs occur offshore of the Florida Keys archipelago. Coral reefs also extend into the Gulf of Mexico from Key West to the Content Keys. Coral reefs thrive in relatively warm, clear waters with normal marine salinities. Corals derive nutrition from algae that require light. Most reef corals are colonial organisms. Two species of fire corals, or branching corals, occur on Florida reefs: the bladed fire coral and the crenulated fire coral. (U.S. Department of the Air Force, 1998b)

Octocorals, which include sea whips, sea plumes, sea fans, gorgonians, and soft corals, are found on most Florida Keys reefs. Sixty-three species of stony corals have been identified in the Florida Keys. Stony corals with octocorals form the reef canopy. Branching corals along with the reef framework provide shelter for fish. The coral canopy provides shelter from larger predators that occur along the reef margin. (U.S. Department of the Air Force, 1998b)

Several areas or habitats in the Gulf of Mexico are afforded special protection or recognition. Aquatic preserves are state-owned submerged lands with outstanding biological or scientific features. These lands are managed to ensure that development activities are compatible with goals of resource protection. The Gulf Islands National Seashore was established in 1971 to preserve and maintain historic and natural features. It is composed of three mainland tracts in Pensacola and Gulf Breeze, Florida, and Ocean Springs, Mississippi, and 241.4 kilometers (150 miles) of islands from Ship Island, Mississippi, to Santa Rosa Island. (U.S. Department of the Air Force, 1998b)

The Florida Keys National Marine Sanctuary consists of 7,251 square kilometers (2,800 square miles) of nearshore waters extending from just south of Miami to the Dry Tortugas. The Dry Tortugas were declared a National Park in 1992 and have the least disturbed coral reef system in the continental United States. The Florida Middle Grounds contains the principal hard-bottom in the United States and is the northernmost extent of coral reefs in the Gulf of Mexico. This live bottom area supports a variety of species similar to typical Caribbean reef communities. The Florida Middle Grounds are sensitive to environmental change. (U.S. Department of the Air Force, 1998b)

3.11.2.1.2 En Route Gulf of Mexico to Pacific Ocean

The route from the Gulf of Mexico to the Pacific Ocean would most likely follow the coast of South America toward Cape Horn since the vessel would not be able to pass through the Panama Canal. The Atlantic Ocean, the second largest of the world's five oceans after the Pacific Ocean, covers an area of approximately 77 million square kilometers (30 million square miles). The equator divides the Atlantic into the North Atlantic Ocean and the South Atlantic Ocean. The southern Atlantic has a counterclockwise warm water current system. Natural resources in this region include oil and gas fields, fish, marine mammals (seals and whales), and sand and gravel aggregates. Endangered marine species include the manatee, seals, sea lions, sea turtles, and whales. (Central Intelligence Agency, Directorate of Intelligence, 2002a)

3.11.2.1.3 Pacific Ocean

The general composition of the ocean includes water, sodium chloride, dissolved gases, minerals, and nutrients. These characteristics determine and direct the interactions between the seawater and its inhabitants. The most important physical and chemical properties are salinity, density, temperature, pH, and dissolved gases. For oceanic waters, the salinity is approximately 35 parts of salt per 1,000 parts of seawater.

Most organisms have a distinct range of temperatures in which they may thrive. A greater number of species live within the moderate temperature zones, with fewer species tolerant of extremes in temperature. Most areas of the Pacific maintain a temperature of 4˚C (39.2˚F).

Surface seawater often has a pH between 8.1 and 8.3 (slightly basic), but generally is very stable with a neutral pH. The amount of oxygen present in seawater will vary with the rate of production by plants, consumption by animals and plants, bacterial decomposition, and surface interactions with the atmosphere. Most organisms require oxygen for their life processes. Carbon dioxide is a gas required by plants for photosynthetic production of new organic matter. Carbon dioxide is 60 times more concentrated in seawater than it is in the atmosphere.

Coastal Zone

The coastal zone is defined as that area which typically extends from the high tide mark on the land to the gently sloping, relatively shallow edge of the continental shelf, the submerged part of the continents. This may differ from the way the term coastal zone is defined in the Hawaii Revised Statutes, Chapter 205A, *Coastal Zone Management.*

Although it makes up less than 10 percent of the ocean's area, the coastal zone contains 90 percent of all marine species. The sharp increase in water depth at the edge of the continental shelf separates the coastal zone from the offshore zone. (Pacific Missile Range Facility, Barking Sands, 1998)

The coastal zone includes several different ecosystems including coral reefs, estuaries, and coastal wetlands. There are no estuaries or coastal wetlands in the BOA ROI. Coral reefs are the world's oldest and most diverse and productive ecosystems—the marine equivalent of tropical rain forests. Species diversity associated among reef communities is probably the highest of all biological habitats in the sea. (Pacific Missile Range Facility, Barking Sands, 1998)

Ocean Zones

Classification of the Pacific Ocean zones is based upon depth and proximity to land. Using this methodology, there are four major divisions or zones in the ocean: the littoral zone, the coastal zone, the offshore zone, and the pelagic zone. Spanning across all zones is the benthic environment, or sea floor. This section discusses the pelagic zone and the benthic environment.

