Final Environmental Impact Statement

Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Brigade Combat Team in Hawai‘i

Volume 1

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CHAPTER 2

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CHAPTER 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section describes the Proposed Action and alternatives to the Proposed Action. Section 2.2 describes the existing USARHAW training facilities, Section 2.3 discusses the Proposed Action (Preferred Alternative), Section 2.4 discusses the Reduced Land Acquisition Alternative, and Section 2.5 discusses the No Action Alternative. Other alternatives considered but not carried forward for analysis are discussed in Section 2.5.

2.2 USARHAW TRAINING COMPLEX

This discussion of the USARHAW training complex is included here in order to help the reader better understand the nature of training in Hawai‘i and to provide a baseline for comparing the existing conditions with the alternatives. The USARHAW training complex has 26 ranges, 49 training areas, 2 airfields, 5 airborne drop zones, and 13 surveyed field artillery and mortar firing points on O‘ahu. It also has 21 ranges, 23 training areas, 1 airfield, and 113 field artillery and mortar firing points at PTA on the island of Hawai‘i (Nakata Planning Group LLC 2002a).

The 25th ID(L) trains at Schofield Barracks Military Reservation (SBMR) (which includes Schofield Barracks Main Post and Schofield Barracks East Range [SBER]), Dillingham Military Reservation (DMR), Mākuʻa Military Reservation (MMR), Kahuku Training Area (KTA), Kawaiola Training Area (KLOA), and Wheeler Army Airfield (WAAF) on O‘ahu. Additional training sites are at Pōhakuloa Training Area (PTA) and Bradshaw Army Airfield (BAAF) on the island of Hawai‘i. The locations of these sites are shown in Figure 2-1; lands composing these installations include federal, state, and private property. State and private lands used by installations are subject to lease and easement agreements. Additional Army installations on O‘ahu, such as housing, hospitals or administrative facilities, or those that do not provide substantial training resources, are not described. Table 2-1 provides additional information on the principal locations used by the Army.
2. Description of the Proposed Action and Alternatives

Figure 2-1
Hawai‘i Location Map
### Table 2-1
**USARHAW Land Areas and Personnel**

<table>
<thead>
<tr>
<th>Location</th>
<th>Acres (in hectares)</th>
<th>Military Personnel¹</th>
<th>Civilian Personnel²</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBMR</td>
<td>11,448 (4,633)</td>
<td>9,587</td>
<td>3,105</td>
</tr>
<tr>
<td>Cantonment area</td>
<td>1,605 (650)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training area</td>
<td>4,286 (1,735)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBER</td>
<td>5,154 (2,086)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other lands³</td>
<td>4,645 (1,880)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAAF</td>
<td>1,369 (554)</td>
<td>1,593</td>
<td>530</td>
</tr>
<tr>
<td>KLOA</td>
<td>23,348 (9,449)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DMR⁴</td>
<td>664 (269)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MMR⁴</td>
<td>4,190 (1,696)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>KTA</td>
<td>9,398 (3,808)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PTA</td>
<td>108,792 (44,027)</td>
<td>24</td>
<td>97</td>
</tr>
</tbody>
</table>

**Notes:**

¹Military personnel authorized for the site or installation.
²Department of Defense civilian personnel authorized for the site or installation, as well as other civilian personnel, such as unappropriated fund employees and full-time contractor personnel.
³Includes buffer zones west of the training area ordnance impact area.
⁴Military training and personnel access these areas, but no military or civilian personnel are stationed there.

SBMR serves as headquarters for the 25th ID(L), which is a tactical force that operates as a combined arms force with internal units or units attached to it or under its operational control. With supporting infantry, engineer, artillery, aviation, and air defense units, it has strategic responsiveness and flexibility.

The 25th ID(L) and I Corps units train at the locations on O'ahu and the island of Hawai'i shown on Figure 2-1. These training resources include an assortment of live-fire (real ammunition) and nonlive-fire (blank ammunition) maneuver training facilities, fixed-position live-fire training facilities, infantry and engineer demolition training facilities, and grenade training facilities. Blank ammunition contains powder but no solid projectile and is used to simulate gunfire. Live-fire maneuvers occur at SBMR, PTA, KTA and MMR¹, while nonlive-

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¹ In 1998, after several wildland fires were started by munitions that fell outside designated impact areas, the Army suspended live-fire training at MMR. The Army is currently conducting limited live-fire training exercises and is preparing a separate EIS to evaluate a proposal to conduct routine live-fire training at MMR.
2. Description of the Proposed Action and Alternatives

fire maneuver training occurs at the other locations. Safety barriers or buffer areas must be located in downrange or direction-of-fire areas to stop or contain the projectiles, and to prevent personnel from entering areas where projectiles could land. Many portions of the training areas are too steep for maneuver training. Company-level live-fire exercises may be conducted at two small areas of PTA, but because of the areas’ restricted size, they are of limited value. The following is a brief description of the training resources that the Army is proposing to update or use for SBCT training. The proposed project features are described in Section 2.3.

*Schofield Barracks Military Reservation* is in central O‘ahu and is divided into two main land areas, referred to as the Main Post (Figure 2-2) and SBER (Figure 2-3). Principal training areas at the Main Post include the West and South ranges, the ordnance impact area, and the cantonment area. SBMR is the primary range complex in Hawai‘i for individual weapons qualification with limited light maneuver training areas. Training and ordnance impact areas are west of the cantonment area. The wooded eastern slope of the Wai‘anae Mountains in the western portion of the installation is used primarily for tactical infantry maneuver training, including land navigation training. SBMR has approximately 11,448 acres (4,633 hectares), of which approximately 1,235 acres (500 hectares) are suitable for maneuver training.

SBER is composed of 5,154 acres (2,086 hectares) and has no live-fire training facilities or ordnance impact areas. SBER provides training lands for tactical field exercises by the 25th ID(L) or other Army and Marine Corps units. The western maneuver area on SBER is composed of about 2,223 acres (900 hectares). This area is valuable for rappelling, jungle survival, and patrolling operations. Several open areas are used for air assault and airborne operations. Unit uses include limited battalion and company-level Army Training and Evaluation Program (ARTEP) missions. Climate, terrain, and vegetation provide training conditions similar to areas of potential conflict in the Pacific and Pacific Rim. The eastern portion of SBER has extremely rugged terrain and is densely forested. No live-fire exercises are conducted on SBER; all exercises are limited to pyrotechnics and blank ammunition. The Army has established a 1,000-foot (305-meter) noise buffer zone between the boundaries of the range and the adjacent Wahiawā residential areas. The use of small arms blank ammunition is not authorized in SBER training areas 1A, 1B, 2, 3A, and 3B between the restricted hours of 6 PM and 6 AM. The use of pyrotechnics and explosion simulators is also prohibited in those training areas.

*Wheeler Army Airfield (WAAF)* is in central O‘ahu and is bordered on the northwest by the Schofield Barracks Main Post, and by SBER and the Kamehameha Highway on the northeast. WAAF consists of 1,369 acres (554 hectares) and provides administration, housing, maintenance, training, and flight facilities for peacetime mission requirements, including security and law enforcement support. Additionally, the Directorate of Logistics Munitions Branch operates an ammunition supply point at WAAF. The 25th Infantry Division’s Aviation Brigade at WAAF consists of two aviation battalions, one reconnaissance squadron, one medical evacuation company, and one aviation intermediate maintenance
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Figure 2-2
Schofield Barracks Main Post
Figure 2-3
Schofield Barracks East Range
2. Description of the Proposed Action and Alternatives

company. The Aviation Brigade is equipped with 108 helicopters, 280 land vehicles, and 1,000 Soldiers who work at WAAF and are housed there and at SBMR (USACE 1994, 1-1-16, 2-1-7).

Because it is immediately adjacent to SBMR and operates as an adjunct to it, WAAF is treated as a part of SBMR in this document.

Kawailoa Training Area (KLOA) is bordered on the south by SBER and on the north by KTA (Figure 2-1). Access to KLOA is very limited due to unimproved roads, steep terrain, and dense vegetation. A single unimproved road traverses most of the western boundary, but there is no primary access road; people, equipment, and supplies for training and land management are transported by helicopter. KLOA was established under a nonexclusive maneuver agreement with the private landowner on January 25, 1955, as a troop maneuver and training area. It is composed of 23,348 acres (9,449 hectares).

KLOA is currently used primarily for helicopter aviation training. The installation is an excellent location for mountain and jungle warfare training because of its ravines and dense vegetation. Approximately 5,310 acres (2,149 hectares) of the installation are suitable for maneuver training (e.g., on the Kawai‘iki Trail). The remaining area is considered unsuitable for maneuver training due to excessively steep slopes. In areas with slopes greater than 20 percent, troops are deployed typically in single-file small units along ridgelines and are transported via helicopter. Live fire, tracers, incendiaries, explosives, and other pyrotechnics are prohibited per lease agreements; very rugged terrain is off-limits, and military vehicle access is restricted to Pāpūkea Pa‘ala’a Road through Helemano Gate. Military units may train in KLOA training area K1B during weekends and federal holidays with prior public notification. Hunters and hikers are allowed access when the area is not scheduled for training. Blank ammunition is authorized on KLOA training areas. No low elevation contour-tracking (nap of the earth) helicopter flights are permitted outside KLOA boundaries due to the presence of cattle ranches on adjacent lands.

Dillingham Military Reservation (DMR) (Figure 2-4) is bounded on the north by the Pacific Ocean and on the south by the northeastern slopes of the Wai‘anae Mountains. DMR is composed of 664 acres (269 hectares) and has an active joint-use military/civilian airfield. Portions of the reservation, including the runway and parking area, have been leased to the Hawai‘i Department of Transportation (DOT) for civilian light aircraft operations and support. The lease, which expires in 2008, limits civilian operations to between sunrise and sunset. Night operation is reserved for military operations. The Army can close the airfield for daytime military operations with prior notification to the Hawai‘i DOT.

Approximately 354 acres (143 hectares) are suitable for maneuver and field training, 107 acres (43.3 hectares) are developed within the cantonment area, and the remaining 203 acres (82.1 hectares) are on steep slopes of the Wai‘anae Mountains. The airfield has extensive hardened areas that can support vehicles and headquarters activities. DMR is used for small unit (platoon and squad) maneuvers and combat support operations and supports field
Dillingham Military Reservation includes maneuver and field training areas and an active joint-use military/civilian airfield.

Legend
- Dillingham Military Reservation Boundary
- State Land Use District Boundary
- D1 Dillingham Trail
- Water
- Unrestricted Stryker maneuver area
- Strykers restricted to roads and ranges (no off road maneuvers)

Source: CEMML 2002, USGS 1998c&e

Figure 2-4

O'ahu, Hawai'i
training for headquarters and service support units. Specific training includes command post exercise operations, emergency deployment readiness exercise support operations, limited maneuver training, airborne operations, including equipment and personnel parachute operations, support operations, and night vision goggle training for helicopter pilots. Platoon-level ARTEP missions are supported at DMR.

DMR provides the space for infantry and associated support units to maneuver. This maneuver is conducted in a dry- or blank-fire scenario; that is, bullets are not fired. Blanks are used in rifles and machine guns, along with multiple integrated laser engagement system (MILES) equipment, which is provided to each unit and allows units to conduct force-on-force maneuver against the enemy, engage the enemy, and receive incoming fire. MILES fires an eye-safe laser beam; a harness worn by each Soldier senses the laser and indicates the hits and near misses. In force-on-force exercises, MILES provides feedback on the enemy threat, unit capabilities, and training status (Garo 2002).

Ammunition is restricted to blanks and use of ammunition is prohibited on the runway. Ground produced smoke is allowed in designated areas but is prohibited on the runway. The airfield portion is leased to the State Department of Transportation for light civil aircraft and airfield support operations. Maneuver training is not permitted on the portion of DMR that is leased to the state of Hawai'i without prior state approval. There are no live-fire activities, designated ordnance impact areas, or associated surface danger zones on DMR.

Kahuku Training Area (KTA) is bounded on the north by private agricultural lands, by KLOA on the south and by private lands on the remaining perimeter (Figure 2-5). KTA is composed of 9,398 acres (3,803 hectares). It is the largest contiguous ground maneuver training area on O'ahu, containing 4,569 acres (1,849 hectares) categorized as suitable for maneuver. The northern portion of the installation supports all tactical maneuver training scheduled on KTA, including mountain and jungle warfare, pyrotechnics, and air support training. KTA can accommodate a number of training scenarios involving infantry battalion ARTEP missions. A number of landing and drop zones for military aircraft and parachutists are on KTA. Aviation assets are incorporated into appropriate training events, but there are no developed airfield facilities for training use. All aviation support assets found on KTA are temporary and associated with specific training events. The southern portion of the installation is more elevated, with rugged terrain and dense vegetation. The ruggedness of this terrain makes it poorly suited for large-scale field exercises.

Portions of KTA training area are off-limits to military training during weekends and federal holidays without prior approval from Range Division-Hawai'i. Under a permit from the state, the public (i.e., Hawai'i Motosports Association) has obtained a lease giving the public exclusive rights to Training Area A-1 during weekends and federal holidays. Lease provisions allow the Army to close these areas for brigade or larger field exercises only if it first notifies the public. Units must submit requests during the Range Scheduling Conference for an early public notification.
Kahuku Training Area is bounded on the north by private agricultural lands south of the Kamehameha Highway, by the KLOA on the south, and by private and public lands on the remaining perimeter.
Military units may train in Training Areas A-1 and A-3 during weekend and federal holidays, with prior public notification. Hunters and hikers are allowed access when the areas are not scheduled for training (typically weekends and holidays). Pyrotechnics (e.g., smoke and incendiary devices) are permitted, subject to Range Control approval. All pyrotechnics are prohibited in specific training areas and within a 3,280-foot (1000-meter) buffer zone on the inside of the KTA boundary.

Pōhakuloa Training Area (PTA) is the largest military training area in Hawai’i and consists of 108,792 acres (44,027 hectares) (Figure 2-6). The ordnance impact area consists of approximately 51,000 acres (20,639 hectares) and extends from central PTA to the southern boundary. This area allows for firing all types of tactical weapons currently in the USARHAW inventory. Approximately 56,661 acres (22,930 hectares) are suitable for maneuvers.

PTA supports all types of live-fire training and can support large-scale (battalion or larger) maneuver training under uniquely realistic conditions, although the terrain limits training in certain areas (Nakata Planning Group, LLC 2002b, 3). Ranges at PTA are as follows (Sato 1996): Infantry Squad Battle Course/Squad Defense Range; Combat Pistol Qualification Course; Rifle Grenade Range; Rifle Range; Hand Grenade Range; Hand Grenade Qualification Course; Rifle Zero Range; Multi-purpose Machine Gun/Sniper Range; Demolition Range; Infantry Platoon Battle Course; Multi-purpose Anti Armor Range; Grenade Machine Gun Range; Direct Fire Range; Helicopter Gunnery; Bombing Range; Forward Area Arming and Refueling Point; Forward Area Refueling Point; Drop Zone; Confidence Course; Mortar Firing Positions; Artillery Firing Positions. See Section 2.2.3 for a more complete discussion of current training. Units are scheduled to conduct training at PTA annually, using an automated system known as Range Facility Management Support System (RFMSS). PTA provides the space for infantry and associated support units to conduct force-on-force maneuvers. Under this maneuver, live bullets are not fired, and blanks are used in rifles and small caliber automatic weapons, along with MILES equipment.

Many types of weapon systems are generally used at PTA (Sato 1996) including small arms, antitank weapons, mortars, field artillery, air defense artillery, explosives, and rockets.

PTA supports training for a variety of services, including the US Army, Army National Guard, US Navy, US Marine Corps, US Air Force, Special Operations Forces, and allied armed forces from the Pacific region. Transportation of military personnel and cargo to PTA involves use of several alternative land, sea, and air routes that employ commercial and military transportation systems (Sato 1996, 2-1).

PTA includes BAAF, which is directly west of the cantonment area and includes a 90-foot by 4,750-foot (27.4-meter to 1,448-meter) paved runway.
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Figure 2-6
Pōhakuloa Training Area
2. Description of the Proposed Action and Alternatives

2.2.1 Other Training Facilities

Hickam Air Force Base (HAFB) is on the south side of O'ahu, approximately nine miles west of downtown Honolulu. Currently the Army uses Building 1138 at HAFB to conduct troop rigging as part of joint deployment training.

2.2.2 Current Force Vehicle and Weapon Systems

Vehicles used during current force training include transport and supply trucks, High Mobility Multipurpose Wheeled Vehicles (HMMWV), and four-wheel drive vehicles of various types. The weapons systems that the current force uses are the standard 9-millimeter (mm) pistol, M-4 carbine (a lightweight rifle with a short barrel), M-16 assault rifle, M-203 40mm grenade launcher, M-240 7.62mm machine gun, M-249 5.56mm squad automatic weapon (machine gun), M-24 sniper rifle, MK-19 grenade machine gun, M-2 .50 caliber machine gun, 105mm and 155mm howitzer (towed), 60mm and 81mm mortars, AT-4 and Javelin anti-tank missile, tube-launched, optically tracked, wire-guided (TOW) missile, mine-clearing line charge, shoulder-fired Stinger missiles, and HMMWV-mounted Stinger missiles.

2.2.3 Description of Current Training

Primary users of USARHAW subinstallations are combat arms units, which include light infantry, combat engineers, field artillery, air defense artillery, attack aviation, ground cavalry, US Marine Corps combat forces, the US Navy, Hawai'i Army National Guard, US Coast Guard, and US Army Reserves. Major training activities associated with these users on USARHAW subinstallations are light maneuver training, weapons live-fire, support areas, and aviation training. As a rapid strike force of nearly 12,000 Soldiers, the 25th ID(L) focuses primarily on training for low intensity conflict throughout the Pacific. Principal training activities are described below. Additionally, Army units integrate Air Force, Marine, and Navy systems into live-fire training exercises.

The principal existing, ongoing current force training activities that would continue under the No Action Alternative are described in the following sections. These include maneuver, reconnaissance, live-fire, bivouac, deployment, and aviation training, along with training support operations.

Maneuver Training

There are areas considered unsuitable for maneuver training on each subinstallation because of topographic and maneuverability constraints. Limited use and restricted areas, ordnance impact areas, habitat and species protection areas, identified cultural resource sites, cantonment areas, and recreation areas within each subinstallation reduce and compartmentalize the available maneuver and training space. The total training area that would be available to the Army on O'ahu is approximately 55,571 acres (22,498 hectares), but the acreage considered suitable for maneuver training is approximately 15,119 acres (US Army 1997c). The total training area available to the Army on the island of Hawai'i is approximately 108,792 acres (44,027 hectares), of which 56,661 acres (22,930 hectares) is suitable for unit maneuver (US Army 1997c).

The subinstallations described below and addressed by this EIS are small and noncontiguous and have limited ability to support tactical exercises above company level, which range in size
from 62 to 190 Soldiers. SBMR can support up to company-sized live-fire maneuver training. KTA is used as the primary mounted (vehicle) and dismounted (foot) maneuver training area for units up to brigade size and larger on O'ahu. KLOA and DMR are used primarily for helicopter training activities and small unit training. SBER is used mainly for small unit exercises and dismounted training. PTA on the island of Hawai'i allows training for up to brigade-size maneuvers and limited mounted maneuvers.

Maneuver training exercises are conducted at all levels, from squad to brigade, to ensure a combat ready fighting force and are sometimes supported by fire support assets. The typical size and composition of each Army combat element is presented in Table 2-2. Combat effects, such as smoke and obscurants, noise, and simulated artillery, nuclear, biological, and chemical conditions, are integrated into training to condition units for operations in a realistic and stressful battlefield environment. Obscurants are manmade or naturally occurring particles suspended in the air that block or weaken transmission of particular parts of the electromagnetic spectrum, such as visible and infrared radiation or microwaves.

Movement refers to the shifting of units on the battlefield (training areas). Unit leaders use a combination of formations and movement techniques to successfully move units. Formations are arrangements of units and of Soldiers in relation to each other. Units from squad to battalion use formations for control, security, and flexibility. Troop movements can be tactical or administrative. Both classifications apply to most movements but one is normally dominant. Unit movements (even tactical dismounted), maneuvers (both offensive and defensive), and extended maneuver training usually involve the use of a small number of light wheeled vehicles for command and control or support. However, range restrictions, tactical scenarios, and maneuverability constraints may keep these light wheeled vehicles to established roadways. Airborne units may parachute into designated drop zones.

**Table 2-2**

**General Structures of Army Forces**

<table>
<thead>
<tr>
<th>Element</th>
<th>Number of Soldiers</th>
<th>Commander</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team</td>
<td>3-5</td>
<td>Noncommissioned officer</td>
</tr>
<tr>
<td>Squad/section</td>
<td>8-10</td>
<td>Noncommissioned officer</td>
</tr>
<tr>
<td>Platoon</td>
<td>16-44</td>
<td>Lieutenant</td>
</tr>
<tr>
<td>Company/battery/troop</td>
<td>62-190</td>
<td>Captain</td>
</tr>
<tr>
<td>Battalion/squadron</td>
<td>300-1,000</td>
<td>Lieutenant Colonel</td>
</tr>
<tr>
<td>Brigade</td>
<td>3,000-5,000</td>
<td>Colonel</td>
</tr>
<tr>
<td>Division</td>
<td>15,000</td>
<td>Major General</td>
</tr>
</tbody>
</table>

Source: USACE 2001a

Tactical movements are conducted when contact with enemy forces is likely either en route or after arrival at a destination. They emphasize tactical considerations such as security and
the use of combat ready formations. They de-emphasize efficiency and ease of movement, and they anticipate ground contact with the enemy. Administrative movements are conducted when contact with enemy forces is unlikely, both en route and soon after arrival at a destination. They emphasize the best method of movement and de-emphasize tactical considerations.

All units in the 25th ID(L) conduct tactical marches. There are two types of tactical marches: foot march and motor march. A foot march is the movement of troops and equipment mainly by foot, with limited support from vehicles. A motor march is similar to a foot march, but with troops moving in military vehicles. Both foot marches and motor marches are routinely executed on roads and trails.

Maneuver also entails setting up temporary defensive positions to repel an enemy attack. Defensive positions may consist of Soldiers lying in concealed positions and designating fire zones. More complex maneuver defense entails digging individual fighting positions or trenches using hand tools and digging in larger crew-served weapons using excavators.

During extended maneuver training, Soldiers may sleep in the field. To avoid detection and allow for quick displacement, tents are not set up during light infantry maneuvers. Soldiers normally eat packaged meals in the field. Other prepared meals are brought in from support areas. Training units carry out all trash to avoid detection. Units may use blank ammunition and MILES equipment during nonlive-fire. MILES fires an eye-safe laser beam, and each Soldier wears a harness that senses the laser and indicates hits or misses. Field artillery and mortar fires are simulated by pyrotechnics that provide both audio and visual effects.

Reconnaissance Training
Typical reconnaissance training operations involve small groups, from squad to platoon strength (8 to 44 Soldiers) and may occur at any USARHAW training area. No live fire is involved. The training is conducted between 20 and 40 times per year, during daytime and at night.

Live-Fire Training
Live-fire training at PTA, SBMR, and MMR follows the Army standard training methodology in Field Manual (FM) 7-10. The individual Soldier qualifies with an assigned weapon and then progresses through squad, platoon, and company level live-fire exercises. Live-fire entails an individual Soldier, a crew of a weapon system, or a collective unit firing at targets on a range facility. Live-fire exercises may incorporate free maneuver within the established safety zones of a range.

The requirement for live-fire training varies depending on individual and unit mission, weapons assigned, and ammunition available. Each Soldier must demonstrate proficiency on the assigned weapon system annually or semiannually (US Army 1997a). Unit commanders must ensure that live-fire training meets readiness standards. Weapons proficiency, or qualification, is scored and recorded for each individual or crew and is reported collectively by unit.
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Training may include the use of short-range training ammunition (SRTA, also known as blue-tip ammunition), which uses a plastic ball projectile. Although SRTA is classified as live-fire training in accordance with AR 385-63, the maximum range of this ammunition is only 300 to 700 yards (274 to 640 meters), depending on the caliber used. SRTA may be used at SBMR, MMR, and PTA in conjunction with other live-fire ammunition. At KTA, only SRTA or blank ammunition would be used.

Live-fire training at SBMR and PTA includes basic weapons marksmanship ranges, grenade training, urban/village assault and entrenched enemy training, small unit live-fire and maneuvers, artillery and mortar firing, and infantry demolition, using mines and bangalore torpedoes. At KTA the only live-fire training permitted is urban/village assault using SRTA.

**Combat Service Support Operations and Training**

Combat service support operations and training occur at the installations. Support areas are those where camps are set up for rest, resupply, refit, maintenance, and support. Sites vary, depending on unit size and mission. Tactical operations may be staged from a bivouac site. Depending on unit size, support areas can contain areas for vehicle and weapons maintenance and parking, general supply, munitions supply, medical care, helicopter landing zones, and vehicle off-loading. A support site consists of a series of tents and temporary structures, which house the unit, covered with camouflage nets. Tents provide sleeping/living areas, maintenance shops, supply storage, medical facilities, operations/communication areas, and mobile field kitchens. Sites are chosen to accommodate the unit support element, to provide communication links and concealment from the enemy, and to support maneuver operations. Campfires are not allowed in support areas, which have security and observation posts and may have individual fighting positions. Vehicle access routes are guarded, and roving patrols are established for security. Areas an enemy would be likely to approach are monitored and designated for defensive planning and for repulsing an attack. Munitions used in support areas typically consist of grenade and artillery simulators and blank ammunition.

**Deployment Training**

Deployment training teaches Soldiers how to prepare and move military units and supplies as part of a military action. Operational and training deployment activities occur at SBMR, WAAF, HAFB, Kawaihae Harbor, and BAAF, nearly all within the confines of the military installations. Training exercises may range from testing the load plan of any given vehicle in a unit to an Emergency Deployment Readiness Exercise (EDRE), which is designed to simulate the movement plans of a unit to deploy to an overseas location. All deployable units normally participate in an EDRE annually. Executed realistically, EDREs provide a process for commanders to evaluate their units’ strengths and weaknesses in a deployment.

Vehicle convoys move personnel and equipment between installations. A convoy is normally defined as six or more military vehicles moving simultaneously from one point to another under a single commander, ten or more vehicles per hour going to the same destination over the same route, or any one vehicle requiring a special haul permit. Per command guidance, USARHAW convoys normally maintain a gap of at least 30 minutes between serials (a group of military vehicles moving together), and 330 feet (100 meters) between vehicles on
highways and 7.5 to 15 feet (25 to 50 meters) while in town traffic. Per state regulation, military convos are not authorized to operate on state highways during “rush hour” - between the hours of 6:00 AM and 8:30 AM or between 3:00 PM and 6:00 PM, Monday through Friday. Movements on Saturday, Sunday, and holidays are by special request only. Convos traveling from Kawaihae Harbor to PTA must get clearance, and vehicles operating on Saddle Road within the boundaries of PTA must not exceed 25 mph.

Units must seek permission from the 25th ID(L) for convos of 25 vehicles or more. Permission must also be granted from the State of Hawai'i DOT for convos of six or more vehicles or to move oversize or outsized cargo over state highways. As long as all federal, state, and Department of Defense (DOD) regulations are followed no additional permits are required to move munitions. To ensure maximum safety, all convos must comply with local policies, as specified in standard operating procedures (SOPs), which direct such matters as vehicle safety inspections and convoy safety briefings, and vehicle operators must be properly trained and licensed to operate assigned military vehicles.

Units are also deployed to PTA from Honolulu to Kawaihae Harbor. Deployment requires both barges and logistic support vessels (LSVs). Current annual vessel traffic for deployment to PTA averages about 4 barge and 60 LSV round-trips, which have a 12-foot (4-meter) draft and a top speed of 13 knots. New theater support vessels (TSVs), modern high-speed vessels with a 15-foot (5-meter) draft and a top speed of 40 knots, may be fielded in the future and appropriate NEPA documentation will be prepared at that time. Soldiers are typically transported to PTA by one to two C-130 aircraft twice a year.

Aviation Training
Aviation training occurs at SBMR, SBER, MMR, WAAF, DMR, KTA, KLOA, and PTA and, depending on location, consists of aircrew training, maneuver training, and live-fire training. Aircrew training pertains to normal aviation flight skills, including takeoffs and landings; normal, nap of the earth, contour and low level flights; confined and high altitude area takeoffs and landings; and navigation for helicopters. Maneuver training requirements for aviation units are the same as for ground units, with the added capability of using the third dimension for speed and maneuver. During some training exercises, aircraft may fly at treetop level or lower. This type of training is critical for the tactical safety of the flight crews because it provides protection from enemy radar coverage and air defense weapon systems.

High mobility and combat flexibility of aircraft are important assets on the battlefield. This type of training requires up to 20 helicopters flying in smaller tactical formations of four to six aircraft while carrying ground troops and equipment to battle areas. Aircraft pick up Soldiers in pickup zones and carry them to landing zones. Aviation live-fire training follows the standard Army training methods and progresses in a similar manner as the ground units. Aviation live-fire training takes place on designated ranges, with ground targets and scoring systems to determine weapons accuracy and weapons effects. Once crews have qualified with their aircraft, they progress through section, platoon, and company live-fire exercises.
The aircraft that are used in support of current forces in Hawai‘i are the armed reconnaissance OH58D Kiowa Warriors, utility lift UH60 Blackhawks, and the medium lift CH47 Chinook.

