4.2 NORTHWESTERN HAWAIIAN ISLANDS

Table 4.2-1 lists ongoing research, development, test, and evaluation (RDT&E) operations for the No-action Alternative and proposed RDT&E operations for Alternatives 1 and 2 near the Northwestern Hawaiian Islands. Alternative 2 is the preferred alternative.

Table 4.2-1. RDT&E Operations Occurring Near the Northwestern Hawaiian Islands

Research, Development, Test, and Evaluation (RDT&E) Operations
• Missile Defense

The prohibitions required by the Presidential Proclamation establishing the Papahanaumokuakea Marine National Monument do not apply to activities and exercises of the Armed Forces. The Proclamation does require that all activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities. Current Navy activities associated with the Monument are missile defense operations.

Missile defense RDT&E operations for the No-action Alternative (see Figure 2.2.2.4.1-3) and proposed RDT&E operations for Alternatives 1 and 2 (see Figure 2.2.3.4-1) have overflights and intercepts that have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands.

4.2.1 NORTHWESTERN HAWAIIAN ISLANDS OFFSHORE

A review of the 13 resources against program offshore RDT&E operations under the No-action Alternative, and proposed RDT&E operations under Alternative 1 and Alternative 2, was performed for the Northwestern Hawaiian Islands. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts to air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any airspace issues associated with the Northwestern Hawaiian Islands offshore are addressed in Section 4.1.1 (Airspace—Ocean Ocean). There are no current or proposed Hawaii Range Complex (HRC) activities that will affect air quality, health and safety, land use, noise; or the existing land forms, geology, or associated soils development of the islands. Socioeconomic characteristics (population size, employment, income generated, and housing cost) do not apply since all the islands are uninhabited. No transportation (roadways, railways, etc) and utility systems (water, wastewater, electricity, and natural gas) exist offshore. HRC activities within the Northwestern Hawaiian Islands do not generate any hazardous waste streams that could impact local water quality.

4.2.1.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS—OFFSHORE

4.2.1.1.1 Nihoa—Biological Resources—Offshore

Less than 12 of the potential 46 annual missile flight trajectories could result in a missile flying over portions of the Papahanaumokuakea Marine National Monument. Of particular concern are overflight of and the potential for debris on Nihoa and Necker islands at the southeastern end of the Northwestern Hawaiian Islands, the closest of the Northwestern Hawaiian Islands to the Main Hawaiian Islands. At this point in their flight, the boosters follow a ballistic trajectory and will not impact the monument. For select intercept missions the potential exists for limited debris to fall into the waters offshore of Necker and Nihoa in the Papahanaumokuakea Marine National Monument. As discussed in the beginning of Section 3.2, military readiness activities are exempt from consultation requirements or monument regulations. All activities and exercises in the HRC will be performed in a manner that avoids, to the extent practicable and consistent with training requirements, adverse impacts on monument resources and qualities. All activities with the potential to affect the Northwestern Hawaiian Islands will be performed in accordance with ongoing practices, such as equipment inspections, to minimize the potential for contributing to the spread of invasive species.

4.2.1.1.1.1 No-action Alternative (Biological Resources—Nihoa—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the Terminal High Altitude Area Defense (THAAD) (one of the missiles with a trajectory that could potentially result in debris offshore of Nihoa) Project Office. Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, or other marine species occurring in offshore waters. Quantities of falling debris (e.g., solid rocket propellant) will be low and widely scattered so as not to present a toxicity issue.

The potential exists for debris greater than 0.5 foot-pound to impact the offshore waters of Nihoa. Since most of the 20 species of coral present only survive at depths greater than 30 feet, coral cover is not greater than 25 percent, the debris will be widely scattered, and the velocity will be slowed following impact at the water's surface, the likelihood of impacts to submerged coral reef habitat associated with Nihoa will be low.

According to the analysis in the Point Mugu Sea Range Environmental Impact Statement (EIS), less than 0.0149 marine mammals would be exposed to missile debris per year, and the probability of this debris affecting marine mammals or other marine biological resources is less than 10^{-6} (1 in 1 million). This probability calculation was based on the size of the Pacific Ocean area studied and the marine mammal population density within that area. The Point Mugu range area (27,183 square nautical miles [nm^2]) is 0.1 percent of the Pacific Missile Range Facility (PMRF) Temporary Operating Area (2.1 million nm^2), and the density of marine mammals is larger. It is reasonable to conclude that the probability of marine mammals being

struck by debris from missile testing at PMRF will be even more remote than at Point Mugu. (U.S. Department of the Navy, 1998c)

Various trajectories, launch sites, and intercept areas are used, which help to minimize the effects to any particular location. An exercise is halted if marine mammals are detected in a target area. For a marine mammal or sea turtle to be injured, it would have to enter the target area undetected and then surface at the exact point where a projectile, spent missile, or spent target landed.