The pelagic zone is commonly referred to as the open ocean. The organisms that inhabit the open ocean typically do not come near land, continental shelves, or the seabed. Approximately 2 percent of marine species live in the open ocean.

The bottom of the sea floor is known as the benthic area. It comprises 98 percent of the species of animals and plants in the ocean. Less than 1 percent of benthic species live in the deep ocean below 2,000 meters (6,562 feet).

Biological Diversity

Marine life ranges from microscopic one-celled organisms to the world's largest animal, the blue whale. Marine plants and plant-like organisms can live only in the sunlit surface waters of the ocean, the photic zone, which extends to only about 101 meters (330 feet) below the surface. Beyond the photic zone, the light is insufficient to support plants and plant-like organisms. Animals, however, live throughout the ocean from the surface to the greatest depths.

The organisms living in pelagic communities may be drifters (plankton) or swimmers (nekton). The plankton consists of plant-like organisms and animals that drift with the ocean currents, with little ability to move through the water on their own. The nekton consists of animals that can swim freely in the ocean, such as fish, squids, and marine mammals. Benthic communities are made up of marine organisms, such as kelp, sea grass, clams, and other species that live on or near the sea floor.

Threatened and Endangered Species

Species identified as threatened or endangered that exist in the Ocean Area ROI, listed in table 3.4.2-1 include the sei whale, blue whale, fin whale, humpback whale, sperm whale, Hawaiian monk seal, loggerhead sea turtle, green sea turtle, leatherback sea turtle, hawksbill sea turtle, and olive ridley sea turtle.

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

In order to "ensure the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species (resources) of the Northwestern Hawaiian Islands," Executive Order 13178, *Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve,* created the reserve so named in December 2000. Executive Order 13196, *Final Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve,* amended Executive Order 13178 by finalizing several of its provisions.

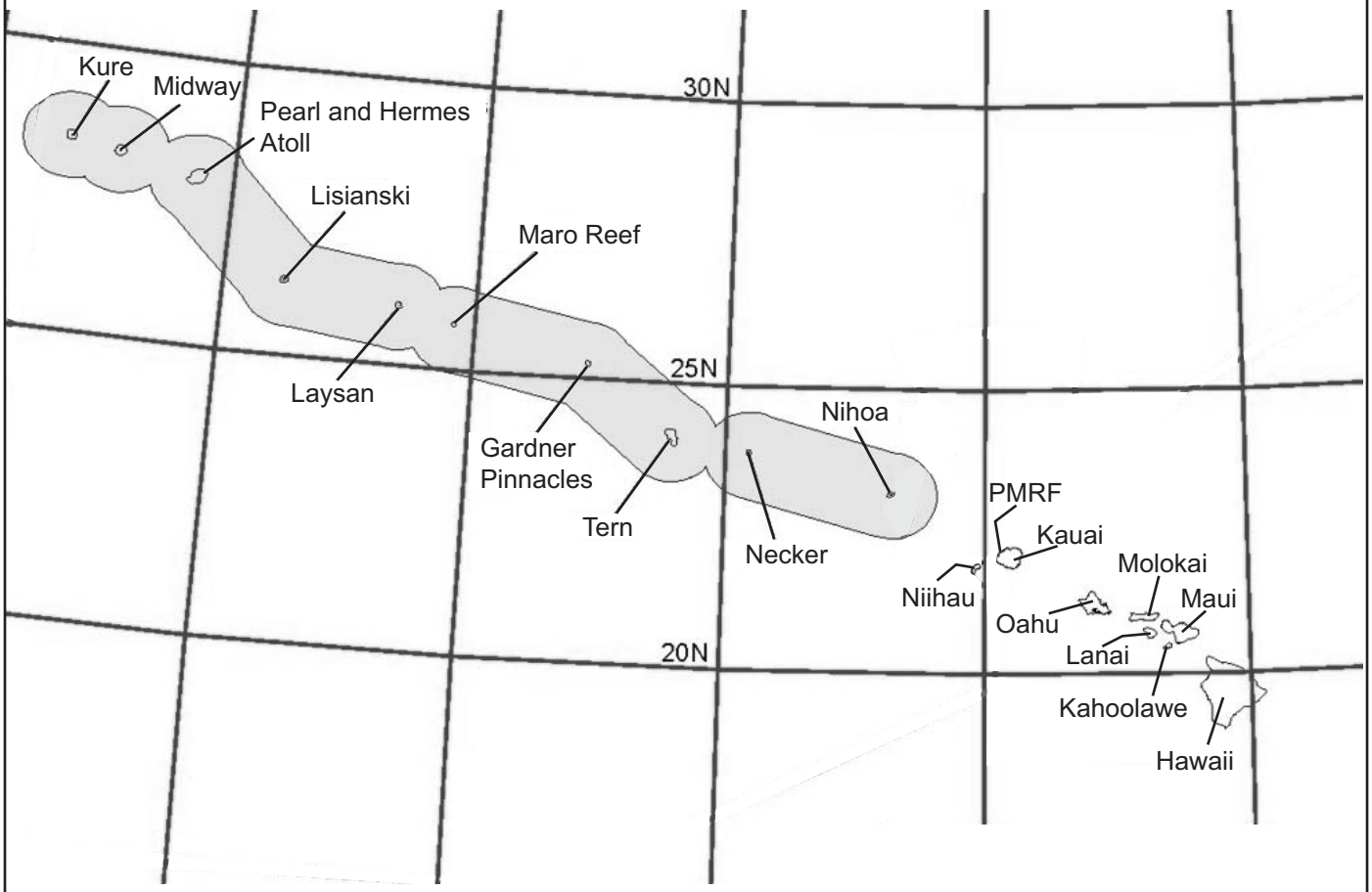
The reserve lies to the northwest of the main islands of the Hawaiian chain. The Reserve includes submerged lands and waters of the Northwestern Hawaiian Islands, extending approximately 2,220 kilometers (1,200 nautical miles) long and 185 kilometers (100 nautical miles) wide. The Reserve is adjacent to and seaward of the seaward boundaries of the State of Hawaii and the Midway Atoll National Wildlife Refuge. The Reserve also includes the Hawaiian Islands National Wildlife Refuge to the extent that it expands beyond the seaward boundaries of the State of Hawaii. The seaward boundary of the Reserve is 93 kilometers (50 nautical miles) from the approximate geographical centerline of Nihoa, Necker, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan, Lisianski, Pearl and Hermes Reef, Midway Atoll, and Kure (figure 3.11.2-1). (Federal Register, 2000a)