**Combined Live-Fire/Maneuver Training**

Company combined arms live-fire exercises (CALFEXs) are conducted at USARHAW live-fire ranges and integrate different firing platforms in order to amass their effects against the enemy. A typical company-level CALFEX will include a dismounted maneuver ground force with small arms weapons (M4s, M16s, M249 SAW, M240B machine guns, M203), supported by the company mortar section equipped with two 60mm mortars, and a battalion mortar section or platoon of two to four 81mm mortars. Engineer, artillery, and aviation fire support assets will also support the company. The level of support can vary but in general can be expected to be a platoon of 105mm artillery (three howitzers) and two to four aviation gunships (OH-58D Kiowa Warrior helicopters). Maneuver training is a tactical exercise that can include but is not limited to movement by foot, vehicle, and helicopter, offensive operations, and defensive operations. CALFEXs follow a variety of tactical operations and involve more than one operation, such as attacking a trench line. The exercises may be offensive or defensive, but they generally use the same types of weapons and munitions.

The most common CALFEX is attacking a strong point, which can be anything from forces defending a built up area to forces defending from a trench line. Currently, CALFEXs at MMR are limited to daytime.

**Force-on-Force Training**

In a force-on-force scenario at SBMR, KTA, or PTA, a battalion or brigade engages an opposing force in nonlive-fire maneuver over a relatively large area, typically for an extended period (ten or more days). In a brigade-sized operation, as an exercise progresses, the battle zone develops into a linear configuration divided into three areas of operations: the forward area or security zone, the main battle area, and the brigade rear. Different types of operations occur in each of these areas. The security zone is where the opposing force is located, forward of friendly troops. The main battle area is where most intense combat training occurs. The brigade rear area, located behind friendly combat units, is where selected headquarters elements, administrative, logistical, medical, and aviation field operating sites are positioned.

Specific military activities in a force-on-force exercise normally include cross-country vehicle maneuvers, blackout driving, using pyrotechnics and artillery simulation devices, building hasty/limited defensive positions, placing obstacles, and establishing forward/rear support areas or field hospitals. Vehicles are moved on hardened and improved all-weather roads, with limited use of unimproved roads and trails. Cross-country travel usually involves HMMWVs or other wheeled vehicles. During their nonlive-fire force-on-force training, units may designate another unit within the US or friendly foreign military to portray the enemy. During live-fire training, units may designate the targets that they will fire at to depict an enemy. Also, to prepare for force-on-force or live-fire training, units may simply train...
tactically, as if there were a real enemy opposing them. All of this is done to prepare Soldiers and units for combat.

### 2.2.4 Current Institutional Programs

Institutional matters can be described as good stewardship plans and programs that could affect, protect, and manage the biological, physical, and socioeconomic environment at USARHAW. Several management programs have been developed to address the sustainability of specific resources. The following programs are currently established and operating at USARHAW: range management, integrated training area management (ITAM), environmental management, and sustainable repair and maintenance.

#### Range Management

The Range and Training Land Program (RTLP) is the program under which the Army conducts range operations and maintenance on lands where Soldiers train in the field. A range is an area that is normally equipped for practice in weapons delivery and/or shooting at targets. The RTLP provides a military-centered framework for land management since USARHAW lands are primarily classified for military use. Range Division (which includes Range Control) implements the RTLP, operates firing ranges, and regulates use of training and ordnance impact areas. In addition, Range Division regulates access to training areas and ranges and protects and conserves sensitive natural resources from military and recreational use.

The key RTLP planning device is an installation range development plan, which defines the range and training land requirements. This plan is incorporated into the USARHAW Real Property Master Plan, the Integrated Natural Resources Management Plan (INRMP), and the Integrated Cultural Resources Management Plan (ICRMP). These efforts, together with the ITAM work plan described below, produce a sound approach for consistent and proactive management of training land while balancing mission, infrastructure, and environmental stewardship. Specific range management actions that are conducted annually at SBMR, KTA, and PTA are as follows:

- Range scheduling;
- Range inspection;
- Range target repair and replacement; and
- Range maintenance.

Range target repair and replacement and general range maintenance do not occur at DMR, SBER, or KLOA because there are no targets or ordnance impact areas at these sites.

#### Integrated Training Area Management

The ITAM program is the Army’s formal strategy for implementing the sustainable use of training and testing lands. The intent of the ITAM program is to systematically provide uniform training land management capability across USARHAW and to ensure that the carrying capacity of the training lands is maintained over time. The Army manages its lands to minimize loss of training capabilities in order to support current and future training and
mission requirements. The integration of stewardship principles into training land and conservation management practices ensures that the Army’s lands remain viable to support future training and mission requirements. ITAM integrates elements of operational, environmental, master planning, and other programs that identify and assess land use alternatives. The ITAM program also supports sound natural and cultural resources management practices and stewardship of its land assets, while sustaining land attributes conducive to supporting training, testing, and other installation missions. These management requirements are as follows:

- Integrate training requirements with training land management;
- Conduct annual monitoring and analysis of resources and ranges;
- Conduct repair and maintenance of training land;
- Enhance mobility, maneuverability, access, and availability in training areas; and
- Train Soldiers in Sustainable Range Awareness to minimize training land damage.

These requirements are applicable at all training areas.

**Environmental Management**

The Army environmental strategy consists of four pillars, which represent the major areas of activity: pollution prevention, compliance, restoration, and conservation. Projects under each major activity area are implemented and managed at USARHAW.

The primary objective of pollution prevention is source reduction. Pollution prevention eliminates or reduces the sources of pollutant discharges or emissions. This includes substituting materials and changing processes to avoid the use of hazardous substances. The program reduces operating costs and liability from environmental compliance and cleanup.

The goal of the compliance program is to meet applicable federal, state, local, and Army environmental laws, regulations, and other requirements. The compliance program at USARHAW consists of eight major program areas: air quality, asbestos, water quality, hazardous waste and hazardous materials, lead hazard, solid waste, storage tanks, and wastewater.

Under the restoration program, the Army identifies, investigates, and cleans up contamination from hazardous substances, pollutants, and contaminants. The primary priority of the restoration program is to identify and clean up the sites that present the highest risk to public health and the environment. It is the Army’s priority to remediate contaminants, such as chlorinated solvents, which are regulated by the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA). In addition, USARHAW investigates and remediates all types of contaminants, such as PCBs and petroleum, which are not regulated under CERCLA, but are regulated under various other federal, state, and Army regulations.
The conservation program consists of natural and cultural resources management, as well as compliance with NEPA, the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA). The conservation program focuses on responsibly managing Army lands to ensure long-term natural resource productivity and cultural resources protection and preservation, so the Army can achieve its mission.

**Sustainment, Restoration, and Modernization Program**

Real property management is the Army’s planning process for identifying facility requirements, for designing and constructing new facilities, for maintaining existing facilities, and for reusing or disposing of obsolete facilities. This program includes activities such as writing long- and short-range plans, updating the program for tabulating facilities required and available, developing capital investment strategies, mapping installations and surrounding areas, and maintaining Installation Design Guides written to unify the overall appearance of installation facilities. Real property management also includes a variety of supporting elements, including traffic planning and inventories of historical properties.

Land is real property. It is a priceless nonrenewable asset that must be responsibly managed to support the national defense mission. Family housing, barracks, offices, roads, recreational areas, live-fire ranges, and maneuver areas are all real property assets occupying Army lands. Master planning uses land use planning, or zoning, as the primary method to balance compatible and incompatible land usage to meet industrial, residential, and recreational requirements.

**Real Property Master Plan**

To manage its land, facilities, and infrastructure, USARHAW has prepared a real property management plan based on assigned mission and guidance contained in a variety of plans and other documents. These references establish trends, strategies, goals, and objectives on which Army planners can base long-range and near-term plans for economical, environmentally responsible, and effective support of Army goals, objectives, missions, and populations.

USARHAW adheres to five basic concepts in its planning goals and objectives: maximizing facilities utilization, maintaining existing facilities, meeting regulatory and environmental concerns, renewing facilities in an orderly and cost-effective manner, and providing new facilities when all other alternatives are exhausted.

Army Regulation 210-10, Real Property Master Planning, guides USARHAW’s real property planning process. Each real property management plan consists of four components: long-range, capital investment strategy, short-range, and mobilization.

The real property management plan addresses the planning process associated with over 300 types and categories of installation real property, including barracks, family housing, utility systems, industrial facilities, roads, classrooms, ranges, and maneuver land. Planning quantifies the requirements for facilities to support installation missions, evaluates the adequacy of existing facilities, proposes modifications, removals and additions, and provides a planning roadmap to address shortfalls and excesses.
2. Description of the Proposed Action and Alternatives

**Cultural Resource Management Efforts**

The cultural resources management program at USARHAW has a staff that includes a Cultural Resources Manager, six Cultural Resources Specialists (archaeology), and an Architectural Historian. The program covers the following tasks:

- Complying with federal preservation law;
- Reviewing installation projects to ensure compliance;
- Maintaining a cultural resources database in Access and GIS;
- Conducting field surveys and site evaluations;
- Monitoring cultural resources during training activities;
- Preserving sites;
- Engaging in Native Hawaiian consultation and providing cultural access; and
- Coordinating with other regulatory agencies.

The cultural resources team also coordinates and facilitates public outreach actions that include site tours and public education and forming cultural advisory groups on Hawai‘i and O‘ahu.

**Integrated Wildland Fire Management Plan**

Since the publication of the Draft EIS, the USARHAW finalized the Integrated Wildland Fire Management Plan (IWFMP) (October 2003). As such, discussion of this program was moved from the section describing proposed institutional programs to the section describing existing institutional programs in the Final EIS. The IWFMP lays out specific guidance, procedures, and protocols in the prevention and suppression of wildfires on all USARHAW training lands with wildland fuels. The goal of the plan is to convey the methods and protocols necessary to minimize fire frequency, severity, and size while allowing military units to maintain a high level of combat readiness. The plan defines the responsibilities of all offices, departments, and agencies involved and describes strategic and tactical actions to be taken for pre-suppression and suppression of fires. The plan will be reviewed and updated every other year to ensure the latest information is consistently incorporated into Army wildfire prevention and suppression procedures.

2.3 **PROPOSED ACTION (PREFERRED ALTERNATIVE)**

Under the Proposed Action, the 2nd Brigade would be converted to an SBCT and, as such, would operate as part of the Army’s Interim Force. Table 2-3 provides a snapshot comparison of a current force light brigade, such as the 2nd Brigade, and the proposed SBCT. Implementing the Proposed Action would require taking several distinct and coordinated actions and activities directly associated with transforming the 2nd Brigade. This would include fielding Stryker systems and SBCT-specific weapons, building new facilities, acquiring new land and additional easements, and conducting SBCT-specific training. Table 2-4 provides an overview of the proposed individual project actions by location (Figure 2-7 through Figure 2-11); Table 2-5 shows the proposed projects for each alternative. This EIS
### Table 2-3
**Current Force and SBCT Light Brigade Comparison**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>SBCT (Proposed Action)</th>
<th>Current Light Brigade (No Action)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel strength</td>
<td>3,818 officers and enlisted <strong>Soldiers</strong></td>
<td>3,008(^1) officers and enlisted <strong>Soldiers</strong></td>
</tr>
<tr>
<td>Vehicles</td>
<td>1,005 emission producing vehicles (including 291 Strykers)(^3)</td>
<td>659 emission producing vehicles(^2)</td>
</tr>
<tr>
<td>Weapons</td>
<td>Current force inventory plus use of twenty-seven 105mm Stryker mounted cannon and thirty-six 120mm mortars and a change from eighteen 105mm howitzers to eighteen 155mm howitzers</td>
<td>Current inventory</td>
</tr>
<tr>
<td>Aircraft</td>
<td>Current force inventory</td>
<td>108 helicopters, including the OH58D Kiowa Warrior, UH60 Blackhawk, and CH47 Chinook</td>
</tr>
<tr>
<td>Vessels</td>
<td>Current force vessels.</td>
<td>Current inventory of LSVs and barges (For future additions, see Chapter 9, Cumulative Impacts)</td>
</tr>
<tr>
<td>Information systems</td>
<td>Computers in every vehicle</td>
<td>Computers in command centers</td>
</tr>
<tr>
<td>Communications</td>
<td>Internet</td>
<td>Voice over radio or telephone</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>SRAA, WPAA, Dillingham Trail, Helemano Road, and Kawaihae to PTA Trail</td>
<td>As needed on an individual case-by-case basis</td>
</tr>
<tr>
<td>New construction</td>
<td>Seven new ranges, two airfield upgrades, thirteen support facilities, and twenty communication antennas</td>
<td>As needed on a case-by-case basis (see Chapter 9, Cumulative Impacts)</td>
</tr>
<tr>
<td>Road improvements</td>
<td>Helemano Road, Dillingham Trail, and Kawaihae to PTA Trail</td>
<td>As needed on a case-by-case basis (see Chapter 9, Cumulative Impacts)</td>
</tr>
</tbody>
</table>

Source: US Army 2002b

\(^1\)The 3,008 is based on FY04 estimates.

\(^2\)The heaviest vehicles currently used are 5-ton 6-by-6 wheeled cargo trucks.

\(^3\)The 20-ton Stryker is heavier than the light wheeled vehicles currently used because it has armor on it, but it is lighter than other armored vehicles, such as Bradley armored personnel carriers, and also is much lighter than the M1A1 Abrams tank, which weighs 70 tons.
2. Description of the Proposed Action and Alternatives

Table 2-4
SBCT Projects Overview

<table>
<thead>
<tr>
<th>Graphics Code</th>
<th>1391 Project #</th>
<th>SBCT Project Title</th>
<th>Location</th>
<th>Construction Commences (Fiscal Year(^2))</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>58143</td>
<td>Urban Assault Course and Training Facilities</td>
<td>Schofield</td>
<td>2006</td>
<td>Construction</td>
</tr>
<tr>
<td>S2</td>
<td>57404</td>
<td>Virtual Fighting Training Facility</td>
<td>Schofield</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>S3</td>
<td>56923</td>
<td>Range Control Facility</td>
<td>Schofield</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>S4</td>
<td>58144</td>
<td>Battle Area Complex</td>
<td>Schofield</td>
<td>2005+</td>
<td>Construction</td>
</tr>
<tr>
<td>S5</td>
<td>57421/58925</td>
<td>Motor Pool Maintenance Shops</td>
<td>Schofield</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>S6</td>
<td>57416</td>
<td>Tactical Vehicle Wash Facility</td>
<td>East Range</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>S7</td>
<td>N/A</td>
<td>Fixed Tactical Internet</td>
<td>Schofield</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>S8</td>
<td>55270</td>
<td>South Range Land Acquisition</td>
<td>Schofield</td>
<td>2004</td>
<td>Additional Land</td>
</tr>
<tr>
<td>S9</td>
<td>57461</td>
<td>Qualification Training Range, QTR1</td>
<td>Schofield (M. Flats)</td>
<td>2004+</td>
<td>Construction</td>
</tr>
<tr>
<td>S10</td>
<td>57462</td>
<td>Qualification Training Range, QTR2</td>
<td>Schofield (S. Range)</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>S11</td>
<td>57422</td>
<td>Multiple Deployment Facility</td>
<td>Schofield (Wheeler)</td>
<td>2005</td>
<td>Construction, Renovation</td>
</tr>
<tr>
<td>S12</td>
<td>57405</td>
<td>Upgrade Airfield for C-130 Aircraft</td>
<td>Schofield (Wheeler)</td>
<td>2009+</td>
<td>Upgrade</td>
</tr>
<tr>
<td>D1</td>
<td>58161</td>
<td>Land Easement/Construct Road, SB/DMR</td>
<td>Dillingham</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>K1</td>
<td>57415</td>
<td>Tactical Vehicle Wash Facility</td>
<td>Kahuku</td>
<td>2007</td>
<td>Construction</td>
</tr>
<tr>
<td>K2</td>
<td>57305</td>
<td>Combined Arms Collective Training Facility</td>
<td>Kahuku</td>
<td>2005</td>
<td>Construction, Renovation</td>
</tr>
<tr>
<td>K3</td>
<td>57406</td>
<td>Road Construction, Schofield to Helemanō</td>
<td>Helemanō</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>K4</td>
<td>57802</td>
<td>Land Easement, Schofield to Helemanō</td>
<td>Helemanō</td>
<td>2004</td>
<td>Additional Land</td>
</tr>
<tr>
<td>P1</td>
<td>57197</td>
<td>Battle Area Complex</td>
<td>Pōhakauloa</td>
<td>2002</td>
<td>Construction</td>
</tr>
<tr>
<td>P2</td>
<td>57183</td>
<td>Anti-armor Live-fire and Tracking Range</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>P3</td>
<td>58273</td>
<td>Construct Military Vehicle Trail, PTA-Kawaihae</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>P4</td>
<td>58273</td>
<td>Land Easement for Military Vehicle Trail, PTA-Kawaihae</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Additional Land</td>
</tr>
<tr>
<td>P5</td>
<td>57417</td>
<td>Ammunition Storage</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>P6</td>
<td>57414</td>
<td>Tactical Vehicle Wash Facility</td>
<td>Pōhakauloa</td>
<td>2006</td>
<td>Construction</td>
</tr>
<tr>
<td>P7</td>
<td>57411</td>
<td>West PTA Maneuver Training Area Land Acquisition</td>
<td>Pōhakauloa</td>
<td>2005</td>
<td>Additional Land</td>
</tr>
<tr>
<td>P8</td>
<td>56994</td>
<td>Range Maintenance Facility</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Construction</td>
</tr>
<tr>
<td>P9</td>
<td>57408</td>
<td>Runway Upgrade/Extension, Bradshaw AAF</td>
<td>Pōhakauloa</td>
<td>2009+</td>
<td>Renovation</td>
</tr>
<tr>
<td>P10</td>
<td>N/A</td>
<td>Fixed Tactical Internet</td>
<td>Pōhakauloa</td>
<td>2005</td>
<td>Construction</td>
</tr>
<tr>
<td>P11</td>
<td>N/A</td>
<td>Installation Information Infrastructure Architecture</td>
<td>Pōhakauloa</td>
<td>2005</td>
<td>Construction</td>
</tr>
</tbody>
</table>

Source: US Army 2002a

\(^1\)Graphics code refers to the project locations shown on figures in Chapter 2 and in Appendix D.

\(^2\)Fiscal Year is based on current program guidance subject to change as a result of future funding availability.
Under the Proposed Action, the South Range Acquisition Area would be 1,400 acres (as shown) while under the Reduced Land Acquisition Alternative it would only be 100 acres (as shown on figure D-27).
Proposed action at Schofield Barracks Military Reservation includes the construction of various training and support facilities, the acquisition of additional land, and changes in the training activities and location. S7 Fixed Tactical Internet project sites are shown on Figure 2-7.

**Legend**
- **Project Areas**
- **Schofield Barracks Main Post Boundary**
- **Wheeler Army Airfield Boundary**
- **State Land Use District Boundary**

**Projects**
S1 Urban Assault Course and Training Facility
S2 Virtual Fighting Training Facility
S3 Range Control Facility
S4 Battle Area Complex
S5 Motor Pool Maintenance Shops
S6 Tactical Vehicle Wash Facility
S8 South Range Land Acquisition
S9 Qualification Training Range 1
S10 Qualification Training Range 2
S11 Multiple Deployment Facility
S12 Upgrade Airfield for C-130 Aircraft


**Proposed Action at Schofield Barracks**
**Military Reservation and Wheeler Army Airfield**
O'ahu, Hawai'i

**Figure 2-8**
The project locations at KTA are the same for both the Proposed Action and Reduced Land Acquisition Alternative. The proposed CACTF includes renovation of existing buildings at the old NCO Site and new construction at the other two MOUT sites.

Project Locations at Kahuku Training Area

O'ahu, Hawai'i

Figure 2-9
Figure 2-10

Pōhakuloa Project Overview

Legend

- Pōhakuloa Training Area Boundary
- P1 Battle Area Complex
- P2 Anti-Armor Live-fire and Tracking Range
- P3/P4 Pōhakuloa to Kawaihae Trail
- P7 West PTA Maneuver Training Area Land Acquisition
- Qualification Training Range 2
- 1010 Land Acquisition Area
- P10 Fixed Tactical Internet
- Main Road

Source: CEMML 2002, Tetra Tech, Inc. 2002

Island of Hawai'i, Hawai'i

Qualification Training Range 2 would not be constructed at PTA under the Proposed Action but would be under the Reduced Land Acquisition Alternative. This is the only difference at PTA between the two alternatives.
2. Description of the Proposed Action and Alternatives

Figure 2-11
Cantonment Area Projects at Pōhakuloa Training Area
## Table 2-5

### Proposed Action (Preferred Alternative), Reduced Land Acquisition Alternative, and No Action Alternative Overview

<table>
<thead>
<tr>
<th>Training</th>
<th>SBMR and Wheeler Army Airfield</th>
<th>Proposed Action (Preferred Alternative)</th>
<th>KTA/KLOA</th>
<th>PTA</th>
<th>Reduced Land Acquisition Alternative</th>
<th>No Action Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live-fire exercises</td>
<td>Live-fire exercises would continue.</td>
<td>None</td>
<td>Live-fire SRA training introduced at the 30-85 acre site at KTA.</td>
<td>Live-fire exercises would continue on existing lands, no live-fire on WPAA.</td>
<td>None</td>
<td>Live-fire exercises at SBMR and PTA as part of current operations would continue at current levels.</td>
</tr>
<tr>
<td>Vehicles used</td>
<td>Increase of 346 emissions-producing vehicles to 1,205 vehicles (including 291 Strykers), which would be based at SBMR. Maneuvers at KTA and SBMR may involve the use of 90 emission-producing vehicles at SBMR.</td>
<td>One to 54 vehicles (includes one to 37 Strykers)</td>
<td>One to 300 vehicles (includes one to 150 Strykers)</td>
<td>97 to 400 vehicles (includes 33 to 192 Strykers)</td>
<td>None</td>
<td>699 emission-producing vehicles.</td>
</tr>
<tr>
<td>Official maneuvers Training (9,300 acres)</td>
<td>No training on WPAA.</td>
<td>No change in training.</td>
<td>No change in training.</td>
<td>Some training would continue.</td>
<td>None</td>
<td>No Strykers would be used. Continued use of wheeled vehicles at SBMR, DMR, KTA, and PTA.</td>
</tr>
<tr>
<td>Weapon used</td>
<td>Current force weapons plus 105mm cannon on wheeled armament system and the 30mm-mounted gun from existing 360mm trenches in existing 125mm trenches.</td>
<td>No change in weapon fired.</td>
<td>No change in weapon fired.</td>
<td>No new aircraft activity except for UAV flights from SBMR to PTA.</td>
<td>None</td>
<td>Existing weapon would continue to be used.</td>
</tr>
<tr>
<td>Aircraft and UAVs</td>
<td>No new aircraft activity.</td>
<td>No new aircraft activity.</td>
<td>No new aircraft activity.</td>
<td>No new aircraft activity except for UAV flights from SBMR to PTA.</td>
<td>None</td>
<td>Continued flight support from current force training.</td>
</tr>
<tr>
<td>Troop transport</td>
<td>Troops would be transported via company-level, plus support units.</td>
<td>Troops transported from SBMR to DMR.</td>
<td>Troops transported from SBMR to KTA.</td>
<td>Troops would be transported from Kawaihae Harbor to WPAA by Strykers, trucks, up to brigade level, in groups of 30 vehicles.</td>
<td>None</td>
<td>No change in troop transport except for marine transport.</td>
</tr>
<tr>
<td>Weapon/Ordnance/T准确 Transport</td>
<td>None</td>
<td>No change from current plans.</td>
<td>No change from current plans.</td>
<td>None</td>
<td>No change from current plans.</td>
<td>No change from current plans.</td>
</tr>
<tr>
<td>Construction/Demolition</td>
<td>Four new ranges built: QTR1, QTR2, Urban Assault Course, and Battle Area Complex.</td>
<td>Two new ranges built: Battle Area Complex and 35S Training Facility.</td>
<td>No new facilities.</td>
<td>None.</td>
<td>No new facilities.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Airfield upgrade</td>
<td>Upgrade parking spaces at Wheeler Army Airfield for C-130 operations.</td>
<td>Upgrade parking spaces at Wheeler Army Airfield for C-130 operations.</td>
<td>None.</td>
<td>None.</td>
<td>No new airfields.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Tactical vehicle wash</td>
<td>One tactical vehicle wash would be constructed.</td>
<td>One tactical vehicle wash would be constructed.</td>
<td>None.</td>
<td>None.</td>
<td>One tactical vehicle wash would be constructed.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Installation infrastructure architecture (I3A)</td>
<td>None.</td>
<td>I3A would be constructed.</td>
<td>None.</td>
<td>None.</td>
<td>I3A would be constructed.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Range control facilities</td>
<td>Range Control Facility built (eight buildings would be demolished: 1124, 1125, 1135, 1140, 1189, 1195, 1204, 1212).</td>
<td>Range maintenance facility built (three buildings demolished: 1124, 1125, 1212).</td>
<td>None.</td>
<td>None.</td>
<td>Range maintenance facility built (three buildings demolished: 1124, 1125, 1212).</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Support facilities</td>
<td>Motor pool maintenance shops and multiple deployment facilities.</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
<td>Expanding ammunition storage facility with three new ammunition storage facilities.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Antennas (fixed tactical)</td>
<td>Three antennas built: two within DMR, and one at Wheeler Army Airfield.</td>
<td>Ten antennas built within and surrounding PTA and one antenna at Kawaihae Harbor.</td>
<td>Ten antennas built within and surrounding PTA and one antenna at Kawaihae Harbor.</td>
<td>None.</td>
<td>Ten antennas built within and surrounding PTA and one antenna at Kawaihae Harbor.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Road improvements</td>
<td>Construct a 1.5-mile-long (2.4-kilometer-long) road from SBMR to Holua Island.</td>
<td>Construct a 1.5-mile-long (2.4-kilometer-long) road from SBMR to Holua Island.</td>
<td>None.</td>
<td>None.</td>
<td>Construct a 1.5-mile-long (2.4-kilometer-long) road from SBMR to Holua Island.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>Less than 20 acres (9 hectares) for current purposes.</td>
<td>Approximately 100 acres (40 hectares) at SBMR and approximately 10 acres (4 hectares) at WPAA.</td>
<td>None.</td>
<td>None.</td>
<td>Land acquisitions may be conducted on a case-by-case basis.</td>
<td></td>
</tr>
<tr>
<td>Easements</td>
<td>Acquire a perpetual easement of 15 acres (6 hectares) from private property.</td>
<td>Acquire a perpetual easement of 15 acres (6 hectares) from private property.</td>
<td>None.</td>
<td>None.</td>
<td>Acquire a perpetual easement of 15 acres (6 hectares) from private property.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
<tr>
<td>Personnel</td>
<td>Increase in 800 family members, with 929 spouses and 1,053 children.</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
<td>Increase in 800 family members, with 929 spouses and 1,053 children.</td>
<td>Projects may be reprogrammed based on future condition or costs.</td>
</tr>
</tbody>
</table>

### Source:

US Army 2002a

May 2004

Styker Brigade Combat Team Final EIS, Hawaii
analyzes only the conversion of the 2nd Brigade to an SBCT and not its ultimate conversion to the future force; a separate NEPA analysis would be done for that next phase as appropriate. Major elements of the SBCT include the following:

- Three Motorized Infantry Battalions, each composed of three Combined Arms Rifle Companies and a Headquarters Company;
- Reconnaissance, Surveillance, and Target Acquisition Squadron (RSTA);
- Antitank Company;
- Field Artillery Battalion;
- Aviation Task Force;
- Engineer Company;
- Brigade Support Battalion;
- Brigade Headquarters and Headquarters Company;
- Signal Company; and
- Military Intelligence Company.

Each major element of the SBCT is composed of a number of smaller units. Individual training activities often consist of section-, team-, squad-, and platoon-sized units operating in a dispersed but coordinated manner. Despite some changes in equipment, capability, and training doctrine, training activities are anticipated to be very similar to those currently conducted by light infantry brigades stationed on and training on O‘ahu and the island of Hawai‘i. However, the number of Soldiers is expected to increase by 810 and the total number of rounds to be fired by all Soldiers trained at USARHAW by 25 percent. This would increase overall training throughput, which would necessitate the construction and update of ranges and facilities to meet the SBCT training requirements. The addition of the Stryker and the need for increased mounted maneuver training would require the acquisition of additional lands.

After the publication of the EIS, the Army announced plans for an enhancement package for SBCTs. The enhancements include an aviation task force, an increase from twelve to eighteen 155mm howitzers in the direct support artillery battalion, and improvements to command, control, communications, computer, and intelligence (C4I) assets. The announcements indicated that the aviation task force would include Comanche helicopters when the aircraft were ready for fielding. In February 2004, the Army determined that no further testing or fielding of Comanches would occur and canceled the Comanche program. The SBCT aviation task force will come from existing 25th ID(L) aviation brigade assets and will result in minor changes to training, primarily some increased aviation training over WPAA in support of units training in that area. The FEIS has analyzed the impacts of the increased aviation training over WPAA and those impacts are minimal. The EIS analyzed the impacts of twelve 155mm howitzers, a change from the 18 105mm howitzers currently in the direct support artillery battalion for 2nd brigade. The addition of another six 155mm howitzers was analyzed in the FEIS and resulted in minimal changes to noise impacts and no
change in the overall determination of effect. The C4I improvements are not expected to have any impacts on the environment.

Overall, the Army has determined that the enhancements are within the original scope of the Proposed Action as described in the EIS, are minor, and do not require a supplemental EIS.