Interceptor missile element test activities associated with the Missile Defense Agency lethality program could include development and testing of Nuclear, Biological, or Chemical material simulants. These activities were analyzed in the *Programmatic Environmental Assessment, Theater Missile Defense Lethality Program* (U.S. Army Space and Strategic Defense Command, 1993c). The only proposed chemical simulant that might be included as part of the No-action Alternative in a target payload will be small quantities of tributyl phosphate (TBP), which is a non-flammable, non-explosive, colorless, odorless liquid typically used as a solvent in commercial industry. The release of simulant will occur at a high altitude over the open ocean during a nominal flight test. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species in the offshore area will be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected.

According to tests performed on White Sands Missile Range using TBP (Missile Defense Agency, 2004), toxicity levels for aquatic species that include algae, crustaceans, water fleas, fathead minnows, and rainbow trout range from 0.0002 ounce (oz) per gal (gal) to 0.002 oz/gal. Assuming as a worse case that TBP would penetrate to a depth of 1 foot, approximately 0.00004 oz/gal would be deposited within 1 cubic foot of water. This amount would be less than the toxicity level for the species mentioned.

4.2.1.1.1.2 Alternative 1 (Biological Resources—Nihoa—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

No increase in the number of missile defense launches (46) would occur as part of Alternative 1, and the impacts to wildlife would be the same as those discussed in the No-action Alternative. Payloads on some future RDT&E target vehicle launches from PMRF would incorporate additional chemical simulants (Section 2.2.3.4), which could include larger quantities of TBP and various glycols. Up to approximately 120 gal of simulant could be used in target vehicles. The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species would be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected.

Also as part of Alternative 1, launches from Wake Island, the Reagan Test Site at U.S. Army Kwajalein Atoll, and Vandenberg Air Force Base toward the vicinity of PMRF are proposed. Launches from those sites would be from existing launch facilities, and the intercept areas would be in the Open Ocean Area and Temporary Operating Area of the PMRF Range. Targets would also be launched from ships and aircraft. The effects of these missile tests would be similar to those described above for the No-action Alternative and in Section 4.2.1.1.1.1.

4.2.1.1.1.3 Alternative 2 (Biological Resources—Nihoa—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

An increase in missile exercises from 46 per year to 50 per year would not necessarily result in additional impacts to wildlife on Nihoa, since the probability for widely scattered debris or simulant to affect fish, marine mammals, or sea turtles would continue to be low.

4.2.1.1.2 Necker—Biological Resources—Offshore

4.2.1.1.2.1 No-action Alternative (Biological Resources—Necker—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

While missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island.

4.2.1.1.2.2 Alternative 1 (Biological Resources—Necker—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact in the offshore waters of the island. No increase in the number of missile defense launches (46) would occur as part of Alternative 1, and any impacts to wildlife would be the same as those discussed above in the No-action Alternative for Nihoa.

4.2.1.1.2.3 Alternative 2 (Biological Resources—Necker—Offshore)

HRC RDT&E Operations

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

An increase in missile exercises from 46 per year to 50 per year would not necessarily result in additional impacts to wildlife on Necker, since the probability for widely scattered debris or simulant to affect fish, marine mammals, or sea turtles would continue to be low.

4.2.2 NORTHWESTERN HAWAIIAN ISLANDS ONSHORE

A review of the 13 resources against program RDT&E operations under the No-action Alternative, and proposed RDT&E operations under Alternative 1 and Alternative 2, was performed for the Northwestern Hawaiian Islands onshore. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts to air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any airspace issues associated with the Northwestern Hawaiian Islands are addressed under 4.1.1 (Airspace—Open Ocean). There are no current or proposed HRC activities that will affect air quality, health and safety, land use, noise; or the existing land forms, geology, or associated soils development of the islands. Socioeconomic characteristics (population size, employment, income generated, and housing cost) do not apply since all the islands are uninhabited. No transportation (roadways, railways, etc) and utility systems (water, wastewater, electricity, and natural gas) exist onshore. HRC activities within the Northwestern Hawaiian Islands do not generate any hazardous waste streams that could impact local water quality.

4.2.2.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS

4.2.2.1.1 Nihoa—Biological Resources

Of particular concern are overflight of and the potential for debris on Nihoa and Necker islands at the southeastern end of the Northwestern Hawaiian Islands. At this point in their flight, the boosters follow a ballistic trajectory and will not impact the monument. For select intercept missions the potential exists for limited debris to fall onto the islands of Necker and Nihoa in the Papahanaumokuakea Marine National Monument.