3.11.3 HEALTH AND SAFETY—BROAD OCEAN AREA

3.11.3.1 Affected Environment

The U.S. marine transportation system encompasses a national and global network of navigable ocean, lake, river, and inland waterway routes; the vessels that carry waterborne commerce; a complex of ports and terminals serving as intermodal points of transfer between the water system and the land-based transportation modes; ship operators; an extensive supplier base; and shipboard, shipyard, and longshore labor forces.

The International Maritime Organization (IMO) is a specialized agency of the United Nations, whose objective is to develop and facilitate the general adoption of the highest practicable standards in matters of ship safety, training, operation, construction, certification, efficiency of navigation, and pollution prevention and control. The Maritime Safety Committee is IMO's senior technical body on safety-related matters.



Source: University of Hawaii, 2002.

EXPLANATION

PMRF = Pacific Missile Range Facility

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

Open Ocean

Figure 3.11.2-1

NORTH

Scale

0 178 356 kilometers

0 96 192 nautical miles

06-09-03 Temp Op Area

IMO has also developed and adopted international collision regulations and global standards for seafarers, as well as international conventions and codes relating to search and rescue, the facilitation of international maritime traffic, load lines, the carriage of dangerous goods, pollution and tonnage measurement.

The *Act to Prevent Pollution from Ships* (33 USC §§ 1901 *et seq.*) was amended by the *Marine Plastic Pollution Research and Control Act of 1987,* which implemented the provisions of Annex V, *Special Areas,* of *Garbage Discharges for Navy Ships Into the International Maritime Convention for the Prevention of Pollution From Ships* (relating to garbage and plastics). Annex V and the regulations implementing it apply to all vessels, whether seagoing or not, regardless of flag, on the navigable waters of the United States and in the exclusive economic zone of the United States. It applies to U.S. flag vessels wherever they are located.

Under the regulations implementing the *Act to Prevent Pollution from Ships* as amended by the *Marine Plastic Pollution Research and Control Act,* the discharge of plastics, including synthetic ropes, fishing nets, plastic bags, and biodegradable plastics, into the water is prohibited. Discharge of floating dunnage, lining, and packing materials is prohibited in the navigable waters and in areas offshore less than 46.3 kilometers (25 nautical miles) from the nearest land. Food waste or paper, rags, glass, metal, bottles, crockery and similar refuse cannot be discharged in the navigable waters or in waters offshore inside 22.2 kilometers (12 nautical miles) from the nearest land. Finally, food waste, paper, rags, glass, and similar refuse cannot be discharged in the navigable waters or in waters offshore inside 5.6 kilometers (3 nautical miles) from the nearest land. There are some exceptions for emergencies. Under the *Act to Prevent Pollution from Ships,* the definition of ship includes fixed or floating platforms. There are separate garbage discharge provisions applicable to these units. For these platforms, and for any ship within 500 meters (1,640 feet) of these platforms, disposal of all types of garbage is prohibited. Additionally, all manned, oceangoing U.S. flag vessels of 12.2 meters (40 feet) or more in length engaged in commerce, and all manned fixed or floating platforms subject to the jurisdiction of the United States, are required to keep records of garbage discharges and disposals (International Year of the Ocean, 1998a). Appendix B provides additional the laws, regulations and standards concerning maritime safety and EMR.