An evaluation of training facilities shows that they do not provide the necessary opportunities for training an SBCT (Nakata Planning Group 2002a). Under this alternative, training capabilities would be enhanced as part of transforming the 2nd Brigade to an SBCT. The Army’s proposed changes to training would rectify training resource shortfalls for SBCT units and would reorient resources to meet evolving mission-related requirements. In order to meet present and future missions, USARHAW units must have modernized maneuver areas, training facilities, and other support facilities, such as infrastructure and telecommunications.

In selecting specific construction projects to meet the training shortfall for SBCT and to minimize costs and impacts on the environment and communities, planners attempted to first use existing USARHAW lands and ranges, where possible, to upgrade existing ranges and facilities, to build new ranges on existing training areas, and, if necessary, to acquire new training lands. Once project alternatives were developed, they were further evaluated and selected based on the following factors: the extent to which they provided mission support; the extent to which they minimized environmental impacts and contributed to environmental stewardship; their economic feasibility; and the extent to which they increased training productivity. Each final site location was further adjusted as necessary to avoid or minimize impacts on natural and cultural resources.

An SBCT deploys very rapidly, executes early entry, and conducts effective combat operations immediately on arrival to prevent, contain, stabilize, or resolve a conflict. An SBCT participates in major war as a subordinate component within a division or corps, in a variety of possible roles. To deploy rapidly, the brigade’s design uses a highly mobile, medium-weight armored combat/combat support platform, with a minimum of personnel and logistical support. Preconfigured in ready-to-fight combined arms packages, the entire SBCT can be deployed anywhere in the world and can begin operations within 96 hours of deployment. Once in the field, the SBCT can self-deploy up to 500 miles in a 12-hour period and can sustain operations for up to 72 hours without resupply. SBCT description, operations, and capabilities are largely derived from the SBCT organizational and operational concept (HQDA 2000). The SBCT is organized primarily as a combined arms, mounted infantry organization. The Stryker Infantry Carrier Vehicle (ICV) serves as the platform for infantry carriers, mobile gun systems, mortars, reconnaissance, surveillance, and target acquisition elements, anti-tank carriers, engineer mobility support vehicles, nuclear/biological/chemical reconnaissance, as well as many of the command and control carriers within the brigade. As a supporting brigade to a light division, the SBCT extends the tactical mobility available to the division commander and increases the firepower available to support dismounted infantry assaults. The typical size and composition of each element of a brigade is presented in Table 2-2.
2.3.1 SBCT Systems Fielding

This element of the Proposed Action involves fielding new and modernized vehicles, weapons systems, and equipment for Interim Forces and, ultimately, the future force, although there will be some upgrades, changes and additions.

Foremost among the new systems is the Stryker, an eight-wheeled, 23-foot (7-meter) long, 9-foot (3-meter) wide, 20-ton (18-metric ton) combat vehicle that can be transported on the C-130 aircraft. The Stryker vehicle has a 350-horsepower Caterpillar Model 3126 diesel engine and can travel at a maximum speed of 60 miles per hour for 330 miles on one full tank of fuel. It represents a substantial improvement in strategic mobility for brigade-sized units and can be designed to accomplish several different tasks. The primary design of the Stryker has two variants: the ICV and the mobile gun system (MGS). The ICV (Photo 2-1) can carry nine Soldiers and their equipment and requires a driver and a vehicle commander. The MGS (Photo 2-2) would be mounted on the Stryker and modified to incorporate a 105mm turreted cannon and autoloader system with a crew of three. Twenty-seven of the 291 Strykers would be MGSs. The actual vehicle used by SBCT may vary from the current Stryker vehicles as the system is developed, but overall will have the same characteristics as the current Stryker. (There are eight other configurations of the Stryker that could be used as part of the SBCT; information on the ICV, MGS, and the eight other Stryker variants is provided in Appendix C.)

Photo 2-1. Stryker infantry carrier vehicle.
If the design of the Stryker or other vehicles used in SBCT are changed in such a manner as to result in a significant environmental impact not analyzed in this document, the Army would conduct appropriate NEPA analysis and would comply with all appropriate laws and regulations prior to implementation. In this study, the Army would analyze the potential for significant impacts on those resource areas that could be affected by the design change.

The SBCT would be equipped with a tactical unmanned aerial vehicle (UAV) similar to the RQ-7A “Shadow 200” (Photo 2-3) to provide day or night reconnaissance, surveillance, and target acquisition capability. The UAV can be likened to a large radio controlled model airplane. The UAV would allow tactical commanders a view into heavily protected battle space that could not be penetrated by other intelligence assets or that presents a high risk to piloted aircraft. Each UAV system includes three unpiloted aircraft equipped with imagery sensors, a ground vehicle to carry the aircraft, two ground control stations mounted on vehicles, and launch, recovery, and support equipment pulled on trailers behind the vehicles. The aircraft weighs approximately 325 pounds, has a wingspan of 13 feet (4 meters), and measures 11 feet (3.4 meters) from nose to tail.
Barges and logistic support vessels (LSV) are currently used for transporting equipment and troops from Pearl Harbor to Kawaihae Harbor for training at PTA. LSV trips would increase by 6 per year, a 10 percent increase under SBCT. New high-speed theater support vessels (TSV) may replace the LSV in the future. Before the TSVs are fielded appropriate NEPA documentation will be prepared including ESA and NHPA consultation if required. The potential impacts of the TSV are discussed in Chapter 9 under cumulative impacts.

The weapons systems in the SBCT would be the same as currently used by, or proposed for, existing units in the 25th ID (L) or the Hawai'i Army National Guard, with the exception of the introduction of the 105mm MGS on the Stryker and the 120mm mortar and an increase of from 12 to 18 155mm howitzers.

2.3.2 Construction

Proposed construction includes building, modernizing, and remodeling buildings, training facilities (e.g., live-fire training facilities), and infrastructure and demolishing buildings and facilities. It also involves ground softening at the PTA Battle Area Complex (BAX) and antiarmor live-fire and tracking range (AALFTR) by using a D-10 bulldozer that will drive back and forth over areas on the ranges to crush lava, large rocks, and hard soil to provide a softer substrate for Soldiers to train. Both of these ranges are constructed over existing ranges, so ground-softening activities would occur as needed on already heavily disturbed areas. The precise location and extent of ground softening would depend on final orientation of firing points and targets but is expected to cover a fraction of the 2,825-acre (1,143-hectare) area of the two ranges.

Proposed construction also includes Dillingham Trail, Helemano Trail, and PTA Trail on land to be acquired as described in Section 2.3.3. Of the 25 locations evaluated for construction of the Fixed Tactical Internet antennas on O'ahu and Hawai'i, a maximum of eight will be selected on each island from the locations represented in the EIS. Locations will be chosen based on the most suitable locations for communication logistics and avoidance of environmental concerns, such as cultural and biological resources. See Table 2-4, Figures 2-7 to 2-11, and Appendix D for details on the construction projects.

2.3.3 Land Acquisition/Easements

This part of the Proposed Action involves real property acquisition, which means negotiating temporary or permanent control of property for Army use, mainly through purchase, lease, or permit. Under the Proposed Action, two areas would be acquired and three easements would be obtained. The two areas identified for acquisition are the South Range Acquisition Area (SRAA) (approximately 1,402 acres [567 hectares]) at SBMR and the West PTA Acquisition Area (WPAA) (approximately 23,000 acres [9,308 hectares]). These parcels were selected because of their proximity to existing installations. The parcels' acreages would provide enough land for new facilities and, when combined with existing installations, adequate acreages for mounted maneuver training.

After it has acquired WPAA, the Army plans to construct about 28 miles of gravel training roads, the location of which are as yet undetermined. The Army would comply with all applicable environmental statutes, including but not limited to NEPA, the ESA, and the...
2. Description of the Proposed Action and Alternatives

NHPA, in determining the location and potential impacts of these roads before construction. The Army would also consult with adjacent property owners and other interested parties on the location of the proposed training roads in order to address and resolve potential air quality and dust concerns.

Although the SRAA would become part of SBMR it is different from the existing South Range, which includes several existing qualification ranges and is just north of the proposed SRAA. The three easements for military vehicle trails would include the trails between SBMR and DMR (known as the Dillingham Trail, 36 acres (14.6 hectares), between SBMR and HMR (known as the Helemanō Trail, 13 acres (5.3 hectares), and between Kawaihae Harbor and PTA (known as the PTA Trail, 132 acres (53.4 hectares). While the Army would not own the underlying land, the easement is a property right to the land. Until trail construction is complete, the Army would use public roads for travel from SBMR to DMR and KTA, and from Kawaihae to PTA. See Figure 2-8 and Appendix D for maps and more details on the land acquisition projects.

2.3.4 SBCT Training

The following subsections describe the SBCT training that would occur under the Proposed Action, with emphasis on the differences between SBCT training and the current force training. Most of the nonlive-fire and other training that does not involve maneuvers by SBCT forces would be similar to that currently being conducted by the 25th ID (L). As with current force training, exercises would continue to be at the squad through company level, with some opportunities for battalion and above training. Urban operations training is more highly emphasized in SBCT requirements. The SBCT would use new urban warfare facilities extensively and would use existing helicopter landing and pickup zones. Nonlive-fire training also is conducted in classrooms, on rappel towers, and obstacle courses, and in a variety of specialized facilities. Table 2-6 compares training under the Proposed Action and No Action Alternatives, and Table 2-7 compares military vehicular traffic between training areas. Table 2-9, under Requirements for SBCT, lists the minimum number of days of training that would take place for specific training.

Doctrine that has thus far been developed for the SBCT may be refined, based on experience following initial operating capability of the unit.

Mounted Maneuver Training

Doctrine provides that the area of operations for which the SBCT could be responsible in combat is normally 31 miles by 31 miles (50 kilometers by 50 kilometers) (Nakata 2002b). On the premise that the Army must train as it intends to fight, the training lands must be sufficient and widely spread to approximate operating in an area that size by simulating the density of units and activities that might occur during combat.
## Table 2-6
### Summary of Training Activities by Installation

<table>
<thead>
<tr>
<th>Training Area</th>
<th>Maneuver Acreage</th>
<th>Proposed Action</th>
<th>No Action</th>
<th>Maneuver Acreage</th>
<th>Proposed Action</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBMR Main Post</td>
<td>0 1,235 Bde</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
<td>0 1,235 Bde</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
</tr>
<tr>
<td>SBER 2,223 2,223 Co</td>
<td>☑ ☑</td>
<td>19,125</td>
<td>☑ ☑</td>
<td>0 2,223 2,223 Co</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
</tr>
<tr>
<td>WAAF 0 494 n/a</td>
<td>0</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
<td>0 494 n/a</td>
<td>0</td>
<td>☑ ☑</td>
</tr>
<tr>
<td>SRAA 1,300 1,300 Pt</td>
<td>☑ ☑</td>
<td>25,855</td>
<td>☑ ☑</td>
<td>0 0 Pt</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
</tr>
<tr>
<td>DMR 354 354 Co</td>
<td>☑ ☑</td>
<td>4,335</td>
<td>☑ ☑</td>
<td>354 354 Co</td>
<td>☑ ☑</td>
<td>1,710</td>
</tr>
<tr>
<td>KTA 4,569 4,569 Bde</td>
<td>☑ ☑</td>
<td>13,772</td>
<td>☑ ☑</td>
<td>4,569 4,569 Bde</td>
<td>☑ ☑</td>
<td>7,211</td>
</tr>
<tr>
<td>KLOA 0 5,310 Co</td>
<td>☑ ☑</td>
<td>0</td>
<td>☑ ☑</td>
<td>0 5,310 Co</td>
<td>☑ ☑</td>
<td>0</td>
</tr>
<tr>
<td>PTA 18,000 56,661 Bde</td>
<td>☑ ☑</td>
<td>25,855</td>
<td>☑ ☑</td>
<td>18,000 71,880 Bde</td>
<td>☑ ☑</td>
<td>13,659</td>
</tr>
<tr>
<td>PTAB 0 23,000 23,000 Bde</td>
<td>☑ ☑</td>
<td>61,894</td>
<td>☑ ☑</td>
<td>0</td>
<td>☑ ☑</td>
<td>☑ ☑</td>
</tr>
</tbody>
</table>

**Notes:**

1. SRTA only
2. Mounted maneuver training would take place along Drum Road in transit to KTA.
3. Although dismounted maneuver acreage is available, this training is not currently conducted at WAAF.
4. Current mounted and dismounted maneuver training at WPAA is done on a training event basis by individual lease agreement.

Co = Company
Pt = Platoon
Bn = Battalion
Bde = Brigade
n/a = Not applicable/activity does not occur
☑ = Activity occurs or will occur

*Note: RLA Alternative has the same training activities as the Proposed Action, with the exception of no live-fire weapons qualification and no off-road maneuvers at SRAA.*
### Table 2-7

Estimated Military Vehicle Traffic Between Schofield and Dillingham and Kahuku, and Between Kawaihae and PTA

<table>
<thead>
<tr>
<th>SBMR-DMR</th>
<th>SBMR-KTA</th>
<th>Kawaihae-PTA</th>
<th>DMR-KTA²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicles Number Per of Convoy</strong></td>
<td><strong>Vehicles Number of Convoy</strong></td>
<td><strong>Vehicles Number of Convoy</strong></td>
<td><strong>Vehicles Number of Convoy</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Number Convoy</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
<td><strong>Annual Frequency</strong></td>
<td><strong>% Trail-Roadway Split¹</strong></td>
</tr>
<tr>
<td><strong>Company Level Exercises</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>15</td>
<td>1</td>
<td>All Road</td>
</tr>
<tr>
<td>SBCT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strykers</td>
<td>11</td>
<td>1</td>
<td>90/10</td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>6</td>
<td>1</td>
<td>60/40</td>
</tr>
<tr>
<td><strong>Battalion Level Exercises</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SBCT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strykers</td>
<td>11</td>
<td>1</td>
<td>90/10</td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>6</td>
<td>1</td>
<td>60/40</td>
</tr>
<tr>
<td><strong>Brigade Level Exercises</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>24</td>
<td>8</td>
<td>All Road</td>
</tr>
<tr>
<td>SBCT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strykers</td>
<td>6</td>
<td>1</td>
<td>90/10</td>
</tr>
<tr>
<td>Trucks and HMMWVs</td>
<td>24</td>
<td>8</td>
<td>60/40</td>
</tr>
</tbody>
</table>

Notes:

1. Split between trails and public roadway estimated as a worst case for public roadway travel.
2. Travel would be entirely on public roadways.
3. Current force would not conduct multi-location exercise.
2. Description of the Proposed Action and Alternatives

Prior Army training doctrine called for using large areas of contiguous maneuver land. This would be preferable if available, but the advent of advanced communication makes it possible for the SBCT to train on noncontiguous parcels of land, even on separate islands, and still simulate operating in a 31-mile by 31-mile (50-kilometer by 50-kilometer) area. For example, while the entire SBCT cannot train within the WPAA, all squad, platoon, company, battalion, and a portion of the brigade tasks can be accomplished there. Only nonlive-fire maneuver training will be done in the WPAA. All training in the WPAA will be supported from PTA. Table 2-8 gives the 2002 land use requirements study (LURS) acreages for existing maneuver land available to the Army in Hawai‘i (US Army 1997c). The table shows that a total of 34,637 acres (14,017 hectares) of suitable training land is available to USARHAW units for dismounted and mounted training. (Other lands are unsuitable for a variety of reasons, because they include cantonment areas, are too steep, or are set aside for environmental reasons.)

Table 2-8
Existing Maneuver Land (in acres)

<table>
<thead>
<tr>
<th>Training Area</th>
<th>Suitable Terrain</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBMR</td>
<td>1,235 (500 hectares)</td>
</tr>
<tr>
<td>SBER</td>
<td>2,223 (900 hectares)</td>
</tr>
<tr>
<td>WAAF</td>
<td>494 (200 hectares)</td>
</tr>
<tr>
<td>MMR</td>
<td>1,034 (418 hectares)</td>
</tr>
<tr>
<td>DMR</td>
<td>354 (143 hectares)</td>
</tr>
<tr>
<td>KLOA</td>
<td>5,310 (2,149 hectares)</td>
</tr>
<tr>
<td>KTA</td>
<td>4,569 (1,849 hectares)</td>
</tr>
<tr>
<td>PTA</td>
<td>56,661 (22,930 hectares)</td>
</tr>
<tr>
<td>Total</td>
<td>71,880 (29,089 hectares)</td>
</tr>
</tbody>
</table>

Source: Land Use Requirements Study (US Army 1997c)

The RTLP Range Development Plan (RDP) describes the land required for individual maneuvers necessary to meet the training requirements for combat within a 31-mile by 31-mile (50-kilometer by 50-kilometer) area (Nakata Planning Group, LLC 2002a). By looking at the amount of land required to support these individual maneuvers the total maneuver lands needed can be determined. The largest of these maneuvers is the semiannual “movement to contact” exercise for the SBCT as a whole, which requires 122,564 acres (49,600 hectares). The same maneuver at the battalion level is to be conducted four times per year and requires only half as much land (61,281 acres [24,801 hectares]).

The Proposed Action encompasses two land acquisitions that would increase the amount of maneuver land available: the South Range land acquisition of approximately 1,402 acres (567 hectares), approximately 1,300 acres (526 hectares) of which would be used for maneuver, and the West PTA maneuver training area land acquisition of up to 23,000 acres (9,308 hectares). These land acquisitions would add up to 24,300 acres (9,834 hectares) to the inventory of 71,880 acres (29,089 hectares) of existing maneuver lands shown in Table 2-8, bringing the total available to 96,180 acres (38,923 hectares). This is approximately 78
percent of the goal, which, when combined with training available along the proposed military use trails, will meet mounted maneuver training needs. Although the most notable physical difference between the current force and SBCT forces is the introduction of the Stryker vehicle, operations and capabilities would also change. The Stryker vehicle is primarily a troop transport vehicle that would traverse terrain and obstacles to ensure protected delivery of infantry squads to their dismount points. Because of the limitations of the Stryker, most mounted movement takes place on roads or unrestricted terrain. The Stryker can maneuver across a slope that is less than 30 percent, up a slope that is less than 60 percent, and over trees less than five inches (13 centimeters) in diameter. In addition, the Stryker would not be allowed in areas subject to other restrictions, such as those containing sensitive species or cultural features resources. The number of Strykers involved in training exercises would depend on the capacity of the training area involved. All 1,005 emission-producing vehicles (including 291 Strykers) would be based at SBMR and would deploy for training as required. Mounted maneuver training at the South Range Acquisition Area would involve from one to 96 Strykers, one to 27 at DMR, one to 96 at KTA, and 32 to 192 at PTA. There would be no mounted maneuvers in KLOA, except along Drum Road.

**Dismounted Maneuver Training**

As described above, Strykers would rapidly transport troops to a predetermined action area, where they would conduct dismounted maneuvers to train for enemy engagement. At times, training may include only dismounted maneuvers without the Stryker. During dismounted maneuvers Soldiers would walk in dispersed groups overland toward a given objective. During simulated engagement, Soldiers would seek cover or concealment, and one section may provide a base of weapons fire, while another maneuvers toward the objective.

During extended maneuver training, Soldiers may sleep in the field. To allow for quick deployment, they would not set up tents. Training may involve live-fire and nonlive-fire exercises. Nonlive-fire exercises use blank ammunition, laser weapons, and simulated artillery and mortar fire with pyrotechnics. During nonlive-fire training there would be no aerial pyrotechnics allowed. If used, helicopters would land in established landing zones.

**Reconnaissance Training**

Reconnaissance training would be carried out in a similar manner as the current force reconnaissance training, except that UAVs would provide air reconnaissance that, in combination with ground reconnaissance, would provide situational awareness and knowledge throughout a larger area.

It is anticipated that the UAV’s total flying hours would amount to 2,400 hours of flight per year (4 UAVs at 600 hours per year), or 600 takeoffs and landings per year. The UAVs would not need to take off from or land at ordinary airfields but could be launched from any location using their own hydraulic launchers. An arrested recovery system using nets and/or cables would also be used, minimizing the area required for launch and recovery. Due to this mobility, most of the launch and recovery sites would be within the existing restricted airspace on O’ahu and the island of Hawai’i. However, launching from WAAF or BAAF may be desired for routine training and maintenance. Before such training and maintenance flights, the Army would coordinate with and obtain approval from the Federal Aviation
Administration (FAA). UAVs would not be launched or recovered at DMR, KTA, KLOA or West PTA, although they would be flown over KTA and WPAA under visual ground monitoring.

**Live-Fire Training**

The transformed brigade would use new and existing live-fire ranges and firing points. SBCT units would perform individual weapon and combined arms live-fire training. Use of pyrotechnics, obscurants, and simulators is anticipated to be similar to current force use. All SBCT training would be planned and conducted in accordance with established USARHAW range and training land regulations and standard operational procedures (SOPs). The SBCT would use the same weapons and explosives as the current force, with the addition of the 105mm mobile gun system on the Stryker and the 120mm mortar and a change from 12 105mm howitzers to 18 155mm howitzers. All current forces at USARHAW use approximately 16 million rounds and individual explosives per year at the various ranges in Hawai’i. SBCT forces with a current force Brigade would use approximately 20 million rounds and individual explosives per year as part of SBCT training, an increase of 25 percent. No live-fire training would be conducted at WAAF, KLOA, DMR or WPAA. Table 2-9 compares the ammunition used for the Proposed Action to the No Action Alternative.

### Table 2-9

<table>
<thead>
<tr>
<th>Ammunition</th>
<th>No Action</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE Artillery (&gt;40 mm)</td>
<td>17,952</td>
<td>22,434</td>
</tr>
<tr>
<td>Non-HE Artillery (&gt;40 mm)</td>
<td>174,520</td>
<td>284,390</td>
</tr>
<tr>
<td>Mortar Rounds (60, 81, 120 mm)</td>
<td>6,836</td>
<td>14,022</td>
</tr>
<tr>
<td>Non-HE Mortar Rounds (60, 81, 120 mm)</td>
<td>11,740</td>
<td>18,176</td>
</tr>
<tr>
<td>Rockets</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Mines</td>
<td>1,088</td>
<td>1,087</td>
</tr>
<tr>
<td>Demolition/Breeching Charges</td>
<td>283,675</td>
<td>205,229</td>
</tr>
<tr>
<td>Standard Live Ammunition (Small Arms)</td>
<td>7,297,358</td>
<td>9,314,025</td>
</tr>
<tr>
<td>Tracer Rounds (Small Arms)</td>
<td>2,807,282</td>
<td>4,051,655</td>
</tr>
<tr>
<td>Blanks/SRTA Rounds (Small Arms)</td>
<td>3,738,584</td>
<td>5,127,061</td>
</tr>
<tr>
<td>Pyrotechnics</td>
<td>588,380</td>
<td>91,955</td>
</tr>
<tr>
<td>Fuses</td>
<td>575,378</td>
<td>120,248</td>
</tr>
</tbody>
</table>

Existing military operations on the urban terrain assault course at SBMR are inadequate to satisfy the SBCT training requirements for the Stryker MGS, light armored vehicle and reconnaissance armored vehicle because it does not have an urban assault course training facility (UACTF), breach facility, or live-fire shoot house. The proposed UACTF at SBMR would provide facilities to train Soldiers in the proper techniques associated with urban combat. These exercises would be conducted with mobile support. The BAX is proposed to provide a realistic battle area for company-level infantry units (dismounted or with supporting vehicles) in need of live-fire training required for an SBCT, which does not exist on O'ahu and the island of Hawai’i. QTR1 is proposed at SBMR to allow consolidation of small arms qualification training that currently is spread across a wide area, requiring units to
occupy numerous antiquated ranges. Ranges for modified record fire and combat pistol qualification on SBMR are nonstandard and conflict with higher priority ranges or other proposed ranges. The construction of QTR2 would eliminate this conflict and would provide a modern training facility. A special use airspace, called a controlled firing area (CFA), would be established above QTR2 to contain activities that, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft. Hawai'i-based units lack a large range to train Soldiers in an urban environment under simulated conditions. The proposed CACTF at KTA would provide a 24 building, SRTA live-fire, facility and range operation support facility to fill that need.

A BAX is proposed at PTA to provide brigade-level CALFEXs not found in Hawai'i. The BAX would provide for gunnery training for MGS, armored vehicle training, or armored vehicle reconnaissance vehicles. Construction at PTA allows enough space for brigade-level CALFEXs that cannot be conducted at SBMR. There currently is no range for anti-armor live-fire and tracking training, which is necessary for supporting Strykers and anti-armor forces firing from HMMWVs. The AALFTR would enable individual and collective gunnery training that simulates sweeping gunfire during movement along the flank of an opposing force.

Service Support Operations and Training
There would be no change in service support operations and training under the Proposed Action. Training would be carried out in a manner similar to current force training.

Deployment Training
Deployment training would principally involve moving troops and equipment from SBMR to the other training areas in Hawai'i or to the continental US. As with current force training, transportation would use a combination of vehicles, high-speed vessels, and C-17 and C-130 aircraft, depending on the type and location of training. Deployment training would be similar to the current training, except SBCT units would be deployed at least twice a year to PTA from HAFB or WAAF using one to two C-17 or C-130 aircraft. Equipment would be deployed to PTA by 6 more individual LSV roundtrips a year. There are no adequate facilities to support deployment activities from multiple airfields in Hawai'i. The proposed Multiple Deployment Facility would provide the facilities necessary for SBCT to prepare equipment and vehicles for deployment from either WAAF or HAFB. Stryker vehicles and trucks would also move Soldiers and equipment from SBMR to other training areas. Those that travel on public roads would follow the rules for convoys as spelled out in Section 2.2.3.

Aviation Training
The number and types of aircraft used for aviation training are expected to be the same as under current force training, with the exception of UAVs. However, the SBCT will not rely on helicopters in the same way light infantry units do. SBCT aviation units will not be used to transport troops but will be used more for supply, convoy support, and close air support. There will not be as many air assault operations during SBCT training.

The aircraft that are used in support of current forces in Hawai'i are the armed reconnaissance OH58D Kiowa Warriors, utility lift UH60 Blackhawks, and the medium lift
CH47 Chinook. The individual use and frequency of the UAVs has yet to be determined, as it would be dictated by each individual training scenario.

**Combined Live-Fire/Maneuver Training**

SBCT forces would conduct dismounted training to include company-level CALFEXs. The only increase in CALFEXs would be from the introduction of the RSTA Squadron, which could conduct up to three company CALFEXs per year. The SBCT dismounted CALFEXs would be similar to the CALFEXs conducted by the current force, using the same types of weapons and similar tactics. SBCT dismounted CALFEX training would occur at several ranges throughout Hawai‘i including the SBMR BAX (company-level), PTA BAX (brigade-level), and possibly MMR (company-level).

MMR is important to military training in Hawai‘i. Although SBCT training does not depend on it, SBCT forces would use MMR if the range were available after completion of the MMR FEIS and ROD. The MMR EIS will analyze the potential environmental impacts associated with dismounted CALFEXs for both current force and SBCT; therefore, this SBCT EIS does not analyze training impacts of SBCT at MMR.

**Force-on-Force Training**

There would be no change in force-on-force training under the Proposed Action, except for the nonlive-fire training at WPAA. However, there would be additional organizations, such as the RSTA Squadron and Anti-Armor Company, which would support the force-on-force units. Force-on-force training would still occur at SBMR, KTA, and existing PTA installations.

**2.3.5 Institutional Programs**

Total Army transformation also affects installation management. Installation management that directly affects the environment includes range management, environmental management, and real property management. The programs described below reflect ongoing programs and total Army transformation changes.

**Implement Sustainable Range Program**

The Army is undertaking a new approach to its range management. The Sustainable Range Program (SR Program) will improve the integration of all programs that affect or are affected by live training. The SR Program begins at Headquarters, Department of the Army, and will be integrated at the Major Army Command and installation level. Through the SR Program, the Army seeks to ensure that its ranges will be available indefinitely to support training readiness. Army ranges are considered to be a combination of live training infrastructure, installation facilities, and the environment. The SR Program integrates training, facility, and environmental management.

**Implement Ordnance Impact Area Management**

After each training event all range trash, including spent shell casings, outside the ordnance impact areas would be cleaned up. In addition all range trash would be cleaned up as feasible during range maintenance.
2. Description of the Proposed Action and Alternatives

**Implement an Environmental Management System**

An Environmental Management System (EMS) is a tool that could provide the Army with a means for the management of environmental activities and resources. The EMS would require the Army to define its environmental goals and to document the processes it uses to achieve those goals. By imposing this discipline, the Army would be able to improve compliance with environmental laws and to reduce environmental impacts. USARHAW already has mature environmental programs with many elements of an EMS.

Executive Order 13148, Greening the Government Through Leadership in Environmental Management, requires implementing an EMS at all appropriate federal facilities by December 31, 2005. The policy calls for systematic integration of environmental management into all missions, activities, and functions. The policy requires current processes to be continually reviewed to identify better ways to reconcile national defense and environmental stewardship missions.

EMS is not a new requirement but a change in management practices. It requires the Army to adapt existing management processes to identify and reduce the environmental risks inherent in mission activities. This approach is intended to make complying with environmental laws simpler, less costly, and a routine part of mission planning and execution.

**Continue Cultural Resources Management Planning**

The Army will continue with cultural resources management as it currently exists.

**Continue Environmental Management Programs**

As discussed previously, the current Army environmental strategy consists of four major areas of activity: pollution prevention, compliance, restoration, and conservation. Projects under each major activity area are implemented and managed at USARHAW. Activities currently conducted under these programs would continue under the Proposed Action and would ultimately be integrated into the EMS.