4.2.2.1.1.1 No-action Alternative (Biological Resources—Nihoa)

HRC RDT&E Operations

Vegetation

Falling debris from missile tests with trajectories that have the potential to affect Nihoa should cool down sufficiently prior to impact so as not to present a fire hazard for vegetation such as the endangered loulu, `ohai, *Amaranthus brownii*, and *Schiedea verticillata*. If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts to vegetation on the island.

Wildlife

A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the THAAD (one of the missiles with a trajectory that could potentially result in debris on Nihoa) Project Office. Preliminary results indicated that debris greater than 0.5 foot-pound is not expected to impact on Nihoa (U.S. Army Space and Missile Defense Command, 2002). Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, migratory, or other endemic species occurring on the island. The probability for this widely scattered debris to hit birds, seals, or other wildlife will be low. Quantities of falling debris (e.g., solid rocket propellant) will be low and widely scattered so as not to present a toxicity issue.

Military readiness activities are exempt from the take prohibitions of the Migratory Bird Treaty Act, provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of debris capable of affecting a population of a particular bird species should exempt the missile tests from the take prohibitions. (U.S. Department of the Navy, 2007)

Regular marine debris removal has been conducted within the Northwestern Hawaiian Islands since 1997 through a multi-agency effort led by the National Marine Fisheries Service, in collaboration with, among others, the Navy, Coast Guard, U.S. Fish and Wildlife Service, National Ocean Service, and State of Hawaii. This effort has resulted in the removal of more than 540 tons of fishing gear and other marine debris over the last 7 years. (National Oceanic and Atmospheric Administration, 2006)

4.2.2.1.1.2 Alternative 1 (Biological Resources—Nihoa)

HRC RDT&E Operations

Vegetation

Falling debris from enhanced and future RDT&E missile tests should cool down sufficiently before impact so as not to present a fire hazard for vegetation such as the endangered loulu, `ohai, *Amaranthus brownii*, and *Schiedea verticillata*. If feasible, consideration would be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts to vegetation on the island.

Wildlife

The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. No increase in the number of missile defense launches would occur as part of Alternative 1. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by birds on the island would be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected. It is also unlikely that enough simulant capable of affecting birds would reach the island of Nihoa due to the dispersal by area winds of the material (which would be exo-atmospheric).

4.2.2.1.1.3 Alternative 2 (Biological Resources—Nihoa)

HRC RDT&E Operations

Vegetation

The increase in the number of missile launches proposed (from 46 to 50) would not necessarily result in additional impacts to vegetation on Nihoa since various trajectories, launch sites, and intercept areas are used that may or may not have the potential to affect the island. Any impacts to vegetation from proposed activities would be similar to those from the No-action Alternative and Alternative 1.

Wildlife

An increase in missile exercises from 46 per year to 50 per year would not necessarily result in additional impacts to wildlife on Nihoa, since the probability for widely scattered debris to hit birds, seals, or other wildlife would continue to be low. Quantities of falling debris (e.g., solid rocket propellant) would be low and widely scattered so as not to present a toxicity issue.

Various trajectories, launch sites, and intercept areas would continue to be used, which would help to minimize the effects on any particular location. Effects would be similar to those discussed above in the No-action Alternative section.

4.2.2.1.2 Necker—Biological Resources

4.2.2.1.2.1 No-action Alternative (Biological Resources—Necker)

HRC RDT&E Operations

Vegetation

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any falling debris should cool down sufficiently before impact so as not to present a fire hazard for the sparse vegetation on Necker, including the endangered `ohai. If feasible, consideration would be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts to vegetation on the island.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island. No increase in the number of missile defense launches would occur as part of Alternative 1.

4.2.2.1.2.2 Alternative 1 (Biological Resources—Necker)

HRC RDT&E Operations

Vegetation

It is unlikely that debris from enhanced and future RDT&E missile tests would impact on or near the island.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island. No increase in the number of missile defense launches would occur as part of Alternative 1.

4.2.2.1.2.3 Alternative 2 (Biological Resources—Necker)

HRC RDT&E Operations

Vegetation

It is unlikely that debris from an increase in missile exercises from 46 per year to 50 per year would impact on or near the island.

Wildlife

An increase in missile exercises from 46 per year to 50 per year would not necessarily result in additional impacts to wildlife on Necker, since the probability for widely scattered debris to hit birds, seals, or other wildlife would continue to be low. Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island.

4.2.2.2 CULTURAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS

Missile defense RDT&E operations, including THAAD, have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands, particularly the vicinity of Nihoa. Some of these islands are known to have significant cultural resources sites, and the islands of Nihoa and Necker are listed in the National and Hawaii State Registers of Historic Places. Debris analyses of the types, quantities, and sizes associated with the PMRF missile exercises indicate that the potential to impact land resources of any type is very low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. As noted in Section 4.2.2.1, future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwest Hawaiian Islands are not expected.

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