The WorldWide Navigational Warning Service is a worldwide radio and satellite broadcast system for the dissemination of Maritime Safety Information to U.S. Navy and merchant ships. The WorldWide Navigational Warning Service provides timely and accurate long range and coastal warning messages promoting the safety of life and property at sea and Special Warnings that inform mariners of potential political or military hazards that may affect safety of U.S. shipping. The world is divided into 16 Navigational Areas (NAVAREAs) for global dissemination of Maritime Safety Information. National Imagery and Mapping Agency is the coordinator of NAVAREAs IV and XII and is staffed 24 hours a day, 365 days a year. NAVAREA IV broadcasts cover the waters contiguous to North America from the Atlantic coast eastward to 35°W and between latitudes 7°N and 67°N, whereas NAVAREA XII broadcasts cover the waters contiguous to North America extending westward to the International Date Line and from 67°N to the equator east of 120°W, south to 3°25'S, then east to the coast.

Management of U.S. ports and its waterways system is spread among various federal agencies and stakeholders exercising specific authorities (International Year of the Ocean, 1998b). For example, the *Department of Transportation Act* (49 USC 101, *et seq.*) gives the DOT the responsibility to oversee the national transportation system. Other authorities relevant to marine

transportation can be found in USC 14, 16, 19, 33, 46 and 49 (International Year of the Ocean, 1998b). The primary maritime organizations within the DOT are the U.S. Coast Guard and the Maritime Administration.

The U.S. Coast Guard serves as Vice Chair to the National Response Team which chaired by the EPA. The National Response Center serves as the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories. The National Response Team, along with Regional Response Teams, is the federal component of the National Response System, which responds to emergency discharges of oil and releases of chemicals.

The U.S. Coast Guard also acts as the United States' agent for maritime information to the IMO.

3.11.3.1.1 Gulf of Mexico

The Gulf of Mexico ROI is defined as the overwaters, as well as the areas extending from the sea surface to the ocean floor that could be potentially affected by the Proposed Action, including the deployment/use of an XBR. The ROI includes the entire northern Gulf of Mexico within the ports of Tampa, Florida; Mobile, Alabama; New Orleans and Lake Charles, Louisiana; and Beaumont, Houston, Galveston, and Corpus Christi, Texas. The ROI for health and safety is based on the area where effects to human exposure, navigation and communication facilities/equipment (military and nonmilitary), fuels, and any existing EMR using portions of the international waters off the Gulf of Mexico could occur.

The ROI for EMR human health effects includes an area up to 85 meters (280 feet) from the SBX platform. Potential interference distances for certain electronic equipment and civilian aircraft includes an area up to 9.5 kilometers (5.9 miles) from the SBX platform for a half populated array and 19 kilometers (11.8 miles) for a fully populated array. Appendix B includes a general description of the health and safety resource area and a detailed discussion of the laws, regulations, and standards concerning maritime safety and EMR.

Section 3.11.1 provides a discussion of potentially affected special use airspace occupying the Gulf of Mexico. Section 3.11.4 provides a detailed discussion of seaports, shipping lanes and transportation issues. There are approximately 4,021 producing oil platforms located within the ROI. (Mineral Management Services, 2001)

The U.S. Coast Guard Atlantic Area Districts 7 (Florida) and 8 (Louisiana) serve the Gulf of Mexico ROI. The U.S. Coast Guard coordinates with and is supported by numerous organizations and authorities utilizing the Gulf Coast ROI including, but not limited to, Eglin AFB, NAS Pensacola, and the Military Sealift Command (U.S. Navy).

3.11.3.1.2 En Route Gulf of Mexico to Pacific Ocean

Warning Areas are established in international airspace and waters to contain activity that may be hazardous, and to alert pilots and captains of nonparticipating vessels to the potential danger. Specific Use Airspace and Air Routes over the Gulf of Mexico and the Pacific Ocean are shown on figure 3.11.1-4.

3.11.3.1.3 Pacific Ocean

The affected health and safety environment for the Pacific Ocean Area is described in detail within each potential range or PSB location in terms of its principal attributes, namely, range control procedures and verification of Ocean Area clearance procedures.