**Continue Ongoing Management Programs to Manage Training and Protect the Environment, as Detailed under the No Action Alternative and Fully Implement Existing Management Plans**

Several plans and programs are in place or would be developed to mitigate potential impacts of the Proposed Action, as well as to protect and manage the biological, physical, and socioeconomic environment at USARHAW during transformation. The following programs are in place and operating at USARHAW and would be fully implemented under the Proposed Action:

- Integrated training area management;
- Integrated natural resources management plan;
- Integrated cultural resources management plan;
- Range development plan; and
2. Description of the Proposed Action and Alternatives

- Real property master plan.

2.4 **REDUCED LAND ACQUISITION ALTERNATIVE**
This alternative would involve downsizing the proposed SRAA by approximately 93 percent, from approximately 1,402 acres (567 hectares) to approximately 100 acres (40.5 hectares). The 100 acres (40.5 hectares) of land would be necessary within the SRAA for constructing the proposed SBCT motor pool because the motor pool must be located close to SBMR where the Soldiers are based and no space is available for building this facility at SBMR or WAAF. This alternative is identical to the Proposed Action, with two exceptions: moving QTR2 to PTA and reducing the land acquired at SRAA. This would require that an expanded version of QTR2 be constructed at PTA rather than at the home station, SBMR. This is contrary to current training of the 25th Infantry Division, which is based on troops completing qualification training at SBMR prior to deploying to PTA. The larger exercises conducted at PTA are more effective if each Soldier is fully qualified at SBMR before deploying to PTA. However, the length of deployment at PTA could be extended to allow training at QTR2 before other training is conducted at PTA. Soldiers not able to qualify during deployment would have to return to PTA to complete their qualifications. The best available site for the proposed QTR2 at PTA is on the site of the current Range 8. A controlled firing area over the QTR2 at PTA would not be necessary since the range would be overlain by the existing R-3103 restricted area. This location falls within the overall boundaries of the anti-armor and live-fire tracking range (AALFTR) also proposed for this site, meaning that both ranges could not be used for live-fire at the same time. An expanded version of QTR2, to include sniper and machine gun training, as well as pistol and M16, would be constructed at PTA, overlaying the proposed AALFTR, so no new area would need to be used or ordnance impact area created. Although the purpose and need for transforming the 2nd Brigade, 25th ID(L) would still be fulfilled, it would not be as efficient, and in some circumstances not every Soldier would become qualified, requiring additional training.

2.5 **NO ACTION ALTERNATIVE**
CEQ regulations state that an EIS must evaluate a No Action Alternative, to serve as a benchmark against which the potential effects of actions can be evaluated. The No Action Alternative represents what would occur if the Army were not to carry out the Proposed Action.

Under the No Action Alternative, the Army would not undertake the proposed conversion of the 2nd Brigade to an SBCT in Hawai’i and therefore would not meet the purpose and need for transforming the USARHAW 2nd Brigade, 25th ID(L). The 2nd Brigade would continue to train and operate as a conventional light infantry force.

2.5.1 **Current Force Vehicle and Weapon Systems**
Vehicles and weapons used under the No Action Alternative would be similar to those that are used now.
2. Description of the Proposed Action and Alternatives

2.5.2 Construction
Construction projects under No Action assume that projects proposed for maneuver training facilities and USARHAW’s inventory of facilities for an SBCT would not proceed. However, other projects in support of current training may be constructed on a case-by-case basis, as dictated to meet the continuing needs of the Army’s conventional forces. These projects would be evaluated under separate NEPA documentation as appropriate. These projects are described in discussion in Chapter 9, Cumulative Impacts.

2.5.3 Land Acquisition
None of the land acquisitions, which are a part of the Proposed Action, would be undertaken. Land could be acquired in support of current training on a case-by-case basis, as might be dictated to meet the continuing needs of historically conventional forces. For example, under No Action, some or all of the SRAA could be acquired for current force maneuver land requirements. While the acreage and precise locations are not known at the present time, these projects would be evaluated in separate NEPA documents, as appropriate.

2.5.4 Description of Training
Under No Action, current training is expected to continue, and may include future changes in training as appropriate. These changes could result in requirements for new weapons that are yet to be developed or the development of new strategies as potential conflicts may dictate.

2.5.5 Institutional Programs
USARHAW has implemented the following institutional programs at all training areas: ITAM, an INRMP, an ICRMP, a range development plan, institutional controls, and a real property management plan. Chapter 2, Section 2.3, describes these programs in more detail. The Army would continue to fund these programs under the No Action Alternative, as funding is available, with the complexity and scope of the program proportional to the proposed land use.

2.6 Alternatives Considered but Not Studied in Detail
Table 2-10 compares each alternative to the training requirements for an SBCT. Several factors shape alternatives available to USARHAW. First, any alternative must meet the purpose of and need for the action by assisting to bring the Army’s Interim Force to operational capability and by providing realistic field training in Hawai‘i while providing the nation with capabilities that meet current and evolving national defense requirements. Alternatives must be practical and feasible; that is, they must be capable of being implemented by the Army or another agency, be technically feasible, and not require commitment of resources that cannot practically be obtained. In addition, in framing alternatives, USARHAW has taken into consideration information and suggestions submitted by individuals, organizations, and public agencies. Finally each alternative, with the exception of the No Action Alternative, must meet the training needs required for an SBCT, as outlined in Table 2-10.
2. Description of the Proposed Action and Alternatives

2.6.1 Transformation of a Different Brigade at Another Location

The Army has identified the first units to be converted to Interim Force status as the “bridge” to the future force. Headquarters, Department of the Army designated the action proposed for implementation by the 2nd Brigade, the effects of which have been evaluated by the Army’s headquarters. Section 4.2.2 of the final Programmatic Environmental Impact Statement for Army Transformation states, “The Army’s operating forces are stationed at those installations that can provide adequate facilities (maneuver areas and training facilities) and infrastructure support. For the foreseeable future, the Army would expect to conduct its transformation of existing operating forces ‘in-place.’ Relocation of units would not be expected” (US Army 2002c). The long-term view is that the entire Army would transform. In the short-term, as indicated by the ROD for the programmatic EIS, converting units to the future force would be sequenced as directed by Headquarters, Department of the Army. The initial sequencing includes the conversion of the 2nd Brigade.

Headquarters, Department of the Army directed the 2nd Brigade to transform in Hawai‘i because the Pacific Rim is a critical area of interest for the United States. Stationing an SBCT in Hawai‘i allows the President to rapidly respond to events in an area of increasing importance to national security. This alternative does not meet the purpose and need and is not included in Table 2-10.

2.6.2 Transformation with Existing Facilities

Under this alternative the Army would attempt to transform but would rely on existing facilities. USARHAW would propose and undertake military construction projects only on a piecemeal basis for the primary purpose of maintaining resources in an acceptable useful condition for current training and as needed as SBCT moves toward the future force. Projects not associated with transformation could continue to be funded and programmed (e.g., family housing improvements or in-kind replacement of deteriorated facilities). Those associated with transformation would have to be funded on a piecemeal basis, and separate NEPA documentation would have to be prepared as each project is identified. Training would continue using existing maneuver and training facilities, under constraints similar to those now managed by unit commanders and would use new facilities as they are constructed.

The principal differences between the current force and the SBCT would be an increase in the number of personnel, introduction of the Stryker, and modification of the training requirements to guide the unit’s readiness training. Current facilities would not accommodate the needs of an SBCT, such as sufficient maneuver training land for the Stryker and automated digitally capable ranges and training facilities. The Army seeks to have the 2nd Brigade capable of executing assigned combat missions in 2007.

This would occur after Strykers, MGSs, and UAVs have been fielded and the Soldiers in the 2nd Brigade have demonstrated their ability to execute their assigned tasks, individually and collectively. The Initial Operating Capability (IOC) cannot be attained without the appropriate types of modernized training facilities with adequate capacity to train individual Soldiers and units available. As is shown on Table 2-10, the existing facilities do not have the
Table 2-10
Comparison of Alternatives Considered to Training Requirements

<table>
<thead>
<tr>
<th>Function</th>
<th>Proposed Action (Preferred Alternative): Transform with Maneuver Training on a Continental US Installation (Includes Maneuver Live-Fire Training)</th>
<th>Transforms with Existing Facilities (No New Construction or Land Acquisition)</th>
<th>Transforms with Reduced Land Acquisition (Construct QTR2 at PTA)</th>
<th>Transforms with Reduced Requirements for SBCT (Current Force Source of Requirement)</th>
<th>Move All Training to PTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Qualification training (fixed firing ranges)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sniper and machine gun training</td>
<td>230 days/year does not meet requirements (RDP pp. 7-23).</td>
<td>230 days/year does not meet requirements (RDP pp. 7-23).</td>
<td>355 days/year does meet requirements (construct QTR1 and QTR2 at SBMR).</td>
<td>230 days/year does not meet requirements (existing capacity per RDP pp. 7-25).</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>MA/M16 qualification</td>
<td>281 days/year does not meet requirements (RDP pp. 7-10).</td>
<td>281 days/year does meet requirements (construct QTR1 and QTR2 at SBMR).</td>
<td>281 days/year does meet requirements (construct QTR1 and QTR2 at SBMR).</td>
<td>281 days/year does not meet requirements (RDP pp. 7-23).</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>Virtual training</td>
<td>Meets requirements. Construct a VFTF and PTI.</td>
<td>Meets requirements. Construct a VFTF and PTI.</td>
<td>Meets requirements. Construct a VFTF and PTI.</td>
<td>Does not meet requirements.</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>Collective training</td>
<td>230 days/year does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>230 days/year does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>230 days/year does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>230 days/year does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>Urban combat training</td>
<td>230 days/year does not meet requirements. Split facility at KTA (Stryker live-fire CACTF) and SBMR (urban assault course).</td>
<td>230 days/year does not meet requirements. Split facility at KTA (Stryker live-fire CACTF) and SBMR (urban assault course).</td>
<td>230 days/year does not meet requirements. Split facility at KTA (Stryker live-fire CACTF) and SBMR (urban assault course).</td>
<td>230 days/year does not meet requirements. Split facility at KTA (Stryker live-fire CACTF) and Schofield Barracks (Urban Assault Course).</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>Anti-tank Missile (Javelin and TOW) training</td>
<td>Does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>Does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>Does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>Does not meet requirements (constructed QTR1 and QTR2 at Schofield Barracks).</td>
<td>Requires construction of live-fire ranges at Schofield Barracks.</td>
</tr>
<tr>
<td>Collective live-fire training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1Range Development Plan 2Virtual Fighting Training Facility 3Fixed Tactical Internet
ability to provide specific training, such as virtual training with a fixed tactical internet (FTI) and antitank missile training. Furthermore shortcomings in capacity and capability of live-fire and simulation training facilities would make it impossible to train the Soldiers of the SBCT to the Army standard. Reduced training time would mean that fewer Soldiers were qualified on their individual weapons systems and that elements of the brigade would not be trained in their collective tasks. This alternative would not meet the purpose and need of transforming the USARHAW 2nd Brigade, 25th ID(L).

2.6.3 Transformation in Hawai’i with Maneuver Live-Fire and Nonlive-Fire Training on the Continental US Instead of on Hawai’i

Under this alternative, the Army would transform by conducting collective live-fire and maneuver training on a continental US installation. All proposed cantonment facilities required to support an SBCT would be built, but no new collective maneuver ranges (nonlive-fire and live-fire) would be constructed. The Army would not acquire the 23,000-acre (9,308 hectare) WPAA adjacent to PTA. In addition the following projects would not be built in Hawai‘i under this alternative because they are tied to the relocated maneuver training:

- The battle area complexes at SBMR and PTA;
- The Combined Arms Collective Training Facility (CACTF) with SRTA live-fire training at KTA;
- The Urban Assault Course (UACTF) at SBMR; and
- The Anti-Armor Live-Fire and Tracking Range at PTA.

QTR1 and QTR2 would still be constructed, and the SRAA would still be needed to provide space for QTR2 and the SBCT motor pool. Both QTRs would be needed to provide day-to-day training of Soldiers on their individual weapons. The Virtual Flight Training Facility (VFTF) to be built at SBMR is a key element of the training requirements for an SBCT because their suite of simulators and specialized training equipment are an integral part of the transformation process.

The Army considered ranges west of the Mississippi River to minimize travel time. Based on these criteria, continental US Army installations considered as potential sites for 2nd Brigade live-fire and maneuver training include Fort Richardson and Fort Wainwright and the Donnelly Training Area in Alaska (considered as one installation for this analysis and collectively called US Army, Alaska (USARAK), Fort Lewis and Yakima Training Center in Washington State (considered a single installation and referred to as Fort Lewis), the National Training Center at Fort Irwin in California, Fort Carson and Piñon Canyon Training Area in Colorado (considered as one installation and referred to as Fort Carson), Fort Hood in Texas, Fort Riley in Kansas, and Fort Polk in Louisiana. These are the major Army installations in the western US devoted to training US Army forces command units. Table 2-11 provides an overview of the installations.

In Table 2-11, “total area” is the land area in acres occupied by each military reservation. Ranges, environmental constraints, cantonment areas, and other factors, such as regulatory
requirements and access, reduce actual lands available for training at each installation. “Current mission” describes the major functions of each installation. As indicated in the last column of the table, USARAK, Fort Lewis, and Fort Polk are undergoing transformation to receive SBCTs; one will be stationed in USARAK, two at Fort Lewis, and one at Fort Polk. The specialized ranges, as well as the MSTF/ISE, VFTF, FTI, and Installation Information Infrastructure Architecture (I3A) projects required for SBCT training are already programmed to be built at these installations. The other installations may eventually receive similar facilities as transformation to the future force occurs over the next 30 years, but at present Forts Irwin, Riley, Hood, and Carson are not capable of providing the specialized training an SBCT requires, and there are no current plans to construct the required facilities at those installations.

Table 2-11 shows that, of the six installations considered, only USARAK, Fort Lewis, and Fort Polk will have the facilities required to train a Stryker brigade; therefore, the others are excluded from further consideration.

If the 2nd Brigade is to train at either of these installations, all the people, equipment, and vehicles associated with each element of the brigade would have to be transported to Alaska or Washington. This would be required to ensure that the Soldiers could train with their own equipment in accordance with Army doctrine. In addition equipment belonging to the Stryker brigades in Alaska and Washington cannot be assumed to be available for use by Hawai‘i personnel. While it is possible to move equipment by barge from O‘ahu to the island of Hawai‘i, Alaska and Washington are too far away for this type of transport to be practical, and the equipment and personnel would need to be airlifted. Military Traffic Management Command’s Traffic Engineering Agency estimated in December 2000 at least 79 C-5 aircraft and 110 C-17 aircraft would be required to move one Stryker brigade (USARHAW 2001a), effectively removing over 80 percent of the Air Force’s transport capabilities during training of one SBCT. The Air Force will receive the last of its 120 C-17 aircraft in November 2004 (FAS 2002a) and has 109 C-5 aircraft, with no more in the pipeline (FAS 2002b). Only six C-17s are proposed to be stationed in Hawai‘i and will replace four C-130s currently stationed there.

Even though the entire brigade may not need to be transported at one time, moving even one rifle battalion would tie up a substantial portion of the Air Force’s airlift capability for an extended period of time. Air Force airlift support would be unavailable for other uses, including actual wartime deployments of the force. Aside from the substantial costs of such operations, it is impractical to expect the Air Force to commit so large a percentage of its resources to support a training exercise.

USARHAW staff estimates that preparation prior to and after each deployment would take five days total. Flight times are estimated at six hours each way. Assuming that maneuver training is to be conducted four times per year, approximately 40 training days of the available 270 would be lost during deployments to Alaska or Washington.
### Table 2-11
Continental US Army Installations Considered

<table>
<thead>
<tr>
<th>Installation, State</th>
<th>Total Area (acres)</th>
<th>Current Mission</th>
<th>SBCT Required Facilities?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Richardson</td>
<td>71,441 (28,923 hectares)</td>
<td>Home to 172&lt;sup&gt;nd&lt;/sup&gt; Infantry Brigade; programmed for one SBCT.</td>
<td>Will be constructed.&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fort Wainwright</td>
<td>656,241 (265,684 hectares)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donnelly Training Area, Alaska</td>
<td>640,488 (259,290 hectares)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fort Lewis</td>
<td>86,174 (34,888 hectares)</td>
<td>Home to I Corps, 1st Brigade of the 25&lt;sup&gt;th&lt;/sup&gt; ID(I), and the 3rd Brigade of the 2&lt;sup&gt;nd&lt;/sup&gt; Infantry Division. Programmed for two SBCTs.</td>
<td>Will be constructed.&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Yakima Training Center, Washington</td>
<td>316,786 (128,253 hectares)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Training Center at Fort Irwin, California</td>
<td>636,251 (257,591 hectares)</td>
<td>National Training Center—desert training of heavy Army forces.</td>
<td>No</td>
</tr>
<tr>
<td>Fort Carson</td>
<td>137,404 (55,629 hectares)</td>
<td>Home to 7&lt;sup&gt;th&lt;/sup&gt; Infantry Division (mechanized).</td>
<td>No</td>
</tr>
<tr>
<td>Piñon Canyon Maneuver Site, Colorado</td>
<td>235,896 (95,504 hectares)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fort Hood, Texas</td>
<td>214,352 (86,782 hectares)</td>
<td>Home to 3&lt;sup&gt;rd&lt;/sup&gt; Corps, 1&lt;sup&gt;st&lt;/sup&gt; Cavalry Division, 4&lt;sup&gt;th&lt;/sup&gt; Infantry Division (mechanized).</td>
<td>No</td>
</tr>
<tr>
<td>Fort Riley, Kansas</td>
<td>100,656 (40,751 hectares)</td>
<td>Home to the 24&lt;sup&gt;th&lt;/sup&gt; Infantry Division (mechanized).</td>
<td>No</td>
</tr>
<tr>
<td>Fort Polk, Louisiana</td>
<td>198,143 (80,220 hectares)</td>
<td>Home of the Joint Readiness Training Center and 2&lt;sup&gt;nd&lt;/sup&gt; Armored Cavalry Regiment.</td>
<td>Will be constructed.&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup>Facilities of the type used to train an SBCT will ultimately be built at all major Army training installations as part of Transformation to the future force, except the AALFTR, which is specifically designated for Hawai’i, but not in time for the 2<sup>nd</sup> Brigade to meet its 2007 IOC target date.

Source: Acreage from Table C-8, US Army 2002c

An analysis of USARAK and Fort Lewis training facilities and capacity was conducted as an appendix to the USARHAW RD Plan (Nakata Planning Group LLC. 2002a). It showed that Fort Lewis and USARAK would lack adequate collective live-fire training facilities to support an additional SBCT. Neither USARAK nor Fort Lewis is proposing to build an antiarmor live-fire and tracking range to provide the capacity for training that has been programmed for Hawai’i. The Army proposes to conduct antiarmor live-fire training at these facilities on ranges constructed for other uses. This requires careful scheduling to avoid conflicts, and adding an additional SBCT would reduce the throughput capacity to unacceptable levels. Because Fort Polk will already be training an SBCT unit, as well as
conducting joint readiness training, the addition of a second SBCT would compromise the throughput capacity of Fort Polk, a situation that is considered unacceptable.

Owing to climate limitations, training can be conducted only 205 days per year at Fort Wainwright and 224 days per year at Fort Richardson (Nakata Planning Group, LLC 2002a), weather permitting, whereas training in Hawai‘i can be conducted 270 days per year. This limitation of training for the SBCT to be stationed in USARAK is considered an acceptable compromise when taken as a part of the Army’s overall stationing strategy. However, if the SBCT proposed for stationing in Hawai‘i were limited to training only when weather allowed in Alaska, the SBCT’s ability to train its units could be diminished, as USARAK’s forces would have priority.

In addition, if wartime situations required deploying Hawai‘i’s SBCT while training on the continental US, the SBCT forces would need to return to Hawai‘i for full deployment, making it impossible to meet the 96-hour deployment goal.

In summary, the alternative of conducting collective live-fire training of the 2nd Brigade of the 25th Infantry Division on continental US installations is not feasible or practical for the following reasons and as such will not meet the purpose and need of transforming the 2nd brigade, 25th ID(I):

- The Hawai‘i-based SBCT could not meet its training requirements using facilities at Fort Irwin, Hood, Riley, and Carson due to the lack of specialized facilities required to train an SBCT, and at present there are no plans to construct them;
- The Hawai‘i-based SBCT could not meet its training requirements at Fort Lewis and USARAK, which are also to receive SBCTs, because they would not have adequate collective live-fire training capacity to support the requirements of an additional SBCT;
- Transporting a Hawai‘i-based SBCT to the continental US for training would consume an unacceptably large portion of the Air Force’s strategic airlift capability needed to meet its other missions and would result in a loss of at least 28 training days while in transit; and
- If an SBCT were training at either USARAK or Fort Lewis and military actions required its deployment to an action area, the brigade would have to return to Hawai‘i to assemble for full deployment. This would prevent the SBCT from meeting its goal to deploy worldwide within 96 hours.

2.6.4 Transformation Using Other Existing Military Facilities and Existing USARHAW Facilities in Hawai‘i

Under this alternative the Army would attempt to transform relying on existing facilities at USARHAW and other military facilities in Hawai‘i not under USARHAW’s control. Other branches of the Armed Forces in Hawai‘i train at existing Army facilities because they do not have adequate live-fire ranges themselves. In addition there are no additional maneuver lands available at other bases in Hawai‘i.
The Army seeks to have the 2nd Brigade obtain IOC in 2007. This would occur after the unit receives its required Strykers and MGSs and the training necessary to execute its mission. Adequate facilities are required to effectively train to Army-established IOC standards. IOC cannot be attained without the appropriate types of modernized training facilities with adequate capacity to train individual Soldiers and units available. Limited facilities would result in reduced training time, which would mean that fewer Soldiers were qualified on their individual weapons systems and that elements of the brigade would not be trained in their collective tasks. Shortcomings in capacity and capability of live-fire and simulation training facilities for individual and crew-served weapons, including the lack of a shoothouse, mock villages, and other modernized training facilities, would make it impossible to train the Soldiers of the SBCT to the Army standard.

2.6.5 Transforming by Moving All Training to PTA
Under this alternative the Army would attempt to transform by moving all SBCT training to PTA. USARHAW would propose and construct all military construction projects and would also construct new barracks, unit headquarters, classrooms, simulation training facilities, family housing, qualification training ranges, and community support facilities on the island of Hawai‘i. All training requirements for SBCT could be met, with the exception of the maneuver training, as approximately 15,219 acres (6,159 hectares) of maneuver lands on O‘ahu would not be available or acquired for use. However, a significant amount of land would need to be acquired to accommodate all the new support facilities required for this alternative, essentially everything that now exists on SBMR and WAAF. Aside from the enormous cost, PTA lacks sufficient water, electric power, sewage treatment capability, and road access to support the required population. In addition construction of all these support facilities would eliminate additional maneuver lands, further increasing the shortfall for maneuver lands.

The Army seeks to have the 2nd Brigade obtain IOC in 2007. This would occur after the unit receives its required Strykers and MGSs and the training necessary to execute its mission. IOC cannot be attained without the proper types of facilities being readily available and having adequate capacity for training the requisite number of units. Although enough land may be available for acquisition for maneuver training and the required construction of an entire new military installation, SBCT Soldiers would not be able to conduct air deployment training operations between SBMR and PTA. Table 2-11 has a comparison of all alternatives to the training requirements for an SBCT. In the absence of adequate maneuver training, Soldiers would not be adequately trained for deployment.

This alternative is not feasible even though the training requirements for an SBCT would be met because the infrastructure at PTA could not handle the housing and other needs of stationing the SBCT at PTA. This would require significant travel between housing at O‘ahu and training at PTA, resulting in lost training days; therefore, this alternative was not evaluated in detail in the EIS.

2.6.6 Alternative Land Purchases Considered
In response to public comments about alternative land acquisitions the following previously considered information has been added to the EIS.
Pu’u Pā
Pu’u Pā is approximately 14,000 acres (5,666 hectares) located northwest of WPAA, next to the town of Waimea. This parcel is close to but not contiguous with PTA. USARHAW has habitually used the WPAA more often because it is adjacent to PTA, but the current and proposed tank trail goes through both WPAA and Pu’u Pā. The Pu’u Pā parcel was eliminated from detailed analysis because of the following factors:

- The terrain is rougher and less likely to support vehicle maneuvering than the WPAA, and the parcel is too small, which would require buying additional land elsewhere;
- The area is not contiguous with PTA, requiring the use of public roads to transit from PTA;
- It could have a greater environmental impact in some portions because there is excessive grass that has not been grazed in several years;
- The area is located between the community of Waimea and the ocean and would have a greater impact on the scenic viewshed because of visible maneuver activities and dust;
- There are numerous known archaeological sites that would result in additional legal requirements; and
- The parcel is closer to built-up areas (Waimea), increasing concerns about noise and dust.

Lualualei
Naval Magazine Lualualei lies in a large coastal valley near the southwestern shoreline of O‘ahu, approximately 10 miles southwest of Wahiawa, and occupies 8,105 acres (3,280 hectares) of the valley. The nearest urban area is Maili, which lies approximately one mile west. Waianae and Nanakuli are also nearby. The parcel was eliminated from further analysis because of the following factors:

- The site has extensive environmental and encroachment concerns, including 192 cultural sites, over 25 endangered species in close proximity, wetlands, and a possible hazardous material spill site;
- The site cannot accommodate vehicle maneuvers, so additional lands would need to be purchased and public roads would have to be used to access the site; and
- The cost would be very high, considering the limitations on construction and potential cleanup costs.
APPENDIX E

AGENCY COORDINATION
3.4 **Airspace**

Airspace in Hawai‘i is well managed and is principally controlled, wherein air traffic control service is provided to aircraft in accordance with individual airspace classifications. All aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements. Flight rules are well understood by both civilian and military pilots, and well-established procedures are in place to manage airspace use.

3.4.1 **Introduction/Region of Influence**

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

For this document, the ROI for airspace is that over and surrounding SBMR, WAAF, DMR, KTA, and KLOA on O‘ahu and PTA on the island of Hawai‘i (Figures 3-1 and 3-2). The affected airspace environment is described below in terms of its principal attributes, namely controlled and uncontrolled airspace, special use airspace, military training routes, en route airways, airports and airfields, and air traffic control. Jet routes, all above 18,000 feet (5,486 meters), are well above the activities proposed and are thus not considered as part of the ROI.

The Federal Aviation Administration (FAA) regulates military operations in the National Airspace System through the implementation of FAA Handbook 7400.2E and FAA Handbook 7610.4J, Special Military Operations. The latter was jointly developed by the DOD and FAA to establish policy, criteria, and specific procedures for air traffic control planning, coordination, and services during defense activities and special military operations.

Additional regulations and laws pertaining to the use of airspace in the ROI are provided in Appendix F.

3.4.2 **Resource Overview**

There are two categories of airspace or airspace areas: the first category is restricted, prohibited, and regulatory areas (the last consisting of controlled airspace [Class A, B, C, D, and E airspace areas, in descending order of restrictive operating rules]); the second category of airspace is nonregulatory, consisting of military operations areas (MOAs), warning areas, alert areas, and controlled firing areas. Within these two categories, there are four types: controlled, uncontrolled, special use, and other airspace. The categories and types of airspace are dictated by the complexity or density of aircraft movements, the nature of the operations conducted within the airspace, the level of safety required, and the national and public interest.
Figure 3-1
O'ahu Airspace Region of Influence (ROI)
Figure 3-2
Hawai'i Airspace Region of Influence (ROI)
3.4 Airspace

O‘ahu

Controlled/Uncontrolled Airspace
The distinction between controlled and uncontrolled airspace is important. Within controlled airspace, air traffic control service is provided to aircraft in accordance with the airspace classification. Aircraft operators are also subject to certain pilot qualification, operating rules, and equipment requirements. Within uncontrolled airspace, no air traffic control service to aircraft is provided, other than possible traffic advisories when the air traffic control workload permits and radio communications can be established (Illman 1993). Most of the airspace above O‘ahu is controlled airspace.

The airspace over southern O‘ahu is dominated by the Class B airspace that lies above and around Honolulu International Airport. Its “upside-down wedding cake” layers are typical of the Class B airspace that surrounds busy airports. It consists of a core surface area, surrounded by several layers of varying floor altitudes but the same ceiling altitude of the core area. Below the Class B layers is Class E controlled airspace, with a floor 700 feet (213 meters) above the surface (Figure 3-1).

Kalaeloa Airport (John Rodgers Field) to the west of Honolulu and Kane‘ohe Bay Marine Corps Airfield on the east coast of O‘ahu are covered by Class D airspace from the surface to 2,500 feet (762 meters) above the airport elevation. WAAF in central O‘ahu is also covered with Class D airspace, with a ceiling of 3,300 feet (1,006 meters). Elsewhere, the airspace not designated as Class A, B, C, D, or E airspace is uncontrolled, or Class G, airspace from the surface to a ceiling of either 700 or 1,200 feet (213 or 366 meters). Above this, the rest of the island is covered with either Class E controlled airspace or special use airspace, which is discussed separately below.

Appendix F provides a full definition of the different classes of airspace and an explanatory diagram.

Special Use Airspace
O‘ahu has several special use airspace areas, including the R-3109 and R-3110 restricted area complex over northwestern O‘ahu and the A-311 alert area in northern O‘ahu, extending over the western side of the Ko‘olau Mountain Range, from east of Mililani Town almost to Kahuku Point. Lying just three nautical miles (a nautical mile is 6,076 feet [1,852 meters]) off the north shore of O‘ahu, is the W-189 warning area (Figure 3-1). The effective altitudes, time of use, and controlling agencies are given in Table 3-1.

Restricted areas contain airspace within which aircraft, while not wholly prohibited, are subject to restrictions. They denote the existence of unusual, often invisible, hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles. Alert areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. Warning areas, extending from three nautical miles outward from the coast, contain activities that may be hazardous to either nonmilitary aircraft or other aircraft not involved with the training.
### 3.4 Airspace

#### Table 3-1

**Special Use Airspace in the O'ahu Airspace ROI**

<table>
<thead>
<tr>
<th>Number/Name</th>
<th>Effective Altitude (feet [meters])</th>
<th>Time Of Use</th>
<th>Controlling Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-311</td>
<td>To 500 (152) AGL</td>
<td>0700-2200</td>
<td>No A/G</td>
</tr>
<tr>
<td>R-3109A</td>
<td>To 9,0001 (2,743)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>R-3109B</td>
<td>9,000 to 19,0001 (2,743 to 5,791)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>R-3109C</td>
<td>To 9,0001 (2,743)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>R-3110A</td>
<td>To 9,0001 (2,743)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>R-3110B</td>
<td>9,000 to 19,0001 (2,743 to 5,791)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>R-3110C</td>
<td>To 9,0001 (2,743)</td>
<td>Intermittent2</td>
<td>Honolulu ATCT</td>
</tr>
<tr>
<td>W-189</td>
<td>To unlimited</td>
<td>0700-2200 M-F</td>
<td>Honolulu CERAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0800-1600 Sa-Sun3</td>
<td></td>
</tr>
</tbody>
</table>

Source: NACO 2002

Notes:
A = Alert area; AGL = Above ground level; ATCT = Air traffic control tower; CERAP = Combined Center Radar Approach Control; No A/G = No air to ground communications; NOTAM = Notice to airmen; R = Restricted; W = Warning area

1To, but not including, the indicated altitude
2By NOTAM
3Other times by NOTAM

**Military Training Routes and Number of Aircraft**

Although there are no formal, published military training routes on O'ahu, the A-311 Alert Area identified in Figure 3-1 is used for helicopter training exercises, with an average of 3,500 aircraft movements per month. Movements are defined as arrivals, departures, or overflights. WAAF experiences an average of 6,500 movements per month, 90 percent of which involve helicopters. These movement statistics cover all DOD branches, including the Hawai'i Air National Guard (Ahching 2002a, 2002b). Typical training activities include 10 rotary winged aircraft in the air at any one time, although maximum numbers have reached 36 in special circumstances. Deployments currently involve one to two C-130s once or twice a year flying out of Hickam AFB and WAAF.

**En Route Airways**

There are a number of low altitude en route airways that enter or transect the ROI (Figure 3-1). These airways are referred to as Class E airspace, established in the form of a corridor. The corridor's centerline is defined by radio navigational aids, which form a network serving aircraft up to, but not including, 18,000 feet (5,486 meters) above sea level.

In addition to the commercial traffic that uses the low altitude en route airways, general aviation aircraft use the airspace over O'ahu. This includes all civil aviation operations, other than scheduled air services and unscheduled air transport operations for remuneration or hire. For example, 27 percent of Honolulu International Airport's 915 average daily
operations involve general aviation, along with 98 percent of Ford Island’s average of 109 daily operations and 97 percent of DMR’s average of 167 daily operations (Table 3-2).

Table 3-2
O’ahu Airport/Airfield or Heliport Operational Statistics

<table>
<thead>
<tr>
<th>Name</th>
<th>Aircraft Operations/Day (Average)</th>
<th>Commercial</th>
<th>Transient General Aviation</th>
<th>Local General Aviation</th>
<th>Air Taxi</th>
<th>Military</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honolulu International</td>
<td>915</td>
<td>55%</td>
<td>23%</td>
<td>4%</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>Ford Island NALF</td>
<td>109</td>
<td>98%</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kāne’ohe Bay Marine Corps Airfield</td>
<td>301</td>
<td>5%</td>
<td>95%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAAF</td>
<td>207</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMR</td>
<td>167</td>
<td>97%</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: AirNav.com 2002; Ahching 2002a; Therrien 2002
Note: Ford Island Navy Landing Airfield (NALF) is closed to civil operations.

The area around Dillingham Airfield on the north shore is indicated on aeronautical charts as a glider operating area, and the area just north of Makapu’u Point on the island’s far southeastern coast is a hang glider and ultralight activity area (NACO 2002). In addition, Dillingham Airfield is a center for skydiving, vintage airplane, and aerobatic flights.

Airports and Airfields
Honolulu International Airport lies in the southern part of the airspace use ROI. Honolulu International Airport is Hawai’i’s principal airport, with approximately 327,000 operations (takeoffs and landings) per year and 20.15 million passengers in 2001 (HDOT 2002).

In addition to the fixed-wing operations at Honolulu International Airport, commercial tour operator helicopters account for approximately 30 operations per day. Their normal flight routes hug the coast of O’ahu, east of the airport toward Makapu’u Point. They typically either circle the entire Ko’olau Mountain Range, returning back to the airport over Kamehameha Highway, down the central part of O’ahu to Pearl Harbor and the airport, or fly over the Pali Pass. Local fire and ambulance helicopters are also based at the airport.

Kalaaeloa Airport, formerly Barbers Point Naval Air Station (NAS), just east of Barbers Point on the coast west of Honolulu, had approximately 184,000 operations in 2001 (HDOT 2002). These were primarily “touch and go” training takeoffs and landings by light-plane pilots, the Hawai’i Air National Guard, and others. US Coast Guard flying operations are based at Kalaaeloa Airport.

Other airports on O’ahu include WAAF in central O’ahu, Dillingham Airfield east of Ka’ena Point on the north shore of O’ahu, and Kāne’ohe Bay Marine Corps Airfield on the east coast. Dillingham Airfield had 81,000 operations in 2001, down four percent from 2000 (HDOT 2002). Heliports, for which no operational statistics are available, include The Queen’s Medical Center, HECO-Waiau, Kuakini Medical Center, Moanalua Medical Center,
and the Hon Municipal Building, all in Honolulu, and Kualoa Ranch, south of Kahana on the east coast of O'ahu (AirNav.com 2002).

**Air Traffic Control**
Air traffic in the ROI within the 12 nautical mile territorial waters limit of the United States is managed by the Honolulu Control Facility.

**Aviation Safety**
All military aircraft fly in accordance with Federal Aviation Regulations (FAR) Part 91 (Air Traffic and General Operating Rules), Subchapter F (Air Traffic and General Operating Rules), which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes when flying outside special use airspace. Army Regulation 95-1 (Aviation Flight Regulations) covers Army aircraft operations, crew requirements, and flight rules. These regulations have precise requirements for the use of airports, heliports, and other landing areas, local flying rules, and special use airspace. For example, an installation commander having Army aircraft assigned to, attached to, or tenant to his or her command must prepare and publish local flying rules. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. Traffic pattern altitudes at Army airfields for airplanes are set at 1,500 feet above ground level. Helicopter traffic pattern altitudes are set at least 700 feet above ground level. Installation commanders may set different altitudes based on noise abatement, fly-neighborly policies, or other safety considerations. These are displayed in flight operations and are published in flight information publications for all pilots.

The Army’s aviation safety record on O'ahu and the island of Hawai'i has been excellent. In the last ten years there have been only two serious mishaps. The first was the collision of two UH 60 Blackhawks, the Army’s tactical transport helicopter, in bad weather over the tactical flight area on SBMR; the second was the crash of an AH-1Cobra, an attack helicopter, at Leader Field on Schofield Barracks, while returning to WAAF on a maintenance test flight. The fatalities were crew members and passengers. All other aircraft incidents have been limited to precautionary landings, or too-fast descents during sling-load training in which concrete blocks are used to simulate the weight of vehicles or water. There have been no mishaps, accidents, or incidents between military aircraft and civilian aircraft in the last 20 years (Sawyer 2003).

**Island of Hawai'i**

**Controlled/Uncontrolled Airspace**
Most of the airspace above the northern half of the island of Hawai'i is controlled airspace of various classes. Class G (uncontrolled) airspace extends from the surface to 700 feet (213 meters), except around Kona and Hilo International Airports and BAAF, which are surrounded by Class D airspace (Figure 3-2).
Special Use Airspace

The northern part of the island of Hawai’i has just one special use airspace area, the R-3103 restricted area over PTA in the central part of the island (Figure 3-2). Its effective altitude, time of use, and controlling agency are given in Table 3-3.

<table>
<thead>
<tr>
<th>Number/Name</th>
<th>Effective Altitude (feet)</th>
<th>Time Of Use</th>
<th>Controlling Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-3103</td>
<td>To 30,000 (9,144 meters)</td>
<td>Intermittent¹</td>
<td>Honolulu CERAP</td>
</tr>
</tbody>
</table>

Source: NACO 2002

Notes:
CERAP = Combined Center Radar Approach Control; NOTAM = Notice to airmen; R = Restricted.
¹By NOTAM issued 12 hours in advance

Military Training Routes and Number of Aircraft

Although there are no formal, published military training routes on the island of Hawai’i, the R-3103 restricted area identified in Figure 3-2 is used for helicopter training exercises, with an average of 900 aircraft movements per month, 99 percent of which involve helicopters. These movement statistics cover all DOD branches, including the Hawai’i Air National Guard (Ahching 2002a, 2002b). Typical training involve the use of 10 rotary winged aircraft at any one time. During deployment training one or two C-130s would be involved about twice a year.

En Route Airways

In addition to the commercial traffic that use the low altitude en route airways, general aviation aircraft use the airspace over the island of Hawai’i. This includes all civil aviation operations, other than scheduled air services and unscheduled air transport operations for remuneration or hire. For example, 50 percent of Kona International Airport’s 281 average daily operations, 28 percent of Hilo International Airport’s 316 average daily operations, and 78 percent of ‘Upolu Airport’s 27 average daily operations involve general aviation (Table 3-4).

Airports and Airfields

Kona International Airport, just north of Keāhole Point, is on the west coast, and Hilo International Airport is on the east coast of the island. Kona International had 160,000 operations and handled 2.64 million passengers in 2001. While aircraft operations were up 10 percent from 2000, the total number of passengers was down 7 percent from 2000. Hilo International had 96,000 operations and handled 1.5 million passengers in 2001. Hilo International Airport similarly experienced an increase in aircraft operations and a decrease in total number of passengers (+17 percent and –7 percent, respectively) compared to 2000. Waimea-Kohala Airport, in the northern part of the island, had approximately 2,500 passengers in 2001, down 4 percent from 2000. No records are available on the number of aircraft operations (HDOT 2002).
3.4 Airspace

Table 3-4
Island of Hawai‘i
Airport/Airfield or Heliport Operational Statistics

<table>
<thead>
<tr>
<th>Name</th>
<th>Aircraft Operations/Day (Average)</th>
<th>Commercial</th>
<th>Transient General Aviation</th>
<th>Local General Aviation</th>
<th>Air Taxi</th>
<th>Military</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAAF</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Hilo International</td>
<td>316</td>
<td>19%</td>
<td>13%</td>
<td>15%</td>
<td>42%</td>
<td>10%</td>
</tr>
<tr>
<td>Ka‘upulehu Heliport</td>
<td>33</td>
<td></td>
<td>50%</td>
<td></td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Kona International</td>
<td>281</td>
<td>29%</td>
<td>19%</td>
<td>31%</td>
<td>9%</td>
<td>13%</td>
</tr>
<tr>
<td>‘Upolu Airport</td>
<td>27</td>
<td></td>
<td>78%</td>
<td></td>
<td>3%</td>
<td>19%</td>
</tr>
<tr>
<td>Waimea-Kohala Airport</td>
<td>28</td>
<td>10%</td>
<td>24%</td>
<td>60%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

Source: AirNav.com 2002

Other airports/airfields in the ROI include BAAF, serving PTA, ‘Upolu at ‘Upolo Point at the northern tip of the island, and the Pu‘u Wa‘a Wa‘a private airfield off Highway 190, midway between Kona and Waimea. There is a private heliport, Ka‘upulehu, on the west coast north of Makatawena, just north of Kona International Airport (Figure 3-2).

Air Traffic Control
The Honolulu Air Traffic Control Center manages air traffic in the ROI within the 12 nautical mile territorial waters limit of the United States.

Aviation Safety
Airspace safety for the island of Hawai‘i is similar to the airspace safety described above for O‘ahu.
3.10 Biological Resources

The isolated nature and volcanic origin of the Hawaiian Islands has resulted in a truly unique diversity of habitats and species. Hawai'i's habitats range from alpine deserts to tropical rainforests, to coastal dunes and coral reef systems, to active volcanoes. Over ninety percent of the native (naturally found) species of plants and wildlife are endemic, that is, found only in the Hawaiian Islands. These unique organisms are adapted to Hawai'i's natural habitats and conditions and to sharing habitat with other native species—those that evolved on the islands but that may also be found elsewhere. These species arrived on the islands by wind, waves, and flight.

- The islands’ 100 endemic land birds evolved from as few as 20 original colonizers (GORP 2003);
- A thousand kinds of flowering plants evolved from 295 successful colonizers (Wagner et al. 1999);
- 168 ferns and fern allies evolved from about 135 colonizers (Wagner et al. 1999);
- Over 1,000 mollusks evolved from at least 22 colonizers (GORP 2003); and
- About 10,000 insect and spider species evolved from 350 to 400 successful colonizers (GORP 2003).

Mammals, amphibians, reptiles, and freshwater fish were less successful in their colonization of the islands’ suitable habitats. Only the monk seal and the hoary bat succeeded for the mammals. Of the millions of attempts at colonization by organisms, few made it to Hawai'i, and fewer survived. Of these surviving colonizers, many gave up their natural defenses because of little threat from predators.

Nonnative species were brought to the Hawaiian Islands by the earliest Polynesian settlers or were introduced after contact with the western world, often as intended or incidental cargo on boats and aircraft, on clothing, and by people themselves. Hawaiian ecosystems are threatened by the introduction of nonnative species, particularly by those classified as “invasive”, i.e., nonnative species that compete with and often replace native species and native communities. Increased human presence and activity over the last two centuries, in the form of commercial, residential, and military development, and the agricultural transformation of land, has contributed to the spread of nonnative species and to the loss of native species and habitats. The islands of O'ahu and Hawai'i have lost a great deal of native natural diversity, leaving many of the endemic and native species in peril.

3.10.1 Introduction/Region of Influence

This section describes biological resources in the SBCT project areas and surrounding areas. Biological resources include plant and animal species and the habitats or communities in which they occur. Discussion of resources occurring in the SBCT ROI includes general wildlife, vegetation, and habitat types, as well as sensitive wildlife, vegetation, and habitats. The SBCT ROI for biological resources is composed of the direct area where SBCT actions are proposed, and surrounding areas that would likely be affected by these actions (Figures
3.10 Biological Resources

3.10.2 Resource Overview

Information on biological resources within the ROI was collected from numerous sources, including the USFWS, DLNR, Hawai‘i Biological Survey (HBS), Hawai‘i Natural Heritage Program (HINHP), and various biological surveys and environmental documents. Portions of the ROI are very disturbed and support mostly nonnative species, while other portions contain some of the least disturbed natural communities left in Hawai‘i and are home to a large number of unique and imperiled native species and the ecosystems that support them. Many of the native species have been wiped out or have decreased substantially due to habitat modification and problems associated with exotic and invasive species. For this reason Hawai‘i contains a greater number of federally listed endangered and threatened species per square mile than anywhere else in the US. Hawai‘i has 381 listed species, including 88 animals and 293 plants. Federal and state special status and rare species have been analyzed to determine the likelihood of their occurrence in the ROI. Those special status and rare species that have been recorded in the ROI or that have the potential to occur, based on documented accounts and/or the presence of suitable habitat, are listed in Appendix I-3.

The Hawaiian Islands are among the most remote groups of islands in the world. The oceanic waters around the main seven-island chain support a variety of marine biological resources, including both marine wildlife (such as marine mammals and sea turtles) and coral reefs. Whales, dolphins, seals, and sea turtles can be found in the Pacific waters of the Hawaiian Islands. Seals and sea turtles may occur on the shores of some of the islands.

Coral reef stands occur throughout the island chain, many of which are in decline from overuse (over-fishing, anchor damage, diver damage/human recreation activities, etc.); decline in water quality (sedimentation, pollution, nutrient loading, coastal construction, urbanization); catastrophic natural events (storm wave impact, lava flows); global warming (bleaching); introduced species; and disease outbreaks.

The Hawaiian environment and the species that have inhabited it have played an important part in Hawaiian culture. Polynesian settlers used the endemic plants and animals in their religious and social lives; for instance, they carved canoes and surfboards out of wood from the native koa (Acacia koa) trees and used o‘hia (Metrosideros polymorpha) trunks for building simple temples. Feathers of native birds moho and ‘oo’oo (Moho sp. and Drepanis sp.) were used for cloaks that adorned only the highest status individuals. (Additional cultural resource
Figure 3-12
Terrestrial Biological Resources Region of Influence Overview
Insets show marine Region of Influences. Inset 1 shows Dillingham Military Reservation Region of Influence, Inset 2 shows Pōhakuloa Training Area Region of Influence. The figure also shows waters located in the Hawaiian Island Humpback Whale National Marine Sanctuary. Only the Pōhakuloa Training Area Region of Influence overlaps with sanctuary waters.

**Legend**
- Hawaiian Island Humpback Whale National Marine Sanctuary Waters
- Marine Region of Influence

Source: NOAA 1997b; 15CFR Part 922 64 Federal Register 228, 1999

**Figure 3-13**

Marine Biological Resource Region of Influence and Sanctuary Waters Overview Hawai‘i
information is provided in Section 3.11). Many of these practices gradually were discontinued after western influences became widespread and native landscapes were changed by development and farming. Though the earliest of these introduced plants were essential to the islander's livelihood, providing food, shelter, and clothing, continued introductions of plants and animals have devastated the fragile communities and habitats of the Hawaiian Islands.

Army stewardship of the land is an essential part of its mission (USARHAW and 25th ID[LI] 2001a). Army use of lands for training has reduced native natural habitats and the species on them. The Army recognizes its effects on the land and consistently strives to protect and manage these resources. This has led to innovative strategies for conservation and sustainable management of their land holdings. Such management is absolutely necessary in Hawai‘i to preserve the integrity of the natural surroundings while maintaining a high standard of military excellence. The INRMPs (INRMPs for 2002-2006) outline current and proposed management plans and specific actions for natural resources stewardship of Army lands. They use up-to-date scientific information, past achievements, and adaptive management when developing the programs outlined within.

As outlined in the INRMPs, Army resource management includes endangered species management, biodiversity and ecosystem integrity, watershed management, pest management, wildland fire management, recreation, education, and outreach. The number and type of funded programs varies by sub-installation and USARHAW priority.

One important component of Army resource management is the ITAM program. ITAM management in Hawai‘i is focused on training lands and is the formal strategy that the Army uses on all installations to achieve sustainable use of these lands. The ITAM program incorporates the land condition trend analysis (LCTA), land rehabilitation and maintenance (LRAM), training requirements integration (TRI), and sustainable range awareness (SRA) components. ITAM incorporation began in Hawai‘i in 1989 in PTA and has increased ever since. The number of ITAM projects varies by sub-installation and USARHAW priority. The sub-installations outlined in this EIS include SBMR, WAAF, KLOA, KTA, DMR, and PTA. A more detailed discussion of ITAM can be found in Section 2.1.5.

Sensitive Species
Sensitive species include special status, or regulated, species such as USFWS or state of Hawai‘i listed endangered, threatened, candidate species, or proposed species, Marine Mammal Protection Act species, federal and state species of special concern, and locally regulated species. Also considered sensitive species are rare species that have had rapid population decline or whose habitat has markedly decreased in recent years. The location of sensitive species in the SBCT ROI is based on the HINHP database (HINHP 2002), USARHAW INRMPs (USARHAW and 25th ID[LI] 2001a, USARHAW and 25th ID[LI] 2001b) and yearly natural resources surveys (PCSU 1999, 2000, 2001, 2002). Since the publication of the Draft EIS two additional federally listed endangered plant species (Lobelia niihauensis and Nototrichium humile) have been identified by USFWS as potentially occurring in the ROI. ESA Section 7 consultation will be reinitiated for these species if they are determined to be present in the ROI.
Recovery Plans

Recovery plans are documents prepared by the USFWS that include summaries of threats to the species, discussions of their needs and recovery strategies, and prescriptions for specific management practices and tasks needed to recover special status species, as required by the ESA. They offer guidelines for private, federal, and state cooperation in conserving threatened and endangered species and areas on which they are presently or historically distributed. Under current law, recovery plans are to be developed for endangered and threatened species, unless the plan would not promote the conservation of the species. Plant and animal species with recovery plans that occur in the SBCT ROI are identified in Appendix I-2.

A recovery plan must include the following components:

- A description of site-specific management actions necessary to achieve the plan's goal;
- Objective measurable criteria that, when met, would result in a determination that the species no longer needs the protection of the ESA and can be removed from the lists; and
- Estimates of the time and costs required to carry out the plan and to achieve intermediate steps toward the goal.

Critical Habitat

Areas of habitat considered essential to the conservation of a listed endangered or threatened species may be designated as critical and are protected under the ESA. These areas may require special management considerations or protection. Although critical habitat may be designated on private or government land, activities on these lands are not restricted, unless there is federal involvement in the activities or direct harm to listed wildlife. Federal agencies are required to conduct Section 7 consultation if a proposed action could affect designated critical habitat, even if the effects are expected to be beneficial. The Army, as a federal agency, is prohibited from adversely modifying critical habitat. The Army has completed Section 7 consultations for proposed SBCT actions on O'ahu and the island of Hawai'i. Reasonable and prudent measures, as determined by the USFWS, will be incorporated into the Proposed Action.

The USFWS has established critical habitat for 101 species of plants on O'ahu (USFWS 2003a) and 46 plants on the island of Hawai'i (USFWS 2003b). Critical habitat is mostly in remote rugged locations of no real development value (USFWS 2002a). Army training areas were excluded from being designated critical habitat because of the essential contribution that Army-led natural resource conservation plays in the recovery of threatened and endangered species. These contributions include ongoing and proposed management actions specified in the INRMPs and other natural resource conservation programs. More than ninety percent of the land is already restricted for development because it is part of the State Conservation District. There are 864 acres of plant critical habitat within the O'ahu ROI and none within the PTA ROI on the island of Hawai'i. There are two bird species, the O'ahu 'elepaio and the palila, that have federally designated critical habitat within the SBCT ROI.
There are a total of 8,629 acres of ‘elepaio critical habitat within the project ROI, all of which occurs on O’ahu, and 2,569 acres of palila critical habitat in the ROI, occurring exclusively on the island of Hawai‘i. Federally designated critical habitat within the SBCT ROI is shown in Figure 3-14 for O’ahu, and in Figure 3-15 for the island of Hawai‘i.

**Hawaiian Islands Humpback Whale National Marine Sanctuary**

In response to public and agency comments, including NOAA Fisheries, the following information has been added to the EIS. The Hawaiian Islands Humpback Whale National Marine Sanctuary is composed of five separate areas abutting six of the major islands. Designated sanctuary waters encompass the entire western portion of the island of Hawai‘i and include waters just outside of and surrounding Kawaihae Harbor. Designated sanctuary waters also encompass marine waters in north O‘ahu near, but not adjoining, the Dillingham ROI. Also, the waters off KTA are designated sanctuary waters, but they are not part of the KTA ROI. Other relevant designated sanctuary waters occur outside of O‘ahu at Penguin Banks, which would be part of the transit route for crew-transporting vessels (see Figure 3-13). The National Marine Sanctuaries Act (16 U.S.C. 1431 et seq., P.L. 106-513) was enacted to designate and manage as National Marine Sanctuaries those areas of the marine environment that have special national significance. The primary objective of this law is to protect marine resources, but it also directs the Secretary of Commerce to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection. Sanctuaries are managed according to site-specific management plans prepared by the NOAA Fisheries.

### 3.10.3 Biologically Significant Areas

Biologically Significant Areas (BSA) are areas containing varying levels of sensitive plants established as a formal rating system by TNC. The abundance and diversity of sensitive plants within an area is used to classify sensitivity. BSA 1 areas contain a high density of federally listed endangered, proposed endangered, or candidate species. BSA 2 areas contain lower densities of known federally listed endangered, proposed endangered, or candidate taxa, or contain candidate taxa or other species of concern that are expected to be upgraded to federally protected status within the next few years. BSA 3 areas contain stands of intact, relatively common native vegetation types with few or no known occurrences of rare elements.

Important habitat for sensitive snail species also exists in the SBCT ROI. Although this habitat has not been federally designated or proposed as critical habitat, it has been identified as containing the habitat requirements necessary for supporting the federally listed and snail species of concern on O‘ahu. Figure 3-16 shows an overview of sensitive snail habitat and BSAs in the SBCT ROI.
8629 acres of designated 'elepaio critical habitat and 864 acres of plant critical habitat occur within the SBCT Region of Influence on O'ahu.


**Legend**

- O'ahu Region of Influence Boundaries
- Federally Designated 'Elepaio Critical Habitat
- Designated Plant Critical Habitat
- Roads

**Figure 3-14**

Overview of Federally Designated 'Elepaio & Plant Critical Habitat on O'ahu

O'ahu, Hawai'i
Figure 3-15
Overview of Federally Designated Palila & Plant Critical Habitat on Island of Hawai‘i
Biologically Significant Areas
Found in the Region of Influence

O'ahu, Hawai'i

Figure 3-16

47,604 acres of Biologically Significant Areas and 21,893 acres of sensitive snail habitat occur within the SBCT Region of Influence

Legend
- Roads
- Biologically Significant Areas
- Sensitive Snail Habitat
- Region of Influence Boundaries

Source: CEMML 2003, HINHP 2002
3.11 CULTURAL RESOURCES

The Army, through an active cultural resource management program, has identified, evaluated, monitored, and protected numerous cultural resources on all Army lands throughout Hawai‘i.

3.11.1 Introduction/Region of Influence

Cultural resources are defined as historic properties, cultural items, archaeological resources, sacred sites, or collections subject to protection under the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), EO 13007, and the guidelines on Curation of Federally Owned and Administered Collections (36 CFR Part 79). These and other acts and executive orders pertaining to the protection of cultural resources are presented in Appendix N.

The ROI for cultural resources would include the areas of construction of SBCT facilities, the ranges and training areas to be constructed or used under SBCT, those off-road areas to be used by Strykers, areas adjacent to road alignments affected by SBCT activities (Dillingham Trail, Drum and Helemanō roads, and PTA Trail), and the WPAA and SRAA.

3.11.2 Resource Overview

Native Hawaiian Culture and Landscapes

Archaeological and linguistic evidence indicates that the original settlers of Hawai‘i brought with them from the islands of east Polynesia seeds, roots, and cuttings of a variety of plants. These were plants of Southeast Asian and New Guinea origin, which, during the millennia of settlement of the Pacific Islands, had proven capable of surviving long distance voyages and adapting well to the environmental conditions on the volcanic islands of the South Pacific. These included taro (kalo), the staple of the Hawaiian diet, and other plants that were important elements in the Hawaiian diet or useful for medicinal, ceremonial, or utilitarian purposes, such as coconut (niu), breadfruit (‘ulu), gourd (ipu), banana (mai’a), sugarcane (kō), kava (‘awa), ti (lā‘i), and noni. Sweet potato (‘uala), a native of South America, was brought to Hawai‘i by later Polynesian voyagers and became the primary crop in dryland areas.

More than a matter of subsistence, agriculture, horticulture, fishing, limited hunting, and other uses of natural resources were an integral and focused part of Native Hawaiian culture and played a large part in their religious system. Native Hawaiian belief states that natural objects such as rocks, plants, and animals are kinolau (body forms) of the gods (Abbott 1992, 15). Kāne, the great life giver, for example, is said to be present in kō (sugarcane) and ‘ōhe (bamboo); Kanaloa, the master of the sea, is present in mai’a (bananas), and many other sea creatures; Kū, associated with building and war, is present in niu (coconut), some marine animals, and trees; and Lono, the god of peace, planting, and fertility, is present in rain clouds, ‘uala, and ‘ipu (gourds) (Abbott 1992).

The land was divided into areas called ahupua‘a, then into smaller divisions called ‘ili ‘āina that were worked by individuals or families, with areas set aside and worked for the chiefs and ali‘i (Abbott 1992, 11). An ahupua‘a included all the resources necessary for subsistence,
creating a system that maximized natural resources. In nearly all cases, an ahupua’a would have sufficient water to irrigate crops, enough upland (or mauka) resources for building material and hunting, and coastal (or makai) access for marine resource use. It is estimated that for every family that fished and lived along the shore, many more inland families were involved in farming and agriculture (Abbott 1992). Trading between those who farmed the sea and those who farmed the land was developed by the time the Europeans came and ensured that all resources were available to all Hawaiians.

Certain archaeological sites appear to reflect this evolved system of resource use. For example, historic irrigation ditches or auwai would carry water from mountain sources to irrigate the pondfields or lo‘i of several families, while stone walls or earthen berms would be built around agricultural plots.