The Pacific Ocean ROI is defined as the overwaters, as well as the areas extending from the sea surface to the ocean floor that could be potentially affected by the Proposed Action, including the deployment/use of an XBR. The ROI occupies the central north Pacific Ocean. A detailed discussion of airspace, jet routes, seaports and shipping lanes occupying the Pacific Ocean is provided in section 3.11.1.1.3.

The U.S. Coast Guard Pacific Area Districts 11 (California), 14 (Hawaii) and 17 (Alaska) serve the Pacific Ocean ROI. Warning Areas are established in international airspace and waters to contain activity that may be hazardous, and to alert pilots and captains of nonparticipating vessels to the potential danger.

3.11.4 TRANSPORTATION—BROAD OCEAN AREA

Appendix B includes a general description of transportation.

The potential transportation issue related to the proposed activities is that of marine shipping. Marine shipping refers to the conveyance of freight, commodities, and passengers via mercantile vessels.

3.11.4.1 Affected Environment

3.11.4.1.1 Gulf of Mexico

Intracoastal Waterway

A substantial amount of domestic waterborne commerce along the Gulf Coast does not use open Gulf of Mexico waters. For transportation commodities, the Gulf Coast Intracoastal Waterway is the primary route; it is estimated that 40 percent of the world's commerce passes within 1.5 days' sailing time of the port of Key West (U.S. Department of the Air Force, 1998b).

Primary canals in the Gulf Coast Intracoastal Waterway include the New Orleans-Rigolet Cut, the Port-Arthur-Corpus Christi Channel, and the Inner Harbor Navigational Canal at New Orleans (U.S. Department of the Air Force, 1998b).

Commerce in the Gulf Coast Intracoastal Waterway has grown appreciably over the years, from 5.978 billion kilograms (6.59 million tons) in 1938 to 91.625 kilograms (101 million tons) in 1985 (U.S. Department of the Air Force, 1998b).

Within the ROI, 1995 total tonnage (including domestic coastwise tonnage) for the Gulf Coast Intracoastal Waterway was 107.05 billion kilograms (118.0 million tons); this was an increase of 0.3 percent over 1994 (U.S. Department of the Air Force, 1998b). For this same period, 3.688 billion kilograms (4.065 million tons) were transported between Apalachee Bay and Panama City; 6.94 billion kilograms (7.651 million tons) were transported from Panama City to

Pensacola; and 10.002 billion kilograms (11.025 million tons) were transported from Pensacola to Mobile Bay, Alabama (U.S. Department of the Air Force, 1998b). Commodities shipped included coal, petroleum, chemical products, fuels, and manufactured goods.

Based upon March 1997 estimates, this total decreased slightly by 1.8 percent to 105.051 billion kilograms (115.8 million tons) in 1996. This averages to approximately 10.9 percent of the internal U.S. waterways' national domestic total for the 2 years. (U.S. Department of the Air Force, 1998b)

Gulf Shipping Lanes

Figure 3.11.4-1 represents a graphical representation of ships' location within the Gulf of Mexico at a single point in time during 1997 (4,786 locations are presented). The major shipping lanes will normally have two or more vessels track to its next port of call throughout the day.

Table 3.11.4-1 provides the average number of ships in the Gulf of Mexico ports during 1994-1995.