According to tradition, Native Hawaiians feel a spiritual and even genetic connection to plants, specifically kalo or taro, as they play a large role in their creation traditions (the Kumulipo). One version of this story describes how Wākea, the sky god, coupled with his daughter, resulting in a stillborn and misshapen male fetus that was buried in the earth on the east side of their house (Enos 1998, 36). From out of the ground where the baby was buried the kalo grew, nourished by the tears of his mother. When Wākea’s daughter became pregnant again, she bore the first male human, named Hāloa. All future Hawaiians would be related to him, and consequently related to the kalo, the plant that grew out of Hāloa’s stillborn brother.

Many of the plants had multiple uses and were also used as offerings, again bridging the gap between sustenance and religion. Since nearly all plant species were considered kinolau, their use and consumption were directed by the kapu system, which covered religion, social activities, exchanges, and interactions. It was this system that the Europeans encountered when they first arrived.

With such direct links to plant life, much of Hawaiian religion and ceremony is centered around traditions regarding when to plant, fish, harvest, or process natural resources. This focus, and the belief that “Native Hawaiian” extends beyond the human form, encompassing the natural landscape and the physical forms of their gods held within earth, water, plants, and animals, implies that the definition of “ancestor” to Native Hawaiians includes every water source, geological characteristic, plant, insect, and animal that exists in any given area.

Native Hawaiian Resources Regulatory Framework

Native Hawaiian resources, which are included in the cultural landscape section discussed above, consist of properties of traditional religious and cultural importance to a Native Hawaiian group: traditional cultural properties (TCPs); prehistoric and historic archaeological sites, which may include heiau (temple complexes) and burial sites, traditional gathering places and traditional use sites, and plants and animals used for subsistence and other cultural purposes.

The National Park Service defines TCPs as places that at a minimum are “eligible for their inclusion in the [National Register of Historic Places] because of [their] association with
cultural practices or beliefs of a living community that (a) are rooted in the community’s history and (b) are important in maintaining the continuing cultural identity of the community” (Parker and King 1990). TCP studies have been conducted and are ongoing throughout the SBCT ROI. These studies have identified a number of areas of traditional importance (ATIs). The process for determining if identified ATIs are eligible as TCPs includes consultation among the Army, the SHPO, and other interested groups. At this time, the ATIs identified have not yet been evaluated, and as such, there are no formal TCPs within the SBCT project areas.

Executive Order (EO) 13007 protects Indian and Native Alaskan sacred sites on federal lands; AR 200-4 extends these protections to Native Hawaiian sacred sites as follows: “Installation commanders will avoid adversely affecting the physical integrity of sacred sites and shall establish procedures to ensure reasonable notice is provided to… Native Hawaiian organizations when Proposed Actions or land management policies or practices may restrict future access to, ceremonial use of, or adversely affect the physical integrity of sacred sites”. These sacred sites may be considered ATIs; they may not necessarily be the same as TCPs and may or may not be eligible for the National Register of Historic Places (NRHP).

As a general rule, access to Army land is restricted to DOD personnel, but Army staff work regularly with Native Hawaiians and Range Control to provide access to specific ATIs at SBMR, DMR, and PTA on request, subject to missions requirements and public safety concerns and via scheduled tours at PTA. KLOA is on Kamehameha Schools lands, and the Kamehameha Schools control access themselves, subject to military scheduling. USARHAW provides Native Hawaiian groups with ties to the training lands copies of cultural resources reports produced for the cultural resource management program.

**Regulatory Framework for Native Hawaiian Cultural Landscapes**

Federal guidelines recognize four cultural landscape categories, two of which are most relevant for this discussion: historic vernacular landscapes that illustrate peoples’ values and attitudes toward the land and reflect patterns of settlement, use, and development over time, and ethnographic landscapes associated with contemporary groups that are typically used or valued in traditional ways (Stoffle, Halmo, and Austin 1997).

National Park Service Cultural Resource Management Guidelines describe cultural landscapes as complex resources that range from rural tracts to formal gardens, further defined by the way the land is organized and divided, settled, and used, including the types of structures that are built on it (Stoffle, Halmo, and Austin 1997). Natural features, such as landforms, soils, and vegetation, provide the framework within which the cultural landscape evolves, and in its broadest sense, a cultural landscape is a reflection of human adaptation to and use of natural resources (Stoffle, Halmo, and Austin 1997).

It is difficult to define in Euro-American terms what cultural landscapes mean to Native Hawaiians, and it has become evident that labeling and evaluating geographic units that are usually loosely defined and based upon interdependent and intermingled cultural traditions presents only a part of the overall picture. Although a number of different terms may be
used to describe these cultural areas, the term “cultural landscape” is used because it is widely understood and has official standing in federal cultural resources law and regulation.

To apply federal guidelines to Native Hawaiian cultural landscapes, a culturally specific set of components reflecting Native Hawaiian spiritual, religious, and cultural values have been identified. In “Kalo Kanu o Ka ‘Āina,” a report on the cultural landscape for Ke’anae and Wailua Nui, five somewhat overlapping types of sites were identified (McGregor 1998). These categories necessarily reflect the importance of culturally significant natural resources, in addition to human-made resources, such as archaeological sites; they are as follows:

1) Areas of naturally occurring or cultivated resources used for food, shelter, or medicine.
2) Areas that contain resources used for expression and perpetuation of Hawaiian culture, religion and language.
3) Places where known historical and contemporary religious beliefs or customs are practiced.
4) Areas where natural or cultivated endangered terrestrial or marine flora and fauna used in Native Hawaiian ceremonies are located, or where materials for ceremonial art and crafts are found.
5) Areas that provide natural and cultural community resources for the perpetuation of language and culture, including place names and natural, cultural, and community resources for art, crafts, music, and dance.

These specific types of landscapes have not been formally evaluated within SBCT project areas. Considered as ATIs, these are landscapes that have been identified and that may contain culturally significant natural resources or human-made resources that may have been used to cultivate these landscapes.

Research Methods
The Army has used the NEPA scoping process described in Appendix B to begin collecting information from Native Hawaiian groups and individuals that will help identify Native Hawaiian resources in the project areas. During this process, the Army received numerous comments regarding access to and protection of sacred sites and sacred landscapes. In response to these comments and as part of the Army’s compliance with Section 106 of the NHPA, Army staff are consulting with the Advisory Council on Historic Preservation (ACHP), Hawai‘i State Historic Preservation Office (SHPO), OHA, Hui Mālama I Nā Kūpuna O Hawai‘i Nei, the Royal Order of Kamehameha, Mālama Mākua, Native Hawaiian community organizations and civic clubs, and Native Hawaiian elders to further identify Native Hawaiian resources in SBCT project areas. The public involvement discussion in Appendix B and the Section 106 compliance process both address consultation to identify Native Hawaiian resources.

Archival research and field surveys were conducted to identify Native Hawaiian resources not recorded in the Army’s previous cultural resource studies of Hawai‘i. The information
from the previous studies has been categorized by place name, clarifying the extent of the information in each project area section. This place name information is contained in Appendix J. Oral histories collected for projects in areas near or associated with SBCT installations, such as the Saddle Road project (Langlas et al. 1997), the associated Palila mitigation project (Tomonari-Tuggle and Paraso 2002), and the Mauna Kea Science Reserve (Maly 1999), were reviewed for additional information. Sources from the 19th and early 20th century record Hawaiian myths, legends, genealogies, and oral histories and have been re-inspected for references to places and traditional practices on SBCT installations (Kamakau 1961, 1964; Beckwith 1940; Fornander 1880, 1917; Malo 1951, Thrum 1976).

Land grant records collected by previous researchers were inspected for references to traditional uses and practices in the SBCT project areas. Additional archival research has been conducted, and historians and archivists were consulted including consultation with SHPD historian Holly McEldowney, Hawai‘i State Archives, Bishop Museum library and archives, Hawai‘i State library, University of Hawai‘i Hamilton Library Hawaiian and Pacific Collection, the University of Hawai‘i Center for Oral History, Hawai‘i Mission Children’s Society library, and the Hawaiian Historical Society library. Other referenced resources include cultural impact assessments prepared for the state of Hawai‘i and filed at the OEQC, as well as numerous oral histories referenced in the catalog of the Oral History Program and the Bishop Museum Archives.

In addition to consultation and archival research, field surveys were conducted to locate previously recorded cultural resources and identify new cultural resources in SBCT project areas. In compliance with the NHPA, more work would be conducted as appropriate for some discovered sites before the project is implemented.

**Historic Overview**

This section provides a general overview of regional history with an emphasis on military history in Hawai‘i. More specific discussions can be found in later sections concerning each project area.

The Hawaiian Islands were settled between 100 and 800 AD, most likely from the Marquesas Islands in the South Pacific. The greatest population expansion in the islands occurred between 1150 and 1400, and archaeologists believe that during the later part of this period Hawaiian culture became quite complex. During this time, powerful lineages of high chiefs of O‘ahu and Hawai‘i were founded. Additionally, agriculture expanded and intensified during this period. By 1700, the islands had developed the social structure that would greet Europeans on their arrival, with population centers, royal centers, temple complexes, and intensive dryland and irrigated agriculture (Tomonari-Tuggle 2002).

In the 17th and 18th centuries, political strife became common in the islands, as ruling chiefs battled for dominance. Political power became increasingly concentrated, culminating in the development of multi-island chiefdoms in the late 1700s. In 1778 Captain James Cook was the first European to arrive in Hawai‘i, followed by European and American traders looking for supplies and trading opportunities. The influx of European and American trade goods, including cannons and other heavy weapons, influenced Hawaiian politics in the end of the
18th century and beginning of the 19th. By the time of his death in 1819, the legendary King Kamehameha was ruler of all the Hawaiian Islands (Tomonari-Tuggle 2002).

American and European missionaries began arriving in 1820, at the same time that the ancient kapu (or taboo) system collapsed. An influx of settlers, traders, and farmers brought about great changes in Hawaiian social structure, economy, and natural environment. The Great Mahele was a land redistribution system put into place beginning in 1845, redistributing and privatizing land all through the islands. The development of commercial agriculture (ranching, sugar, and pineapple) resulted in waves of new immigrants, including Chinese, Japanese, Portuguese, and Filipinos brought in to work the plantations. A revolution in 1893 replaced the monarchy with a provisional government and then a republic, which was annexed to the United States in 1898 as a territory (Tomonari-Tuggle 2002).

War with Spain was an added incentive for the United States to annex the islands and develop military defenses there. In the last half of the 19th century, construction of multiple military installations began; these included Pearl Harbor, Schofield Barracks, and coastal defenses in southern O'ahu. While many military personnel were relocated to Europe during World War I, after the war aviation stations were developed in Hawai'i as part of the islands' defenses. During the 1930s the threat of impending war with Germany and Japan reinforced military buildup in the islands; Schofield Barracks alone supported 20,000 people (Tomonari-Tuggle 2002).

After the Japanese attack on Pearl Harbor on December 7, 1941, Hawai'i became even more important for the American war effort. Huge numbers of servicemen and women poured into the islands to support the war in the Pacific. By 1942 135,000 Soldiers were serving on O'ahu, and by 1945 that number had swelled to over 250,000. Hawai'i remained under martial law until the end of the war (Tomonari-Tuggle 2002).

Hawai'i continued to support the military during the Korean War (1950-1953), when additional housing was constructed at Schofield Barracks, and Wheeler Army Air Field was brought back into active duty. Kahuku and Pohakuloa Training Areas were established in 1956, and nuclear missile sites were constructed in various locations beginning in 1959, the year Hawai'i became a state. Hawai'i became a staging ground for the Vietnam War from 1963 to 1975, and also served as a rest and recreation retreat for battle-weary Soldiers (Tomonari-Tuggle 2002).

**Prehistoric and Historic Resources**

Prehistoric and historic resources to be found on SBCT project areas include historic and prehistoric archaeological sites, ATIs, historic buildings, structures, and districts, Cold War properties, historic landscapes, and monuments and memorials (Tomonari-Tuggle 2002).

Several hundred archaeological sites have been identified within the SBCT ROI. Recently completed surveys within the project areas have identified a large number of sites that have been recommended for listing on the NRHP. Two sites are already formally determined as NRHP eligible.
Archaeological sites on O'ahu are diverse and may include heiau (religious structures), ko'a (small shrines), fishponds, stone markers, fishing shrines, habitation sites, caves and rock shelters, mounds, burial platforms, earth ovens, stone walls and enclosures, agricultural terraces, canals or ditches, rock art sites, and trails. Sites on PTA include cairns, volcanic glass workshops or quarries, excavated pits, trails, surface platforms or walls, open air shelters, and lava tube sites (Tomonari-Tuggle 2002).

Historic period archaeological sites include gun emplacements, concrete structures and bunkers, concrete walls, wooden structural remains, masonry platforms, concrete revetments, bermed depressions, berms and rock piles, tunnels, miscellaneous feature complexes, road beds, railroad remnants, and trash deposits.

Historic resources within the ROI for SBCT also include military housing, offices, structures, landscapes, and districts, as well as National Historic Landmarks. These historic resources can include properties that are less than 50 years old, such as Cold War properties, if they are found to be of exceptional significance. These historic resources include the Schofield Barracks Historic District, and the WAAF National Historic Landmark.

**Current Management Efforts**

The cultural resources management program at USARHAW has a staff that includes a Cultural Resources Manager, four Cultural Resource Specialists and an Architectural Historian. The management of the resources includes maintaining a cultural site data base, as well as GIS mapping, field survey, site evaluation, location, verification, and monitoring before, during, and after training activities, site preservation, Native Hawaiian consultation and coordination with other regulatory agencies. The cultural resources team also coordinates and facilitates public outreach actions that include site visits and tours and public education. Present efforts also include the formation of Cultural Advisory Committees on the island of Hawai'i and O'ahu.

Cultural resources on Army property are managed in compliance with all applicable Federal laws and regulations, DOD Directive 4715.3 on Cultural Resources Management, and AR 200-4, the Army regulation on cultural resource management. Department of the Army Pamphlet 200-4 provides more detailed guidance to installation staff on cultural resources compliance. Under these regulations, the installation commander is responsible for compliance with cultural resources laws, and cultural resources management. In 1998 an overall ICRMP was developed for all O'ahu ranges; a historic preservation plan (HPP) was completed for PTA. Because WPAA has not been purchased, a plan has not been done for that area. Compliance with Section 106 of the NHPA requires close coordination between cultural resources staff and project planners to integrate the identification and evaluation of historic properties with the planning of construction or other USARHAW projects. This compliance process includes regular consultation with the SHPO, Native Hawaiian organizations, and other interested parties. Such consultation is initiated by letter but may take place face to face. If a project is determined to have an adverse effect on historic properties, Army staff will develop a memorandum of agreement (MOA) or programmatic agreement (PA) to address these effects and mitigate adverse effects. Such an agreement is
usually signed by the Army, the SHPO, the ACHP, and other interested organizations or individuals.

In January 2003, the Army initiated a PA to address Section 106 consultation requirements under the NHPA for the proposed transformation. The Army consulted with the Office of Hawaiian Affairs (OHA), the National Park Service (NPS), Royal Order of Kamehameha I (ROOK), O'ahu Council of Hawaiian Civic Clubs (OCHCC), Hui Malama I Na Kupuna ‘O Hawai‘i Nei, O'ahu Island Burial Council (OIBC), Hawai‘i Island Burial Council (HIBC), Historic Hawai‘i Foundation (HHF), and Native Hawaiian organizations, families, and individuals who attach traditional religious and cultural importance to cultural sites within the various project areas. A January 2004 final version of the PA for the SBCT project contains stipulations that satisfy all the Army’s Section 106 compliance responsibilities for SBCT. However, the PA does not override any rights Native Hawaiians and Native Hawaiian organizations have under federal law, as described in 36 CFR 800.2(c)(ii)(B). Appendix J contains a copy of the PA.

Army cultural resources staff members conduct regular outreach to Native Hawaiians to facilitate the Section 106 and 110 process and other consultation efforts to fulfill its obligations under the NHPA. This outreach includes offering tours and open houses, speaking to school groups and college students, and providing cultural access.

The Army has identified Native Hawaiian burial sites within the SBCT ROI. The Army completed notification and consultation for these burial sites in accordance with NAGPRA and, for the most part, left these human remains in place. Remains recovered from collections related to previous cultural resources work have been repatriated. It is USARHAW policy to leave burials in place and undisturbed whenever possible. Reburial areas are established as required after consultation with Native Hawaiian families, groups and individuals. The PA addresses inadvertent discoveries of human remains within SBCT areas and stipulates that any remains accidentally uncovered would be protected from additional disturbance, and all Army actions would be treated in accordance with NAGPRA.
4.4 AIRSPACE

4.4.1 Impact Methodology
Impacts on airspace are assessed by evaluating the potential effects of both project construction and operations activities on the principal attributes of airspace, namely controlled and uncontrolled or navigable airspace, special use airspace, military training routes, en route airways and jet routes, and airports/airfields. Impacts on controlled and uncontrolled airspace are assessed by determining if the project would reduce the amount of navigable airspace by creating new or expanding existing special use airspace by introducing temporary flight restrictions or by constituting an obstruction to air navigation. Impacts on special use airspace are assessed by determining the project’s requirement for modifications to existing special use airspace. Impacts on military training routes are assessed by determining if the project would require a change to an existing or planned military training route. Impacts on en route airways are assessed by determining if the project would lead to a change in a regular flight course or altitude or instrument procedures. Impacts on airports and airfields are assessed by determining if the project restricts access to or affects the use of airports or airfields available for public use, or if it affects airfield or airport arrival and departure traffic flows.

4.4.2 Factors Considered for Impact Analysis
Factors considered in determining whether an alternative would have a significant impact on airspace, based in part on FAA Order 7400.2E, Procedures for Handling Airspace Matters (FAA 2001), include the extent or degree to which its implementation would result in the following:

- Reduce the amount of navigable airspace;
- Lead to the assignment of new special use airspace (including prohibited areas, restricted areas, warning areas, and military operations areas) or require the modification of special use airspace;
- Change an existing or planned military training route or slow route;
- Change an existing or planned instrument flight rules (IFR) minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure, or require a visual flight rules operation change from a regular flight course or altitude;
- Restrict access to or affect the use of airports or airfields available for public use, or if it would affect commercial or private airfield or airport arrival and departure traffic flows; or
- Create an obstruction to air navigation.

In addition to these factors, public concerns expressed during the scoping process were also considered in the impact analysis. These concerns included aircraft traffic impacts, the numbers and types of aircraft used, altitudes flown, preferred flight patterns, risks to the community from the use of helicopters, and air and aviation safety. These comments are addressed in Chapter 2, the following airspace sections, or the noise sections.
4.4 Airspace

4.4.3 Summary of Impacts
Table 4-3 summarizes airspace impacts for the project areas based on the factors considered in determining whether an alternative would have a significant impact.

Table 4-3
Summary of Potential Airspace Use Impacts

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>SBMR</th>
<th>DMR</th>
<th>KTA/KLOA</th>
<th>PTA</th>
<th>Project-wide Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PA</td>
<td>RLA</td>
<td>NA</td>
<td>PA</td>
<td>RLA/NA</td>
</tr>
<tr>
<td>Reduction in navigable airspace</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>New or modified special use airspace</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Change to a military training route</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Change in en route airways or IFR</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>procedure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrict access to airport/airfield</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Obstruct air navigation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Aviation Safety</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

This table summarizes project-wide impacts. For installation-specific impacts see Chapters 5 – 8. In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**

ยอม = Significant

ยอม = Significant but mitigable to less than significant

ยอม = Less than significant

ยอม = No impact

+ = Beneficial impact

N/A = Not applicable

PA = Proposed Action

RLA = Reduced Land Acquisition

NA = No Action

**Proposed Action (Preferred Alternative)**

**Significant Impacts**
There would be no significant and unmitigable impacts to airspace under the Proposed Action.

**Less Than Significant Impacts**

*Change in En Route Airways or IFR Procedures.* There would be no direct impacts on airspace at any of the SBCT installations except for one less than significant impact at PTA due to the potential for effects on current instrument approach procedures. This would occur because the proposed new reoriented runway at BAAF would change the heading (the compass direction in which the aircraft points) of aircraft approaching the airfield, shift the initial approach fix location, and change the missed approach point and track. This change in heading, AIF location, and missed approach point, can interfere with the instrument approach pattern of other airports or airfields in the vicinity. However, prior notice and consultation with the FAA and the subsequent review process would ensure that any impacts on airspace use would not be significant.
The runway change would also shift and reorient the runway’s clear zone and accident potential zones that extend beyond each end of the runway. This would not have any direct impact on airspace use, but, because the clear zones must be cleared, graded, and free of objects, there is the potential for indirect impacts on land use or biological and cultural resources.

The potential for indirect impacts on land use, biological and cultural resources, and the noise environment from the changes resulting from the proposed extension and reorientation of the runway at BAAF, as well as the increase in number of C-17 and C-130 aircraft operations, are addressed in Sections 8.2, 8.6, 8.10, and 8.11.

No adverse impacts on public health and safety are anticipated from the small increase in Army training flights as a result of SBCT training. The strict procedures and rules in place governing flight operations in controlled and uncontrolled navigable airspace and special use airspace, coupled with the Army’s exemplary aviation safety record in Hawai‘i make future adverse impacts on public health and safety extremely unlikely.

**Reduced Land Acquisition Alternative**

Airspace impacts would be the same under Reduced Land Acquisition as those under the Proposed Action.

**No Action Alternative**

The current baseline of existing conditions would continue under No Action. There would be no direct impacts on airspace at any of the locations because none of the factors considered in determining impacts apply. The potential for indirect impacts on land use, the noise environment, and biological and cultural resources from ongoing, continuing airspace use related to current force training is addressed in Sections 4.2, 4.6, 4.10, and 4.11, respectively.
4.10. **BIOLOGICAL RESOURCES**

4.10.1 **Impact Methodology**

Potential direct and indirect impacts on biological resources were analyzed for local terrestrial and aquatic ecosystems, including general vegetation and wildlife resources, along with sensitive species, biologically sensitive areas, designated critical habitat, regulated habitats, and biological resource management plans and practices.

The methods for assessing potential direct and indirect impacts on biological resources generally include the following:

- Comparing the location of such resources in relation to the physical locations of the proposed actions to determine potential direct and indirect impacts on these resources; and
- Examining the types and intensity of activities proposed in each location to determine the potential for impacts on these resources.

For this analysis, specific potential impacts on biological resources are based on the following:

- Relative importance or value of the resource affected, for example its legal, commercial, recreational, ecological, or scientific value;
- The resource's relevant occurrence in the region;
- Sensitivity of the resource to the proposed action;
- Anticipated physical extent of the potential impact; and
- Anticipated duration of the ecological ramifications of the potential impact.

Each activity in the Proposed Action is assessed based on its location and associated activities in relation to the known presence and extent of biological resources on the installation. The sensitivity of biological resources is evaluated based on the following criteria, listed in order of importance:

- Designation of the resource by federal and state resource agencies (for example, US Army Corps of Engineers, NOAA Fisheries and the USFWS) as a high value or sensitive resource;
- Any known or presumed regional sensitivity of the resource; and
- Any known or presumed local significance of the resource.

Direct impacts may be short-term or long-term, depending on how the biological resources are altered or lost during the course of the project implementation and operation. Examples of direct impacts from project-related construction include grading or brushing vegetation (using a chain to tear out shrubs and brush to leave behind herbaceous plants), filling drainage areas, and losing or interrupting wildlife foraging or nesting areas. Direct impacts
4.10 Biological Resources

for each proposed action under each alternative are defined by the expected grading limits for that action. This impact analysis assumes that all biological resources within the area of proposed grading would be lost.

Indirect impacts occur when project-related activities affect biological resources in a manner other than a direct loss of the resource. For example, indirect impacts from a construction project might last only during construction or for the long-term operation of the facility. Noise, lighting, erosion and siltation, substantial reduction in water quality, dust, and increased human activity within or directly adjacent to sensitive habitat areas are examples of potential indirect impacts. Indirect impacts resulting from the proximity of construction and operation along the roads generally are considered here to affect habitats and species within 167 feet (50 meters) of the development. This boundary was determined by looking at survey methods of biological resources along other trails and roads in Hawai‘i. Additionally, the dust and noise generated by the limited activity that will occur on these roadways will also fall within this buffer, though may extend a greater distance in isolated instances.

In addition, results from the ATTACC model, which estimates the effects of maneuver training on the landscape, were considered when evaluating the potential impacts.

4.10.2 Factors Considered for Impact Analysis

Impacts on biological resources were evaluated by determining the sensitivity, significance, or rarity of each resource that would be adversely affected by the Proposed Action, as described in the previous section. The significance may be different for each habitat or species and is based on the resource’s rarity or sensitivity and the level of impact that would result from the proposed project.

Most impacts on high sensitivity resources are considered significant, while the determination of significance for impacts on the moderate and low sensitivity resources depends more on site-specific factors, such as the habitat quality and population size, as well as the nature and extent of the anticipated impact. For example, impacts on moderate resources could be considered significant if the anticipated impact were to greatly reduce the population or geographic distribution of a species of special concern.

Factors considered in determining whether an alternative would have a significant impact on biological resources include the extent or degree to which its implementation would do any of the following:

- Cause the “take” of a highly sensitive resource, such as a threatened and endangered or special status species (USFWS, NOAA);
- Result in a jeopardy biological opinion by the USFWS or NOAA;
- Reduce the population of a sensitive species, as designated by federal and state agencies, or a species with regional and local significance. This can happen with a reduction in numbers, by alteration in behavior, reproduction, or survival, or by loss or disturbance of habitat;
• Have an adverse effect on a wetland or riparian habitat regulated by the local, state, or federal government or on another sensitive habitat (such as designated critical habitat) identified in local or regional plans, policies, or regulations or by the USFWS or NOAA;

• Interfere with the movement of any native resident or migratory wildlife species (including aquatic species) or with established native resident or migratory wildlife corridors;

• Alter or destroy high to moderate habitat that would prevent biological communities in the area prior to the project from reestablishing;

• Conflict with Hawai‘i Coastal Zone Management Program policies;

• Introduce or increase the prevalence of undesirable nonnative species; or

• Cause long-term loss or impairment of a substantial portion of local habitat (species-dependent).

In addition to these factors, public concerns expressed during the scoping process were also considered in the impact analysis. These concerns included impacts on native species, particularly federally listed ones, and the loss or disturbance of natural habitat. Marine mammals and the Humpback Whale Sanctuary were also mentioned as specific issues of concern.

4.10.3 Summary of Impacts

In response to the agency and public comments received during the Draft EIS comment period we reevaluated our analysis of the biological resources. As a result of considering these comments and a reanalysis of the available information, we recognize that the impacts to biological resources from fire could not be mitigated to the less than significant level. However, these impacts will be substantially reduced as a result of mitigation.

Table 4-10 lists the types of biological impacts associated with the evaluated alternatives at the relevant installations. General descriptions of the impacts are also provided.

Proposed Action (Preferred Alternative)

The Proposed Action would affect biological resources identified within the SBCT ROI. These resources include general plants, animals, and vegetation communities, as well as sensitive species and habitats. Sensitive habitats refer to BSAs, as identified in the O‘ahu and PTA INRMPs (USARHAW and 25th ID[I] 2001a, 2001b), wetlands, and federally designated critical habitat. Impacts to these resources are summarized below and are discussed in detail for SBMR, DMR, KTA, and PTA in the appropriate chapters.

Significant Impacts

**Impact 1: Impact from fire on sensitive species and sensitive habitats.** Fire would have a significant impact on SBMR, KTA, and PTA. At DMR and KLOA impacts would be significant but mitigable to less than significant. Impacts are not mitigable to the less than significant level when considered project-wide. The proposed live-fire training would increase the probability
### Table 4-10
Summary of Potential Biological Resources Impacts

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>SBMR</th>
<th>DMR</th>
<th>KTA/KLOA</th>
<th>PTA</th>
<th>Project-wide Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts from fire on sensitive species and sensitive habitat.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Impacts from construction and training activities on sensitive species and sensitive habitat.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Impacts from the spread of nonnative species on sensitive species and sensitive habitat.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Impacts from construction and training activities on general habitat and wildlife.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Threat to migratory birds.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Noise and visual impacts.</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
<td>☞</td>
</tr>
<tr>
<td>Vessel impacts on marine wildlife and habitat.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>☞</td>
</tr>
<tr>
<td>Runoff impacts on marine wildlife and coral ecosystems.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>☞</td>
</tr>
</tbody>
</table>

This table summarizes project-wide impacts. For installation-specific impacts see Chapters 5 – 8.

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**
- ☞ = Significant
- ☞ = Significant but mitigable to less than significant
- ☞ = Less than significant
- ☞ = No impact
- ☞ = Beneficial impact

that there would be a wildland fire in the project ROI (Section 4.12.3, Impact 7). Full implementation of the terms and conditions of the Biological Opinions for SBCT and current force activities on the islands of O‘ahu and Hawai‘i (dated October 2003 and December 2003, respectively) and full implementation of the Wildland Fire Management Plan (dated October 2003) will substantially reduce the impacts, but not to the less than significant level. The Army has three years to develop and execute the O‘ahu Implementation Plan as directed by USFWS in the Biological Opinion. The Army has two years to execute the terms and conditions defined in the Biological Opinion for the Pohakuloa Training Area. Since there is a risk that a wildfire could result in an irretrievable loss of individuals of sensitive species, the Army has made a conservative determination that although the mitigation will considerably reduce the impacts to biological resources, the impacts may not be reduced to a less than significant level. The mitigation measures below will substantially reduce the impact but not to less than significant.
Regulatory and Administrative Mitigation 1. The effects of the proposed action on listed species in the ROI have been evaluated in the ESA Section 7 Consultation with USFWS. The Army will implement all the terms and conditions defined in the Biological Opinions issued by USFWS for current force and SBCT proposed actions on the islands of O‘ahu and Hawai‘i. The terms and conditions that implement the reasonable and prudent measures determined during this consultation will be incorporated into the Proposed Action. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementation of the Proposed Action. The Biological Opinions are available upon request.