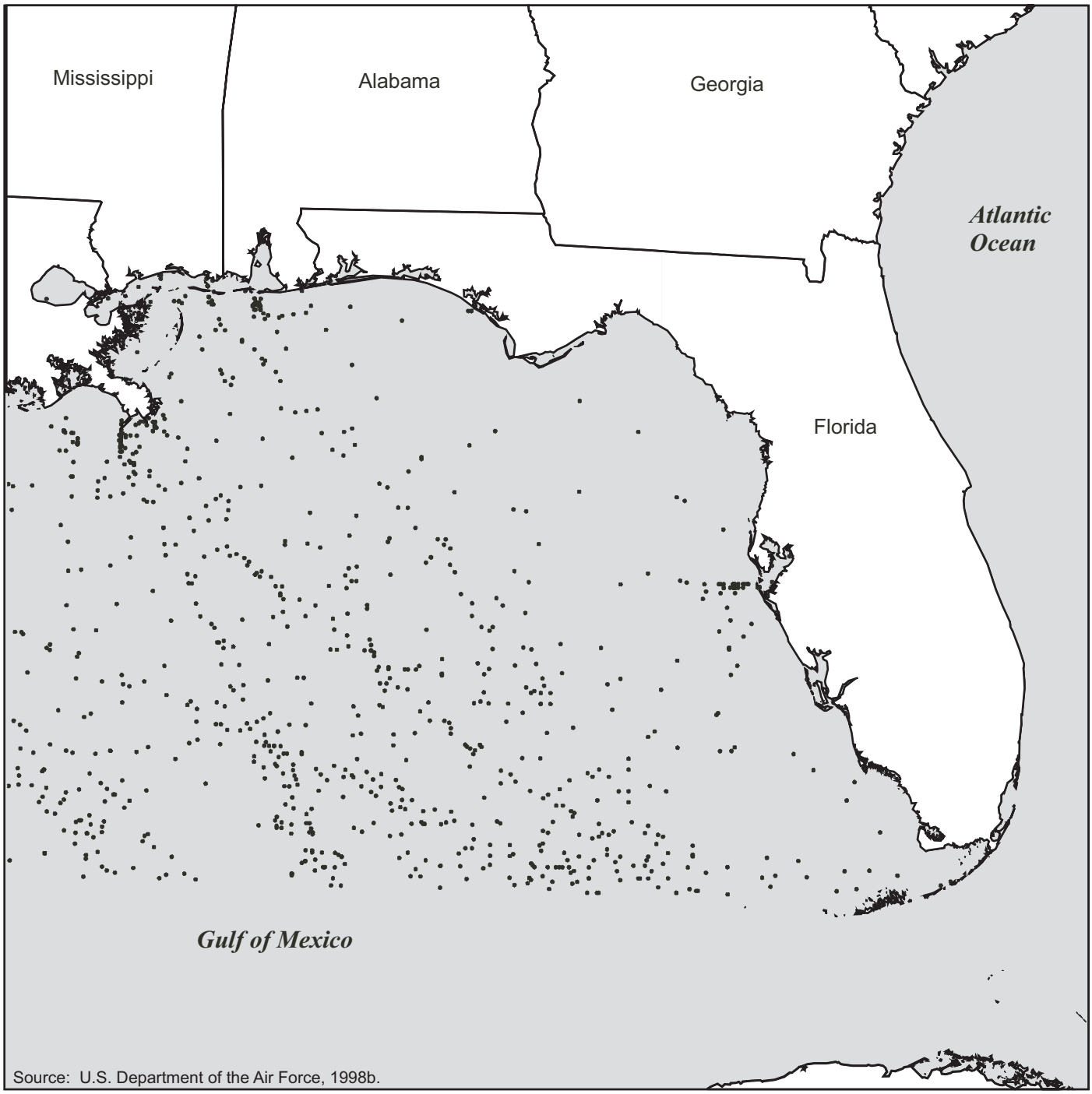
Table 3.11.4-1: Top Ten Gulf Ports in 1995 Based on Total Ships

Port	Number of Ships	Number of Ship Movements
1. New Orleans, Louisiana	2,894	13,539
2. Houston, Texas	1,842	12,022
3. Tampa, Florida	759	3,723
4. Mobile, Alabama	704	2,377
5. Corpus Christi, Texas	589	3,256
6. Galveston, Texas	559	1,847
7. Texas City, Texas	491	2,449
8. Lake Charles, Louisiana	453	1,991
9. Beaumont, Texas	410	1,611
10. Port Arthur, Texas	392	1,380
TOTAL	9,093	44,195

Source: U.S. Department of the Air Force, 1998b.

Port to port travel within the Gulf of Mexico accounts for approximately 31 percent of the tank ships and 36 percent of the cargo ships leaving American ports. About 80 percent of the tank ships and 70 percent of the cargo ships leaving Mexican ports travel to other ports in the region. Major commodities shipped between ports in the region include crude oil, iron and steel products, iron ore, industrial and agricultural chemicals, coal, marine shells, sand, gravel, containerized cargo (such as processes food and equipment), and refined petroleum products (U.S. Department of the Air Force, 1998b).

Some 61 percent of the vessels entering and leaving the region move through the Florida Straits (U.S. Department of the Air Force, 1998b). This traffic passes back and forth under EWTAs 1, 2, 3, 4, 5, and 6 before converging under Warning Area 174 (Navy) to enter or exit the Gulf of Mexico. The remaining vessels travel through the Yucatan Channel and pass under EWTAs 1, 2, and 4.



EXPLANATION

- Ship

Density of Shipping - Single Point in Time

Eastern Gulf of Mexico

NORTH

Scale
0 76 152 kilometers
0 47.5 95 miles

Figure 3.11.4-1

The Gulf of Mexico has 490 public and private seaports with a total of 787 berths, accounting for 25.6 percent of the Nation's total. Seven of the top ten U.S. ports are located in the Gulf region, testament to its importance in U.S. commerce. For 1995, the Port of South Louisiana (ranked first in U.S. port tonnage) handled 26.2 billion kilograms (28.87 million tons) of imported goods and 62.3 billion kilograms (68.64 million tons) of exports (table 3.11.4-2) (U.S. Department of the Air Force, 1998b).

Table 3.11.4-2: 1995 Waterborne Tonnage by Gulf Coast States

State	Shipping to Domestic in kilograms (tons)	Shipping to Foreign in kilograms (tons)	Receiving - Domestic in kilograms (tons)	Receiving - Foreign in kilograms (tons)
Alabama	8.28 billion (9.12 million)	13.34 billion (14.18 million)	15.94 billion (17.57 million)	10.62 billion (11.71 million)
Florida	12.4 billion (13.67 million)	20.68 billion (22.8 million)	50.13 billion (55.26 million)	20.35 billion (22,432)
Georgia	701.25 million (773,000)	7.39 billion (8.15 million)	2.90 billion (3.19 million)	6.74 billion (7.44 million)
Louisiana	88.68 billion (97.76 million)	111.02 billion (122.38 million)	127.42 billion (140.47 million)	97.76 billion (107.76 million)
Mississippi	11.98 billion (13.21 million)	3.13 billion (3.46 million)	7.75 billion (8.54 million)	14.51 billion (16 million)
Texas	43.9 billion (48.39 million)	47.66 billion (52.54 million)	24.25 billion (26.73 million)	156.85 billion (172.88 million)

Note: Data does not allow differentiation between Gulf and Atlantic shipping for Georgia and Florida
Source: U.S. Department of the Air Force, 1998b

Fifteen of the top 50 U.S. ports for non-containerized materials such as coal, petroleum, food, and farm products are in the Gulf of Mexico.

3.11.4.1.2 En Route from Gulf of Mexico to the Pacific Ocean

The enroute ROI, from the Gulf of Mexico to the Pacific Ocean, would most likely follow the coast of South America toward Cape Horn.

The transit period would permit opportunities for testing, including full power calibration and tracking along the route. For periodic testing, the SBX would stop at predetermined locations during transit. The appropriate NOTMARs and NOTAMs would be issued and testing would ensue.

The SBX with retractable thrusters would have a 15.2-meter (50-foot) draft (during transit) and a 26- to 28-meter (85.3- to 91.8-foot) draft during operations. Because most harbors do not have the necessary depth to accommodate the SBX, even with retractable thrusters, it may not enter any port facilities after it leaves its assembly point in the Gulf of Mexico. More than one escort ship may accompany the SBX during its transit around South America and during testing.

Established shipping routes would be utilized during this 7-month test trip.