The IWFMP for Pōhakuloa and O‘ahu Training Areas was updated in October 2003. The Army will fully implement this plan for all existing and new training areas to reduce the impacts associated with wildland fires. The plan is available upon request.

Additional Mitigation 1. No additional mitigation measures were identified for this impact.

Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat. The construction and training impacts on sensitive biological resources associated with the Proposed Action at PTA are significant and not mitigable to the less than significant level. These activities may have a significant and mitigable impact on sensitive species and habitat (including critical habitat) on SBMR, DMR, and KTA/KLOA. Federally listed species and critical habitat, observed in or with the potential to occur within the SBMR, DMR, KTA/KLOA and PTA ROI are listed in Appendix I-3. SBCT activities in this ROI include the use of tactical vehicles for off-road maneuvers, increased dismounted maneuvers, and increased amount of ammunition used (including live fire at SBMR, KTA [SRTA only] and PTA). The direct and indirect effects would be habitat disturbance, deterrence of wildlife use, spread of nonnative species, increase in the probability of fire and direct take of listed wildlife, and destruction of listed plants. At PTA, individuals of sensitive plant species would be eliminated by tactical vehicle maneuvers, construction, and dismounted training and there is the potential for currently unsurveyed lava tubes with sensitive arthropod species to be crushed during training maneuvers. These installation-specific impacts would be mitigated to the less than significant level by the regulatory and administrative measures described below.

The project-wide impact from construction and training on sensitive species and sensitive habitat, including their federally designated critical habitat, would be significant but not mitigable to the less than significant level. The combined impacts of fire at PTA, SBMR, KTA, and DMR and mounted maneuver at PTA could cause long-term loss or impairment of a substantial portion of natural habitat and the loss of individuals. Though the following mitigation measures would decrease the likelihood of this happening, there is a risk that a wildfire could result in an irretrievable loss of individuals of sensitive species. The overall impact of project actions on sensitive (listed) species and their sensitive habitat (including federally designated critical habitat) is still considered significant, according to factors detailed in Section 4.10.2., but not mitigable to less than significant. The mitigation measures below will substantially reduce the impact, but not to less than significant.
Regulatory and Administrative Mitigation 2. The Army will implement all the terms and conditions defined in the Biological Opinions issued by USFWS for current force and SBCT proposed actions on O‘ahu and the island of Hawai‘i. The terms and conditions that implement the reasonable and prudent measures determined during this consultation will be incorporated into the Proposed Action. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the Proposed Action. The Biological Opinions are available upon request. The Army will implement land management practices and procedures described in the ITAM annual work plan to reduce erosion impacts (US Army Hawai‘i 2001a). Currently these measures include implementing a training requirement integration (TRI) program; implementing an Integrated Training Area Management (ITAM) program; a Sustainable Range Awareness (SRA) program; developing and enforcing range regulations; implementing an Erosion and Sediment Control Management Plan; coordinating with other participants in the Ko‘olau Mountains Watershed Partnership (KMWP); and continuing to implement land rehabilitation projects, as needed, within the Land Rehabilitation and Maintenance (LRAM) program. Examples of current LRAM activities at KTA include revegetation projects involving site preparation, liming, fertilization, seeding or hydroseeding, tree planting, irrigation, and mulching; a combat trail maintenance program (CTP); coordination through the Troop Construction Coordination Committee (TCCC) on road maintenance projects; and development of mapping and GIS tools for identifying and tracking progress of mitigation measures.

Additional Mitigation 2: The Army proposes to fence or flag where practicable any sensitive plant communities from activities that may take place in the ROI. The Biological Opinions outline fencing for the majority of the sensitive species. USARHAW will evaluate if additional fencing may be necessary.

Significant Impacts Mitigable to Less Than Significant Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat. In general, nonnative plant and animal species pose a threat to Hawaiian native ecosystems (Atlas 1998). The Proposed Action in the SBMR, DMR, KTA/KLOA, and PTA ROIs would increase the potential for the introduction and spread of alien species through troops and equipment movement, construction, and fires. Nonnative species alter habitat, prey on native species, compete for resources, and carry diseases, all of which decrease the success of native species.

Regulatory and Administrative Mitigation 3. As required in the terms and conditions of the Biological Opinions, the Army will implement the following:

- Educate soldiers and others potentially using the facilities and roads in the importance of cleaning vehicles, equipment, and field gear;
- Educate contractors and their employees about the need to wear weed-free clothes and to maintain weed-free vehicles when coming onto the construction site and to avoid introducing nonnative species to the project site;
- Prepare a one-page insert to construction contract bids informing potential bidders of the requirement; and
Inspect and wash all military vehicles at wash rack facilities before they leave SBMR, KTA, or PTA to minimize the spread of weeds, such as fountain grass and animal (invertebrate) relocations.

USARHAW will follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines federal agency duties for preventing and compensating for invasive species impacts. USARHAW will agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. Implementing an Environmental Management System will further improve the identification and reduction of environmental risks inherent in mission activities.

In accordance with USDA regulations and requirements, the USDA will inspect and certify cargo originating outside of Hawai'i to ensure it is not carrying the brown tree snake or other reptiles before cargo is transported for use on training ranges.

Additional Mitigation 3: The Army proposes to use native plants in any new landscaping or planting efforts where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.

Less than Significant Impacts

Impacts from construction and training on general habitat and wildlife. The project-wide impact as a result of training on general vegetation, wildlife, and habitat would be less than significant. At all project installations, there are impacts on general vegetation and wildlife from vehicle maneuvers. Impacts are limited to some extent by terrain. Additionally, the Army's ITAM program is used to limit the potential impact on land from training by rotating land used for maneuvers and monitoring factors like vegetation cover and soil moisture. The Army will also develop the DuSMMoP, which should reduce the potential for soil erosion harmful to general habitat and wildlife.

The Army proposes to conduct more intensive surveys of lava tubes, which are identified as potentially supporting native root-dependent arthropods. Lava tubes found to contain or support these arthropods will be avoided where practicable. All generated construction- and training-related drainage will be channeled away from lava tubes where practicable.

Threat to migratory birds. The construction and subsequent presence of FTI antennas would not significantly affect migratory bird species known to occur in the SBMR ROI, even those that migrate at night (USFWS 2000). (Specific location, height, and structural features are described in Appendix D.) In general these monopole antennas will be no higher than 100 feet (33 meters) and will be mounted on existing structures. The Army would apply the SOPs and BMPs identified for federal agencies in Executive Order 13186 to minimize the overall impact of SBCT actions on migratory birds. These are identified in Section 5.10.2 and in more detail in Appendix I-2.

Noise and visual impacts. The Proposed Action would have short- and long-term noise impacts on biological resources within the SBMR, DMR, KTA/KLOA, and PTA ROIs. These
impacts would have negative effects but would be less than significant. These impacts would arise from the increase in soldiers, off-road mounted maneuver, and vessel and helicopter use. They could affect marine mammals, which are sensitive to the presence of and noise produced by vessels and low-flying aircrafts. Terrestrial wildlife would be affected by off-road mounted and dismounted maneuver, the increase in ammunition use and low-flying helicopters. The Army’s SOPs restrict the proximity of aircraft to the water surface and would prevent a significant impact occurring as a result of intentional aircraft operation. The remaining sources would not affect species and habitats in any manner identified within the significance factors and methodology described in 4.10.1 and 4.10.2, such as causing a population level decrease or ‘take’ of a federally listed species.

**Vessel impacts on marine wildlife and habitat.** Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. The increase from 60 to 66 LSV trips a year is minor and not significant. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. (Low frequency and/or mid-range sonars have been shown to cause injury and mortality in marine wildlife (Rossiter 2003), but these emissions typically occur off of vessels engaged in defense training maneuvers, not transport). Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges transit through Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under the Proposed Action are not considered to be significant. TSVs are not in use at this time. They may be utilized in the future. When and if that occurs, separate NEPA documentation will be done to address impacts from TSV use to marine wildlife.

**Runoff impacts on marine wildlife and coral ecosystems.** There would be less than significant impacts on marine wildlife and coral ecosystems in the PTA ROI. No impacts from potential runoff are expected for marine wildlife resources or coral ecosystems at the other sites. The expected increase in erosion to the ocean at PTA would be within the natural range that exists due to rainfall and runoff variation. There are no contaminants moving off the range, which is quite a distance from the coastline. No contamination of surface water or groundwater is expected (see Section 8-08 Water Resources). There is no runoff carrying contaminants from UXOs to nearshore ocean waters. There are no UXOs in the marine ROI. No water-contaminating activities are occurring in the upland portions of the marine ROI habitat, so no direct effects from runoff on marine wildlife or coral reefs and their associated organisms would occur. Impacts on marine wildlife and coral ecosystems in the ROI waters are not considered to be significant.

**Reduced Land Acquisition Alternative**
All of the impacts described for the Proposed Action would occur under Reduced Land Acquisition. However, because there is a reduction in size of the SRAA (by 1,300 acres [526 hectares]) impacts at that location from construction and training activities described above would be slightly less than those under the Proposed Action. There is no change in the significance level since the SRAA is an already disturbed area and the training proposed at
SRAA would occur just at PTA. Impacts on biological resources in the SBMR ROI would be further decreased under this alternative due to the removal of QTR2 from proposed actions in this area. There would be less of a loss and degradation of general and sensitive habitat in the SBMR ROI but this impact would still be considered less than significant. Impacts in the PTA ROI would increase slightly due to the placement of QTR2 in the ROI and the subsequent increase in mounted maneuver within the PTA ROI. However, this impact would still be significant and not mitigable.

**No Action Alternative**
The current baseline of existing conditions would continue under No Action.

There would be a continuation of existing significant and not mitigable to less than significant impacts. This includes fire impacts on sensitive species and habitat. Because there is a risk that a wildfire could result in an irretrievable loss of individuals of sensitive species, the Army has made a conservative determination that even under the No Action Alternative species and habitat could be affected by fire under the current force activities. Significant measures have been developed to prevent and control wildfires, and they will be implemented through the IWFMP.

Impacts from construction and training activities and the spread of nonnative species would be significant and mitigable to less than significant for all project areas.

Ongoing Army environmental management and stewardship activities, described in Chapter 2, would continue to decrease impact intensity and to protect sensitive plants and habitats within the ROI. All determinations made through ESA Section 7 Consultation, as described above and detailed in the project location chapters, would apply under this alternative as well.

The following less than significant impacts on biological resources would occur as a result of continued training under the No Action Alternative:

- Threats to migratory birds and noise and visual impacts;
- Impacts from construction and training on general habitat and wildlife;
- Vessel impacts on marine wildlife and habitat; and
- Runoff on marine wildlife and coral ecosystems.

These impacts would be limited and would be addressed by ongoing Army environmental management and stewardship activities.
4.11 Cultural Resources

4.11.1 Impact Methodology
The methods for assessing potential impacts on cultural resources include identifying significant cultural resources in the areas of potential effect (APEs) under the Proposed Action to determine potential direct and indirect impacts on these resources.

To identify cultural resources in the project areas, historic and current maps and aerial photographs, cultural resources reports, and archival records were reviewed. In addition, federal, state, and local inventories of historic places, including the NRHP, were reviewed for information related to prehistoric and historic resources within the project areas. Project areas were surveyed to confirm presence or absence of previously recorded archaeological resources as well as to identify previously unrecorded cultural resources. Native Hawaiian groups were consulted in an attempt to identify and locate ATIs in the project areas.

4.11.2 Factors Considered for Impact Analysis
Factors determining significance of impacts on cultural resources are derived from federal laws and regulations regarding cultural resources protection.

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on properties listed on or eligible for listing on the NRHP. Eligible properties would include properties significant for their importance to Native Hawaiian groups. Section 106 and its implementing regulations state that an undertaking has an effect on a historic property (i.e., NRHP-eligible resource) when that undertaking may alter those characteristics of the property that qualify it for inclusion on the NRHP. An undertaking is considered to have an adverse effect on a historic property when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects include, but are not limited to, the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property or alteration of the character of the property’s setting when that character contributes to the property’s qualifications for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or changes that may alter its setting;
- Neglect of a property, resulting in its deterioration or destruction; and
- Transfer, lease, or sale of a property without adequate provisions to protect its historic integrity.

Native Hawaiian sites, including sacred sites, burials, and cultural items, whether or not they are considered eligible for the NRHP, may also be protected under AIRFA, ARPA, or NAGPRA. Factors considered in determining whether an alternative would have a significant impact on cultural resources include the extent or degree to which its implementation would result in:
• An adverse effect on a historic property or TCP as defined under Section 106 of the NHPA; or

• A violation of the provisions of AIRFA, ARPA or NAGPRA.

It should be noted that an adverse effect on an historic property as defined by NHPA is not necessarily a significant impact under NEPA. While mitigation under NHPA does not necessarily negate the adverse nature of an effect, mitigation under NEPA can reduce the significance of an impact. NHPA and NEPA compliance are separate and parallel processes, and the standards and thresholds of the two acts are not precisely the same.

It should also be noted that some mitigation measures for other resource areas, such as cultivating land to revegetate a plant species, might involve actions that could create adverse effects on cultural resources. Prior to implementation, these actions would also undergo Section 106 review following federal guidelines.

In addition to these factors, public concerns expressed during the scoping process were also considered in the impact analysis. These concerns included access to traditional and religious sites for ceremonial purposes, access for hunting and gathering, protection and preservation of archaeological and traditional sites, interpretation of significance based on Native Hawaiian tradition and the knowledge of elders of the community, community involvement in managing cultural resources on Army land, and compliance with federal and state laws and regulations concerning cultural resources protection.

4.11.3 Summary of Impacts

Table 4-11 lists potential cultural resource impacts associated with the Proposed Action, Reduced Land Acquisition, and No Action at the relevant installations, based on identified cultural resources. General descriptions of identified impacts are provided.

Specifically for SBCT, the Army has complied with its responsibilities under the NHPA by executing a PA with the SHPO and the ACHP and through consultation with the OHA, the NPS, the ROOK, the OCHCC, Hui Malama I Na Kupuna 'O Hawai'i Nei, the OIBC, the HIBC, the HHF, and Native Hawaiian organizations, families, and individuals that attach traditional religious and cultural importance to cultural sites within the various project areas. The January 2004 PA for the SBCT project does not override any rights Native Hawaiians and Native Hawaiian organizations have under federal law, as described in 36 CFR 800.2(c)(ii)(B). Appendix J contains a copy of the PA.

Proposed Action (Preferred Alternative)

Significant Impacts

There would significant impacts on cultural resources and ATIs under the Proposed Action. Mitigation measures have been developed to lessen impacts to these resources.
### Table 4-11
Summary of Potential Cultural Resource Impacts

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>SBMR PA RLA NA</th>
<th>DMR PA RLA NA</th>
<th>KTA/KLOA PA RLA NA</th>
<th>PTA PA RLA NA</th>
<th>Project-wide Impacts PA RLA NA</th>
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<td>Impacts on historic buildings</td>
<td>☒ ☒ ☒</td>
<td>☒ ☒ ☒</td>
<td>☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒</td>
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<tr>
<td>Impacts on archaeological resources from range and</td>
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<td>☒ ☒ ☒</td>
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<td>facility construction</td>
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<td>Impacts on archaeological resources from training</td>
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<td>Impacts on archaeological sites from construction of</td>
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<td>Impacts on ATIs</td>
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<td>☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ✓</td>
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<tr>
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<td>N/A N/A N/A</td>
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<td>N/A N/A N/A</td>
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<tr>
<td>Impacts on archaeological sites from road or trail</td>
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<td>☒ ☒ ☒</td>
<td>☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒</td>
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<td>☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ✓</td>
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<tr>
<td>Impacts on archaeological sites from road use</td>
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</tbody>
</table>

This table summarizes project-wide impacts. For installation-specific impacts see Chapters 5 – 8. In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**
- ☒ = Significant  
- ☒ = Significant but mitigable to less than significant  
- ☒ = Less than significant  
- ☒ = No impact  
- + = Beneficial impact  
- N/A = Not applicable  
- PA = Proposed Action  
- RLA = Reduced Land Acquisition  
- NA = No Action

**Significant Impacts**

*Impact 1: Impacts on historic buildings.* Potential significant impacts on historic buildings would occur at KTA and PTA. Constructing the CACTF could have significant impacts on historic buildings at KTA. Among the properties to that may be adversely affected by the Proposed Action are the Nike Missile Site and other buildings that may be eligible for listing on the NRHP as Cold War-era properties. Construction of the Range Maintenance Facility at PTA would require demolishing Cold War-era buildings; the BAAF runway scheduled for upgrade may be a Cold War-era historic property as well. The Keʻamuku Village Complex within the WPAA may be eligible for listing on the NRHP. The construction of the Range Control Facility at SBMR would require demolishing buildings that are or will soon be 50 years of age and therefore may be eligible for the NRHP. The mitigation measures given below will mitigate the severity of the demolition of historic buildings at PTA but not to less than significant levels.

*Regulatory and Administrative Mitigation 1.* The Army will consult with the SHPO, ACHP, and interested parties, in accordance with Section 106 of the NHPA, on the Nike Missile Site...
complex. The Army will manage and will renovate this complex in compliance with the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

The Army will require WPAA buildings to be avoided by using range management protocols, which will require the area around the buildings to be off-limits to military training activities. Keʻâmuku Village will be marked as off-limits for training to protect it from damage.

**Impact 2: Impacts on archaeological resources from range and facility construction.** The greatest number and intensity of impacts from the Proposed Action would occur at SBMR and PTA. These two areas have the most proposed transformation related ground-disturbing activities and may have the most impacts on archaeological resources.

Facility construction involves ground softening at the PTA BAX, and grubbing vegetation, grading site surfaces, excavating the subsurface, and moving heavy construction equipment at all construction sites. All of these activities may result in direct destruction of or damage to archaeological resources. The mitigation measures given below would mitigate the severity of the impacts but not to less than significant levels.

**Regulatory and Administrative Mitigation 2.** Before construction, the Army will complete the evaluation of any archaeological sites within areas subject to range and facility construction. Sites determined to be eligible for the NRHP will be flagged for avoidance. The projects will be designed to avoid all eligible and unevaluated archaeological sites, to the full extent practicable. Geographical information system (GIS) and global positioning system (GPS) information will be given to project designers and range control to ensure that any sites are considered in project design. If it is not possible to avoid archaeological sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an inadvertent discovery plan (IDP) as part of the PA.

**Impact 3: Impacts on archaeological resources from training activities.** Significant impacts on archaeological sites would occur on DMR and PTA. Significant but mitigable to less than significant impacts would occur on SBMR and KTA. Potential impacts from the proposed training activities include damage to sites from subsurface excavations related to troop training (e.g., field fortifications, emplacement of obstacles), increased access by ground troops into the ranges, off-road vehicular movement, possible damage from live fire where resources are in the line of fire, and cleanup of unexploded ordnance within or adjacent to historic properties. Off-road mounted maneuvers with tactical vehicles could result in greater impacts on archaeological sites in all of the training areas. Activities such as revegetation could also cause impacts through ground disturbance. The presence of large numbers of personnel could affect resources through vandalism or accidental damage. Mitigation measures described below will reduce the severity of the impacts on these resources but not to less than significant levels.
4.11 Cultural Resources

Regulatory and Administrative Mitigation 3. The Army will evaluate archaeological sites within training areas related to SBCT. Sites determined to be eligible for the NRHP and sites pending evaluation will be identified and avoided through protective measures, to the full extent practicable. If it is not feasible to avoid identified archaeological sites or newly discovered sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

Impact 4: Impacts on Areas of Traditional Importance. Potentially significant impacts on ATIs may occur at SBMR, DMR, and PTA.

Potential impacts related to construction of training facilities could include destroying or damaging ATIs, including shrines, archaeological sites, burials, or elements of Native Hawaiian cultural landscapes. Purchasing the SRAA at SBMR and the WPAA at PTA, and then using them for military training, could limit Native Hawaiian access to and use of sites on these parcels for traditional or religious purposes. Native Hawaiians consider range and training activities inappropriate and disrespectful uses of the land that disturb and change the character and feeling of spiritual places.

Construction of FTI antennas at SBMR, including on Mount Ka’ala, and at PTA may result in visual intrusion on cultural landscapes. Because some sites would require construction, they could have an adverse effect on the nature of the cultural landscape.

Activities relating to the construction of Dillingham Trail from DMR to SBMR could also result in significant impacts on such cultural properties; however, identified mitigations, including identification and avoidance, may reduce the severity of the impacts, but not to less than significant levels.

Regulatory and Administrative Mitigation 4. Facility construction or training area uses will be designed to avoid identified traditional places and limit visual impacts on TCPs by site location, design, and orientation, where feasible.

If avoiding identified TCPs or ATIs is not feasible because of interference with the military mission or risk to public safety, the Army will consult with the SHPO and Native Hawaiians, in accordance with the PA, to identify impacts and develop appropriate mitigation measures. Mitigation for impacts on the cultural landscape could include consulting with Native Hawaiians and using a cultural monitor during construction.

The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with AIRFA and Executive Order 13007, on a case-by-case basis. This access program will be expanded to include new land acquisitions.

The Army previously identified Native Hawaiian burial sites in the SBCT ROI. The Army completed notification and consultation procedures for these burial sites, in accordance with NAGPRA, and left these human remains in place. To address any impacts on any burial sites
or an inadvertent discovery of Native Hawaiian human remains or funerary objects, the Army will abide by all notification and consultation requirements outlined in Section 3 of NAGPRA.

**Impact 5: Impacts on archaeological sites from road or trail construction.** Construction of PTA Trail and the proposed trails through WPAA would result in a potentially significant impact on archaeological resources. Trail construction would involve vegetation removal and grading soil, as well as the regular use of heavy equipment. Some trail or road construction at WPAA is projected to go through areas with a high potential for archaeological resources. Cultural resources in the trail corridor and in construction staging areas may be adversely affected during construction of the trail. The PTA Trail route, as established, avoids all archaeological and historic sites in the Kawaihae area, but any alteration in the alignment could result in impacts on historic properties. Activities at WPAA could result in direct destruction or direct or indirect damage to archaeological resources by contributing to soil erosion. Additionally, construction activities could expose or disturb previously undiscovered cultural resources.

Construction of Dillingham Trail would involve vegetation removal and soil grading, as well as the regular use of heavy equipment. Cultural resources in the trail corridor and in construction staging areas could be adversely affected during construction. GIS and GPS information is available for all sites in the Dillingham Trail construction corridor. The project designers will use this information to avoid these sites and thereby mitigate impacts to less than significant levels.

**Regulatory and Administrative Mitigation 5.** In accordance with the PA, the Army will identify cultural properties, evaluate cultural properties for NRHP eligibility, and implement avoidance strategies to the full extent practicable. GIS and GPS information will be provided to project designers to ensure that sites are considered in the design and construction of all the proposed military vehicle trails and training roads on WPAA. If it is not possible to avoid archaeological sites, the Army will consult, in accordance with the PA, to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

**Significant Impacts Mitigable to Less than Significant**

**Impact 6: Impacts on archaeological resources from road use.** Impacts on sites along PTA Trail from military use of the trail could include erosion and possible vandalism or human access. These impacts are likely to be less than significant and will be mitigated by installation cultural resources personnel regularly monitoring them. Road use within WPAA poses a greater risk to resources recorded within the proposed new training area. The large number of gravel roads proposed would create additional impacts on sites within the WPAA, including erosion and possible vandalism or human access. The mitigation measures given below will mitigate the severity of the impacts to less than significant levels.

**Regulatory and Administrative Mitigation 6.** Eligible and unevaluated sites will be flagged and mapped on a range control GPS map. Installation cultural resources staff will monitor the sites regularly. Participants in training activities on the ranges will be ordered to avoid...
identified sites. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

Less than Significant Impacts

Impacts on archaeological sites from FTI construction. FTI antenna construction would have less than significant impacts at SBMR, DMR, and PTA, and no impact at KTA. FTI antennas would be constructed at SBMR and outlying areas. The FTI project at DMR would construct antennas within the installation boundary and on Dillingham Ridge to the southwest of the installation. FTI antennas would be erected at PTA, the WPAA, and several sites off PTA. Antenna support structure locations were chosen to avoid archaeological resources. The FTI project at KTA would construct antennas on disturbed sites and thus is considered to have no impact on archaeological resources.

Reduced Land Acquisition Alternative

Impacts under the RLA Alternative would be approximately the same as under the Proposed Action, but with less intensity of impacts at SBMR. The smaller acreage to be acquired and used for training in the SRAA means that fewer archaeological sites would be affected by Army activities in that area, and there would be less risk of inadvertent discovery of archaeological resources. Impacts at PTA would remain roughly the same as under the Proposed Action, because QTR2 at PTA would be located on land that was previously used for an impact area, and therefore there are few undisturbed archaeological resources remaining.

No Action Alternative

Existing conditions would continue under No Action. Less than significant impacts under No Action generally result from ongoing training activities or infrastructure projects. Ongoing training activities include continued off-road vehicle use. This would result in ongoing impacts on cultural resources in the training areas caused by ground troop activities, off-road vehicle movement, and subsurface excavations. Archaeological resources on the training areas are monitored following exercises to document adverse effects on the sites. Under No Action, current force training would continue, and there would be no additional impacts on cultural resources. USARHAW will continue to inventory eligible historic properties, in compliance with Section 110 of the NHPA, and project planning will comply with Section 106 and its implementing regulations. Impacts on cultural resources would be mitigated in compliance with these regulatory requirements.
6.2 **LAND USE/RECREATION**

The land uses and recreational resources for DMR were identified through review of the state Land Use District designations (State of Hawai‘i 2002a), the state designations for Agricultural Lands of Importance to the State of Hawai‘i (State of Hawai‘i 2002a), the North Shore Sustainable Communities Plan (City and County of Honolulu 2000a), and the City and County of Honolulu Real Property Assessment Division data for tax map key identifications and property boundaries (City and County of Honolulu 2003).

### 6.2.1 Affected Environment

**Land Use**

*Dillingham Military Reservation*

DMR is on the northwestern tip of O‘ahu (Figure 6-1). It consists of 664 acres (269 hectares) and supports units during field exercises (Nakata Planning Group, LLC 2002a). The 107-acre (43.3-hectare) cantonment area includes an airfield and associated roadways, bunkers, and earthen airplane hangars that were built along the coastal plain. Construction that extends into the foothills of the Wai‘anae Mountain Range includes ammunition storage bunkers and gun emplacements (Nakata Planning Group, LLC 2002a).

Approximately 354 acres (143 hectares) of DMR are suitable for maneuver and field training, while the remaining land is on steep mountain slopes. DMR is used for small unit (up to platoon\(^1\)) maneuvers and cannot support large-scale operations. No range facilities are available at DMR (Nakata Planning Group, LLC 2002b). Ammunition is restricted to blanks and is prohibited on the runway (Nakata Planning Group, LLC 2002a). There are no live-fire activities, designated ordnance impact areas, or associated surface danger zones on DMR.

The airfield is an active joint-use military/civilian airfield. The State of Hawai‘i Department of Transportation has a lease from 1983 to 2008 for portions of DMR, including the runway and parking area (USARHAW and 25th ID[LI] 2001a). The lease is for civilian light aircraft operations and support from sunrise to sunset. Night operations are reserved for the military. The Army also retains the right to close the airfield at any time for daytime military operations.

Most of DMR is within the state-designated Agricultural District (Figure 6-2; State of Hawai‘i 2002a); however, the state ALISH map does not identify DMR as agricultural land of importance to the State of Hawai‘i (Figure 6-3). A small portion at the western end of the airfield is within the Conservation District, with no designated subzone (State of Hawai‘i 2002a). County zoning of DMR is Ag-2 General Agricultural District, except for a small portion at the airstrip, which is zoned as F-1 Military (City and County of Honolulu 2001). The Special Management Area includes the airfield portion of DMR (Figure 6-4; State of Hawai‘i 2002a). Special Management Areas are discussed in Appendix N.

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\(^1\) A platoon consists of 16 to 44 Soldiers (USACE Mobile District 2001).
6.2 Land Use/Recreation

Figure 6-1
Land Use at Dillingham Military Reservation
Figure 6-2
State Land Use District Map Dillingham Military Reservation
Figure 6-3
Agricultural Lands of Importance to the State of Hawai‘i Dillingham Military Reservation
Figure 6-4
Special Management Area Dillingham Military Reservation
Military land uses within DMR project areas are listed in Table 6-3. One of the antenna sites is outside DMR boundaries in a Conservation District Resource Subzone, a designation with the objective to develop areas to ensure sustained use of the area’s natural resources.

| SBCT Training | Training |
| FTI           |          |
| Dillingham Airport | Training |
| Dillingham P1 | Training |
| Dillingham Ridge | Conservation District Resource Subzone |

Public recreation/nonmilitary uses at DMR include glider plane operation, parachuting, sky diving, hang gliding, and hiking. Glider plane operation, parachuting, sky diving, and hang gliding are allowed in designated areas associated with the airfield. The military maintains priority use of the airfield at all times. The 2.3-mile (3.7-kilometer) Keālia Trail can be accessed through the western portion of DMR (Figure 6-5). This trail allows non-motorized biking and is open to the general public. If the trail is accessed from the south, through the Ka'ena Point Tracking Station, a DLNR permit is required (Nā Ala Hele 2003).