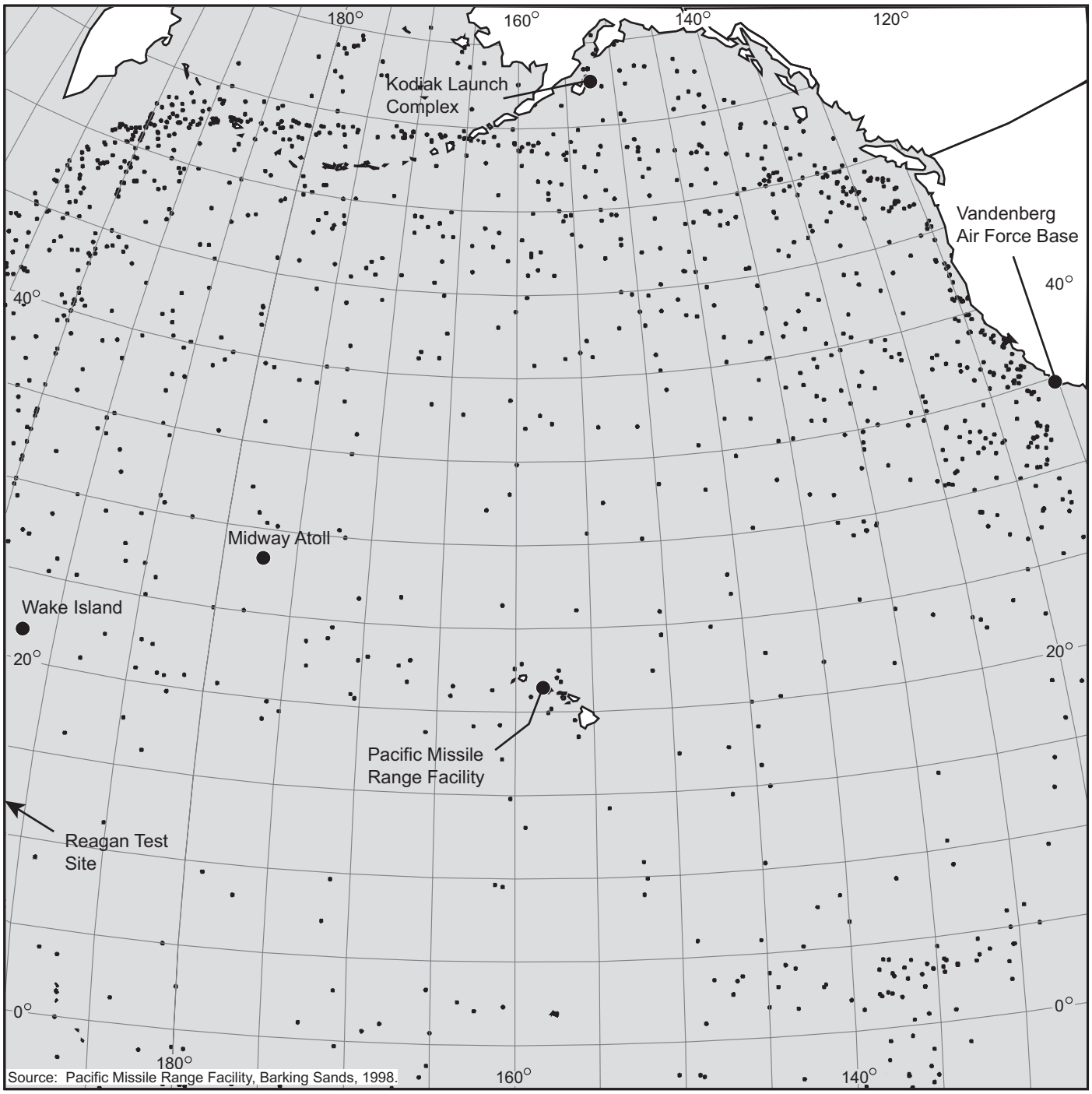
3.11.4.1.3 Pacific Ocean

The northern Pacific is an important commercial seaway, carrying a substantial proportion of the United States' trade in raw materials and finishing products. In 1996, about 21 percent of all commercial vessels importing and exporting goods to and from the United States to 30 ports departed from, or were bound for, ports on the U.S. Pacific seaboard (Pacific Missile Range Facility, Barking Sands, 1998). The large majority of these vessels crossed the northern Pacific Ocean, to and from the large trading ports of Asia.

There are no regulations or directions obliging commercial vessels to ply specific cross-ocean lanes. Once it has left the navigation lanes leading out to the open sea, the majority of shipping will follow the course of least distance between two ports.

A composite "snapshot" of shipping in the Pacific, generated from satellite data for the busiest months of the year, is shown in figure 3.11.4-2. It shows the number of ships traveling across the northern Pacific in August 1997, with each ship identified and located once. The figure includes cargo vessels, tankers, passenger ships, and fishing vessels, and characterizes the random nature of commercial shipping movements in the northern Pacific.

The data shows that, while there is a general adherence to particular routes (such as the great circles of latitude between the United States to Asian ports), commercial vessels plot a diverse range of courses across the northern Pacific. This was confirmed by the National Imagery and Mapping Agency, which stated that it no longer published shipping routes for the northern Pacific for precisely this reason.



EXPLANATION

- Ship

Composite Snapshot of Ship Locations in the Northern Pacific

Scale
0 433 866 kilometers
0 234 468 nautical miles

NORTH

Open Ocean

Figure 3.11.4-2

06-09-03 N Pac Ships

3.12 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on 11 February 1994. Objectives of the Executive Order as it pertains to this EIS include development of federal agency implementation strategies; identification of minority and low-income populations where proposed federal actions have disproportionately high and adverse human health and environmental effects; and participation of minority and low-income populations. Accompanying Executive Order 12898 was a Presidential Transmittal Memorandum, which referenced existing Federal statutes and regulations to be used in conjunction with the Order. The memorandum addressed the use of the policies and procedures of NEPA. Specifically, the memorandum indicated that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC Section 4321 et. seq."

An Environmental Justice impact would be a long-term health, environmental, cultural, or economic effect that has a disproportionately high and adverse effect on a nearby minority or low-income population, rather than all nearby residents. No adverse long-term impacts have been identified at any of the locations analyzed in this EIS. As such, there would be no disproportionately high and adverse human health or environmental effects on the minority or low-income populations that may be present in the vicinity of those locations. Thus, no Environmental Justice impacts are anticipated and additional Environmental Justice analysis will not be presented in this document.

Vandenberg AFB personnel suggested that Environmental Justice could be an issue if the potential exists for disproportionate effects on local Native Americans from the proposed project. However, initial analysis of the Environmental Justice issues, with respect to Chumash Indian uses of cultural areas in the vicinity of the proposed project locations, indicate that there should be no disproportionate impacts. Chumash use of the areas in question should be affected no more than that of other groups who access the base for recreation, fishing, etc. Furthermore, the proposed project requires only infrequent closures of the areas in question. Therefore, Environmental Justice is not an issue warranting in-depth analysis at Vandenberg AFB.