**Dillingham Trail**

The proposed land easement/road construction for Dillingham Trail would extend north from Main Post, would travel along the northeastern edge of Poamoho Gulch, and would turn west to continue to DMR. The trail alignment is along existing agricultural and undeveloped lands (USGS 1998c and 1999a). The state ALISH map shows Prime, Unique, and Other Agricultural Lands along the trail corridor (Figure 6-3). The trail passes near Thomson Corner, a residential subdivision. The trail also crosses the Mokulēia Forest Reserve Access, a 4.2-mile (6.8-kilometer) paved trail accessible on foot and by bicycle (Nā Ala Hele 2003).

The trail crosses the Special Management Area as it passes to the north and west of Thomson Corner (Figure 6-4).

**Ownership**

**Dillingham Military Reservation**

The federal government owns DMR. Figure 6-6 shows land parcels within DMR, and Table 6-4 lists Tax Map Keys of the affected land parcels and the associated landowners and lessees.
Figure 6-5
Kuaokalā-Mokulēʻia Area Trails (Hiking Trails at Dillingham Military Reservation)
Figure 6-6
Affected Parcels Map Dillingham Military Reservation
Table 6-4
Dillingham Military Reservation Landowners and Lessees

<table>
<thead>
<tr>
<th>Tax Map Key</th>
<th>Landowner (Lessee)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DMR</strong></td>
<td></td>
</tr>
<tr>
<td>68014001 to 68014008 and 68014011 to 68014025</td>
<td>United States of America (State Department of Transportation Airports Division)</td>
</tr>
<tr>
<td>68002018</td>
<td>United States of America</td>
</tr>
<tr>
<td><strong>FTI site outside of DMR</strong></td>
<td></td>
</tr>
<tr>
<td>Dillingham Ridge</td>
<td></td>
</tr>
<tr>
<td>68001004</td>
<td>State of Hawai‘i</td>
</tr>
</tbody>
</table>

Source: City and County of Honolulu 2003

**Dillingham Trail**
The proposed Dillingham Trail land is owned by various entities. Affected parcels are shown in Figure 6-6, and Table 6-5 lists Tax Map Keys of the affected land parcels and the associated landowners and lessees.

**Surrounding Land Use**

**Dillingham Military Reservation**
The land surrounding DMR is generally undeveloped and includes Prime agricultural land to the east and beaches to the north, with some residences to the northeast. The Kawaihāpai reservoir and associated pumping station and aqueducts are located east of DMR (USGS 1983). Dillingham Ranch, a former cattle ranch, is approximately 1.6 miles (2.6 kilometers) west-southwest of DMR; its facilities include horse stables. Land south of DMR is mountainous and includes a state hunting area to the southwest (Figure 5-10). Conditions for hunting in this area, shown on Figure 5-10, are presented in Table 6-6. Land uses to the west include an inactive quarry immediately to the west and the YMCA’s Camp Erdman and the military’s Camp Ka‘ena, approximately 0.7 mile (1 kilometer) west of DMR.

Mokulē‘ia Beach extends along the shoreline north of DMR, across Farrington Highway. Mokulē‘ia Beach Park, included north of the eastern side of DMR, is used for beachcombing, bodyboarding, fishing, snorkeling, surfing, swimming, and windsurfing (Clark 1999). Facilities include restrooms, showers, camping sites, and parking. A bikeway is proposed along Farrington Highway, but construction has not been planned (City and County of Honolulu 2000a; and Lloring 2002).

**Dillingham Trail**
The land surrounding Dillingham Trail is generally agricultural or undeveloped. The trail passes near the residential subdivision Thomson Corner (Figure 6-1).
### Table 6-5

**Dillingham Trail Landowners and Lessees**

<table>
<thead>
<tr>
<th>Tax Map Key</th>
<th>Landowner (Lessee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>64003001</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>65001002</td>
<td>Dole Food Co., Inc. (Waialua Sugar Co., Inc.)</td>
</tr>
<tr>
<td>65002010</td>
<td>George Gailbraith Trust Estate (PPI Del Monte Fresh Produce)</td>
</tr>
<tr>
<td>65002011</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>65002018</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>65002019</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>65002025</td>
<td>George Gailbraith Trust Estate (PPI Del Monte Fresh Produce)</td>
</tr>
<tr>
<td>66025001</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>66027001</td>
<td>Dole Food Co., Inc. (Haruo I. Ishida)</td>
</tr>
<tr>
<td>66027007</td>
<td>T. Otake &amp; Sons, Ltd.</td>
</tr>
<tr>
<td>67002004</td>
<td>Dole Food Co., Inc. (Waialua Ranch Partners)</td>
</tr>
<tr>
<td>67003019</td>
<td>Dole Food Co., Inc. (Waialua Ranch Partners)</td>
</tr>
<tr>
<td>68002005</td>
<td>Dole Food Co., Inc. (Aloha Farms, Inc.)</td>
</tr>
<tr>
<td>68003004</td>
<td>Dole Food Co., Inc.</td>
</tr>
<tr>
<td>68003006</td>
<td>Metropolitan Mtg. and Securities Co., Inc. (Yusung Timber Co., Ltd.)</td>
</tr>
<tr>
<td>68003009</td>
<td>Dole Food Co., Inc. (Aloha Farms, Inc.)</td>
</tr>
<tr>
<td>68003015</td>
<td>Metropolitan Mtg. and Securities Co., Inc. (Yusung Timber Co., Ltd) Metropolitan Mtg. and Securities Co. Inc.</td>
</tr>
<tr>
<td>68003030</td>
<td>Metropolitan Mtg. and Securities Co., Inc. (Yusung Timber Co., Ltd.) Metropolitan Mtg. and Securities Co. Inc.</td>
</tr>
<tr>
<td>68003031</td>
<td>Metropolitan Mtg. and Securities Co., Inc. (Yusung Timber Co., Ltd.) Metropolitan Mtg. and Securities Co. Inc.</td>
</tr>
<tr>
<td>68003040</td>
<td>Metropolitan Mtg. and Securities Co., Inc. (Yusung Timber Co., Ltd.) Metropolitan Mtg. and Securities Co. Inc.</td>
</tr>
<tr>
<td>68003041</td>
<td>State of Hawai‘i</td>
</tr>
<tr>
<td>68007002</td>
<td>Dole Food Co., Inc. (Waialua Sugar Co., Inc.)</td>
</tr>
<tr>
<td>71001002</td>
<td>George Gailbraith Trust Estate (PPI Del Monte Fresh Produce)</td>
</tr>
<tr>
<td>71001003</td>
<td>George Gailbraith Trust Estate (PPI Del Monte Fresh Produce)</td>
</tr>
<tr>
<td>71001022</td>
<td>George Gailbraith Trust Estate (Wahiawa Water Co., Inc.)</td>
</tr>
</tbody>
</table>

Source: City and County of Honolulu 2003

1'This parcel is adjacent to the Dillingham Trail alignment.
Table 6-6
Hunting Near Dillingham Military Reservation

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Game Mammals</th>
<th>Game Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game to be taken</td>
<td>Wild pigs and wild goats</td>
<td>Ring-neck pheasant, green pheasant; California valley quail, Japanese quail, Gambel's quail; Erckel's francolin, gray francolin, black francolin; chukar partridge; barred dove (small dove), spotted dove (large dove)</td>
</tr>
<tr>
<td>Permitted hunting methods</td>
<td>Rifles, shotguns, handguns, spears, bows and arrows. Dogs are permitted only from August through October.</td>
<td>Shotguns and bows and arrows</td>
</tr>
<tr>
<td>Open hunting periods</td>
<td>February through April, archery only; May through July, firearms; August through October, use of dogs allowed.</td>
<td>First Saturday in November through Martin Luther King Day or the third Sunday in January, whichever occurs later. There are additional special bird seasons for increased takes for the barred dove and spotted dove.</td>
</tr>
<tr>
<td>Open hunting days</td>
<td>Daily</td>
<td>Saturdays, Sundays, and state holidays</td>
</tr>
<tr>
<td>Special conditions and restrictions</td>
<td>Access through DMR (subject to military activities).</td>
<td>Public and private lands. Hunting on private lands requires permission of the landowner. The special dove seasons are limited to private lands.</td>
</tr>
<tr>
<td>Hunters</td>
<td>Persons who have the appropriate hunting license, tags, permits, or permit tags on their person and who have signed in at a hunter checking station.</td>
<td></td>
</tr>
</tbody>
</table>

Sources: DLNR 1999a, 1999b

**Surrounding Land Ownership**

*Dillingham Military Reservation*

Landowners adjacent to DMR include Dole Food Co., Inc., to the east, the State of Hawai‘i to the west and southeast, and Metropolitan Mtg. and Securities Co. Inc., to the south. Land ownership to the north, across Farrington Highway, includes the City and County of Honolulu, Metropolitan Mtg. and Securities Co., Inc., and the United States of America (Mokulē‘ia Army Beach).

*Dillingham Trail*

Landowners of parcels adjacent to the proposed Dillingham Trail are the same as those listed in Table 6-5, plus the various landowners of parcels within Thomson Corner and the Metropolitan Mtg. and Securities Co., Inc.
6.2 Land Use/Recreation

6.2.2 Environmental Consequences

Summary of Impacts
A summary of impacts associated with land use and recreation at DMR is provided in Table 6-7. Under the Proposed Action and the Reduced Land Acquisition Alternative, less than significant impacts would occur from converting agricultural land to training land because Dillingham Trail would be constructed on agricultural roads and undeveloped land. Less than significant impacts on land use would also occur from construction of an FTI in a Conservation District, during the temporary construction of the projects, and from SBCT training on lands currently used for current force training. There would be no impacts on natural resources management or recreational land use. There would be no impacts under No Action.

Table 6-7
Summary of Potential Land Use/Recreation Impacts at DMR

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion of agricultural land to training land</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Impacts on natural resources management and recreational land use</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Construction of FTI in a Conservation District</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Impacts on land use during construction activities</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>SBCT training on lands currently used for current force training</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
</tbody>
</table>

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

LEGEND:
☒ = Significant
☐ = Significant but mitigable to less than significant
☐ = Less than significant
☐ = No impact
+= Beneficial impact
N/A = Not applicable

Proposed Action (Preferred Alternative)
Environmental impacts discussed in this section are the result of the acquisition of an easement and construction of Dillingham Trail, the construction and operation of new communication antennas, and training associated with the SBCT transformation.
Less Than Significant Impacts

Conversion of agricultural land to training land. An easement of approximately 55 acres (22.3 hectares) would be acquired and used for constructing Dillingham Trail. In general, the land use would be converted from agriculture (Prime, Unique, and Other) to training land. The trail alignment is generally through agricultural and undeveloped lands. According to the state land use law, roads can be constructed through agricultural fields (Hawai‘i Revised Statutes Section 205-4.5[a][7]). Use of existing agricultural roads is preferred to minimize disruption of agricultural practices. Most of Dillingham Trail would be constructed along existing agricultural roads. The trail segment along Poamoho Gulch would be constructed along the gulch ridge to minimize impacts. Trail construction and use is not expected to significantly affect land use. The Army would consult with land owners so that, following construction of Dillingham Trail, joint use of the plantation roads would be coordinated to minimize impacts on agricultural land use.

Construction of FTI in a Conservation District. Construction of one antenna outside of DMR would affect a minimal area within the Conservation District. The new antenna facility would reuse an existing site, where possible, and when an existing facility is not available the new antenna would be constructed on a relatively small area (500 square feet [46 square meters]). The new facility would also be located, where possible, close to existing access roads or trails. It would be sited, painted, and landscaped to minimize their impacts on surrounding areas and users. As required in a Conservation District, endemic or indigenous plants would be used to renaturalize project areas where natural vegetation plant cover has been disturbed. Construction would be scheduled, where possible, to minimize conflicts with existing recreation activities. In addition, antenna sites are available for emergency efforts for aiding or rescuing stranded or lost hikers and hunters.

Impacts on land use during construction activities. During construction activities, land uses may be temporarily affected. To minimize impacts on agricultural practices, most of Dillingham Trail would be constructed along existing agricultural roads, and the trail segment along the Poamoho Gulch would be constructed along the gulch ridge.

SBCT training on lands currently used for training. Land use at DMR would not significantly change with the Proposed Action. Areas being used for maneuver training would continue to be used in the same manner. Vehicles used during maneuver exercises would be replaced by the Stryker vehicle. The land is expected to be used more frequently and intensively, with vehicle traffic between SBMR and DMR increasing in frequency (adding four brigade-level exercises per year), with vehicle density increasing to between 27 and 37 (an increase of 86 total vehicles on the road). However, maneuver areas would remain the same, therefore, introducing the Stryker is not considered a land use change. Public access to and use of the airfield at DMR would remain the same.

No Impacts

Impacts on natural resources management and recreational land use. Projects associated with DMR and the Dillingham Trail would not affect natural resources management areas. The recreation uses of the DMR airfield and access to Ke‘alia Trail and the hunting area southwest of DMR would not change with the Proposed Action.
Reduced Land Acquisition Alternative
The impacts associated with the RLA Alternative are identical to those described for the Proposed Action.

No Action Alternative

No Impacts
Under No Action, transformation would not occur, so no major changes to training areas would take place in Hawai‘i. The Army would continue to operate and maintain its range, training areas, and support facilities to meet its current force training mission requirement. However, the level of training would change occasionally in response to this requirement, and, as a result, the land uses of these areas could change. If future changes could affect the environment, NEPA documentation would be prepared.
6.4 AIRSPACE

6.4.1 Affected Environment

The affected airspace environment is described below in terms of its principal attributes, namely controlled and uncontrolled airspace, special use airspace, military training routes, en route airways, airports and airfields, and air traffic control. Jet routes, all above 18,000 feet (5,486.4 meters), are well above the activities proposed and thus are not considered as part of the ROI. The maximum height of each FTI antenna will be 100 feet (33 meters) or the FAA-approved height, whichever is lower. Prior to final design, the Army will coordinate with FAA to ensure that each antenna does not obstruct air navigation, including approach and departure clearance near any runway or airfield.

Controlled and Uncontrolled Airspace

The airspace in the DMR ROI is composed of Class G (uncontrolled) airspace from the surface to a ceiling of 1,200 feet (365.8 meters) and Class E (controlled) airspace above 1,200 feet (365.8), with the exception of the special use airspace discussed below. Appendix F provides a full definition of the different classes of airspace and an explanatory diagram.

Special Use Airspace

The R-3110 B & C restricted area lies to the south of Dillingham Airfield. Just north of the airfield, three nautical miles off the north shore of O'ahu, is the W-189 warning area. (The effective altitudes, time of use, and controlling agencies for these special use airspace areas are given in Table 6-9). During the published hours of use, the agency using the airspace is responsible for controlling all military activity within a restricted area and determining that its perimeters are not violated. When the airspace is inactive, the using agency releases it back to the controlling agency or center, and, in effect, the airspace is no longer restricted.

Military Training Routes

There are no formal, published military training routes in the DMR airspace ROI.

<table>
<thead>
<tr>
<th>Number/Name</th>
<th>Effective Altitude (in feet)</th>
<th>Time of Use</th>
<th>Controlling Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-3110B</td>
<td>9,000 to 19,000&lt;sup&gt;1&lt;/sup&gt; (2,743 to 5,791 meters)</td>
<td>Intermittent&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Honolulu ARTCC</td>
</tr>
<tr>
<td>R-3110C</td>
<td>To 9,000&lt;sup&gt;1&lt;/sup&gt; (To 2,743 meters)</td>
<td>Intermittent&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Honolulu ARTCC</td>
</tr>
<tr>
<td>W-189</td>
<td>To Unlimited</td>
<td>0700-2200 Monday-Friday 0800-1600 Saturday-Sunday</td>
<td>Honolulu CERAP</td>
</tr>
</tbody>
</table>

Source: NACO 2002
Notes:
ARTCC = Air traffic control center

<sup>1</sup>To but not including the indicated altitude
<sup>2</sup>By notice to airmen (NOTAM)
**En Route Airways**

No low altitude en route airways enter or transect the ROI, but general aviation aircraft use the airspace in the ROI. This includes all civil aviation operations, other than scheduled air services and unscheduled air transport for hire.

**Airports and Airfields**

Dillingham Airfield is the only airport in the airspace ROI. The area around Dillingham Airfield on the north shore of O'ahu is indicated on aeronautical charts as a glider operating area (NACO 2002). In addition, Dillingham Airfield is a center for skydiving and for vintage airplane and aerobatic flights. The airfield has an average of 167 takeoffs and landings per day, 97 percent local general aviation and 3 percent military (AirNav.Com 2002).

Dillingham Airfield is a joint-use military/civil airfield, portions of which have been leased to the State of Hawai'i Department of Transportation. The lease only allows civil operations during daylight hours; night operation is reserved for military operations. The Army can close the airfield for daytime military operations with prior notification to the State of Hawai'i Department of Transportation.

**Air Traffic Control**

Air traffic in the ROI is managed by the Honolulu Control Facility. Dillingham Airfield does not have a control tower.

6.4.2 **Environmental Consequences**

This section addresses the environmental consequences of the Proposed Action and No Action on airspace.

**Summary of Impacts**

The Proposed Action, Reduced Land Acquisition, and No Action alternatives would have no impacts on DMR airspace ROI. Table 6-10 summarizes the airspace impact issues at DMR.

**Proposed Action (Preferred Alternative)**

**No Impacts**

*Reduction in Navigable Airspace.* There would be no requirement for new or modified special use airspace to accommodate the Proposed Action nor any requirement for the imposition of any flight restrictions, thus no reduction in the ROI's navigable airspace.

*New or Modified Special Use Airspace.* The proposed UAV flights would normally be conducted within the R-3109 and R-3110 restricted area complex south of DMR or within the W-189 warning area off the northern coast of O'ahu; thus, the UAV flights would use existing special use airspace. Although the nature and intensity of utilization varies over time and by individual special use airspace area, the proposed UAV flights represent precisely the kinds of activities that the special use airspace was created for. Restricted areas contain airspace within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Activities within these areas must be confined because of their nature or limitations imposed on aircraft operations that are
Table 6-10
Summary of Potential Airspace Impacts at DMR

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in navigable airspace</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>New-modified special use airspace</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Change to a military training route</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Change in en route airways or IFR procedure</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Restriction of access to airport/airfield</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Obstruction to air navigation</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Aviation safety</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**
- ☒ = Significant
- ☐ = Significant but mitigable to less than significant
- N/A = Not applicable
- ☓ = Less than significant
- ○ = No impact

not part of these activities, or both. Warning areas contain activity that may be hazardous to nonparticipating aircraft, and pilots are warned of the potential danger and must abide by the operating rules of Federal Aviation Regulations, Part 91. As such, the UAV flights would not represent an adverse impact on special use airspace and would not conflict with any airspace plans, policies, or controls. UAV flights are also addressed under aviation safety.

**Change to a Military Training Route.** There are no published military training routes in the ROI, and no new aircraft activity is proposed at DMR. Consequently, no changes to military training routes would result.

**Change in En Route Airways, or IFR Procedures.** There are no low altitude en route airways in the DMR airspace ROI, and no new aircraft activity is proposed at DMR. Consequently, no changes to existing or planned IFR minimum flight altitude, published or special instrument procedure, or IFR departure procedures would be required, and VFR operations would not be required to change from a regular flight course or altitude.

**Restriction of Access to Airports/Airfields.** With no new aircraft activity associated with the Proposed Action, access to, or the use of, airports/airfields available for public use, would not be affected, and commercial or private airport/airfield arrival and departure traffic flows would not be affected.

**Obstruction to Air Navigation.** Construction of two 42-foot (12.8-meter) FTI antenna support structures (Dillingham ARPT and Dillingham P1, Figure 2-7) along the road to DMR would
be well below the 500-foot (152.4 meter) above ground level threshold for an obstruction to air navigation specified by the FAA (FAA 2001). The antenna support structures would also be at sufficient distance from the Dillingham Airfield runway to be well below the civilian and military airport imaginary surface thresholds (FAA 2001) and thus would not constitute an obstruction to air navigation. Construction and operation of Dillingham Trail would have no impacts on airspace.

**Aviation Safety.** With no new aircraft activity proposed, no new aviation safety issues, and no adverse impacts on public health and safety are anticipated. The strict procedures and rules in place governing flight operations in both controlled/uncontrolled navigable airspace and special use airspace, coupled with the Army’s excellent aviation safety record in Hawai‘i make future adverse impacts on public health and safety extremely unlikely.

For those UAV flights that could not be contained wholly within restricted area or warning areas, their operations would be conducted in accordance with well-defined FAA procedures for remotely operated aircraft. At least 60 days before UAV operations, the FAA regional office in Honolulu would have to approve the UAV flights, which would be contingent on the Army demonstrating that the flights would be as safe as those for manned aircraft. Methods include radar observation, forward or side-looking cameras, electronic detection systems, observation from one or more ground sites, or a combination thereof (FAA 2001). In addition, coordination, communications, route and altitude procedures, and lost link/mission abort procedures would all have to be identified. Authorized UAV flights and the other proposed training activities at DMR would have no adverse impact on aviation safety and thus public health and safety.

**Reduced Land Acquisition Alternative**
The impacts associated with RLA would be identical to those described for the Proposed Action.

**No Action Alternative**

**No Impacts**
Continued support for current force training at DMR would have no impacts on controlled and uncontrolled navigable airspace, special use airspace, military training routes, en route airways, or airports/airfields and would not create obstructions to air navigation in the airspace ROI. Existing conditions would continue under No Action. Under the status quo of No Action, there would be no impacts because none of the factors considered in determining impacts apply.
6.10 Biological Resources

6.10.1 Affected Environment

This section is divided into discussions of general wildlife and vegetation and habitat types common to DMR, including sensitive species and habitats known to occur or with the potential to occur in this area. The DMR ROI was based largely on the potential for damage from fires during SBCT training. Fire has been evaluated to be the most far-reaching impact of SBCT on DMR, with the exception of Dillingham Trail, because of its ability to affect a large area. Fire is a lesser concern for Dillingham Trail, where trampling/crushing, introduction of exotic species, and noise are the major concerns. The ROI at DMR has been determined, based on the above factors, to correspond with the installation boundary. The DMR ROI also includes a 164-foot (50-meter) buffer on either side of Dillingham Trail as well as a portion of the coastline and adjacent Pacific waters over which aircraft maneuvers may occur.

The waters that surround the islands in the Hawaiian chain host an array of marine wildlife (NMFS 2000a to 2000bb) and extensive coral reef ecosystems that support a variety of industries and resource uses (HCRI 2002). The location and sensitivity of these ecosystems were taken into account when determining the ROI for the SBCT project areas. Marine organisms and wildlife are evaluated when they occur adjacent to or in the vicinity of the terrestrial ROI. The DMR Marine ROI is represented in Figures 6-15 and 3-13.

Biological data were collected from numerous sources, including the USFWS, NOAA Fisheries, DLNR, HBS, HINHP, and various biological surveys and environmental documents pertinent to the species and habitats of DMR. For details on pertinent regulations see Definition and Regulatory Considerations in Appendix N.

This DEIS was developed concurrently with ESA Section 7 consultation with USFWS. The biological resource section has been updated to reflect additional information resulting from these consultations.

Recovery Plan

Two animal species with recovery plans are known to or have the potential to occur within the DMR ROI. These species are listed in Appendix I-1a.

Vegetation

The area surrounding DMR is sparsely populated, and neighboring land is either owned privately or by the State of Hawai‘i. Botanical surveys to identify rare plants, communities, and potential threats to these resources have been conducted intermittently since 1977. HINHP surveyed the area in 1995, but the visit was brief due to the small size and rugged terrain of the training area. During this site visit, HINHP staff documented the only known example in Hawai‘i of extremely dry closed canopy forest. These natural resource surveys have been used for the resource assessments in the Endangered Species Management Plan Report, O‘ahu Training Areas (R. M. Towill Corp. 1997b), as well as the more recent O‘ahu Training
Figure 6-15
Dillingham Military Reservation Biological Region of Influence
Areas Natural Resource Management Report (PCSU 2001) and O'ahu Training Areas INRMP (USARHAW and 25th ID[L] 2001a). Figure 6-16 shows the locations of vegetation communities described below that occur within the DMR ROI. The low-lying areas of DMR are populated mostly by nonnative vegetation, some species posing serious threats to the native natural communities that exist in more remote locations of this small training area. Guinea grass (*Panicum maximum*) is becoming more widespread in DMR. It regenerates quickly after fire and can inhibit the growth of other plants by its dense matting and by producing chemicals that discourage other plants from taking root.

There are only two types of native lowland dry communities on DMR. Lonomea (*Sapindus oahuensis*) forest is the only known occurrence in Hawai'i of a closed canopy, extremely dry forest type. Little information is available about this type of forest due to its rarity. On DMR it is found on the cliff slopes at the southern end of the training area. It is considered to be globally imperiled. The other forest type is wilwili (*Erythrina sandwicensis*). This is also found in the sloping cliff areas of DMR but grows in patches with the Lonomea Forest. These areas are surrounded by heavily degraded weedy shrubland.

A jurisdictional wetland was identified in the DMR ROI and is described further under Biologically Significant Areas (Figure 6-17). This wetland is perched and is outside of the area that would be used for maneuver training. An additional wetland area was investigated and determined to be non-jurisdictional and, therefore, not regulated under Section 404 of the Clean Water Act based on an evaluation by the Corps of Engineers, Honolulu District, Regulatory Branch dated September 4, 2002. No training or construction is proposed to occur in this area.

**Disturbed Habitat**

Invasive and noxious weeds targeted for eradication in DMR include padang cassia (*Cinnamomum burmannii*), Chinese banyan (*Ficus macrocarpa*), and fountain grass (*Pennisetum setaceum*) (USARHAW and 25th ID[L] 2001a). Widespread weed species would be controlled where they threaten native plants and communities.

Populations of feral pigs (*Sus scrofa scrofa*) directly affect native plants and contribute to numerous ecological problems (Atlas 1998). The effects of these wild pigs include trampled and grazed native plants, erosion, and landslides (USARHAW and 25th ID[L] 2001a; PCSU 1999, 2000, 2001). Browsing and otherwise destroying the native vegetation encourages nonnative plants to become established, which can severely affect the habitat. What native habitat remains at DMR is accessible to pigs, and signs of pig activity have been observed.

Habitat disturbance by humans on DMR includes possible disturbance by military training activities. Trampling associated with training activities could affect populations of rare plants (R. M. Towill Corp. 1997b). Nonmilitary impacts on the area include those from hiking and occasional hunting and poaching.

Fire threat is moderate in DMR and is a threat to native plants and ecological communities. Nonmilitary fire impacts could come from vehicles, campfires, arsonists, cigarettes, and
Figure 6-16
Vegetation Communities in the Dillingham Military Reservation Region of Influence
There are two Biologically Significant Areas that occur within the Region of Influence.

**Legend**
- Region of Influence
- USACE Jurisdictional Wetland
- Dillingham Military Reservation Boundary
- Roads

**Biologically Significant Areas**
- High density of sensitive species and habitat
- Lower but still significant density of species and habitat

**Dillingham Military Reservation**  
**USACE Jurisdictional Wetland and Biologically Significant Areas**  
O‘ahu, Hawai‘i  
**Figure 6-17**
civilian use of the airfield (R. M. Towill Corp. 1997b). Civilian use might also contribute to pollution and introduction of exotic species into the area. Additionally, the rugged terrain of the training area limits access for fire suppression and control. DMR is a small parcel of land and the training that takes place there is relatively low impact, so there are few ITAM requirements for this range. The ITAM program at DMR provides for collection of plant specimens to document species and supports Range Division through the use of GIS and GPS. The IWFMP includes provisions for this range.

**Wildlife**

Zoological field surveys on DMR have been limited due to the rugged terrain and small size. Surveys have focused on special status invertebrates, mammals, and birds. No specific reptile surveys have been conducted on DMR due to the absence of native terrestrial reptiles and amphibians on the Hawaiian Islands. Surveys of DMR were made by the Environmental Impact Study Corp. in 1977, the HINHP in 1995, and PCSU natural resource staff in 2000 and 2001. The following sections describe the general presence of species within the invertebrate, mammal, bird, and fish species. There are two wildlife species with a recovery plan in the ROI (Appendix I-1).

**Invertebrates**

The native invertebrates on DMR could include dragonflies (*Nesogonia blackburni*) and damselflies (*Megalagnion hawaiiense*) (USARHAW and 25th ID [L] 2001a). In surveys of DMR conducted in 1995, staff from the HINHP detected three nonnative invertebrates: cannibal snail (*Euglandina rosea*), two-spotted leafhopper (*Sophonia rufofascia*), and Louisiana crayfish (*Procambarus clarkii*). The black twig borer is suspected to occur on DMR, based on the presence of host species, but has not yet been observed.

Humans have purposely or accidentally introduced these nonnative species to O'ahu. They now threaten the native snail species through competition for resources and predation, as well as by the spread of disease.

**Amphibians**

There are no native terrestrial amphibians on the Hawaiian Islands. Nonnative amphibians with the potential to occur at DMR include the green and black dart-poison frog, bullfrog, wrinkled frog, giant toad, coqui frog, and Cuban tree frog (USARHAW and 25th ID [L] 2001a). These species were introduced into O'ahu from other countries and have inhabited areas where adequate aquatic habitat and surrounding vegetation exists.

**Reptiles**

The Hawaiian Islands have no native terrestrial reptiles. Nonnative reptiles with the potential to occur at DMR include the green anole, mourning gecko, stump-toed gecko, tree gecko, Indo-Pacific gecko, house gecko, metallic skink, and gold dust day gecko (USARHAW and 25th ID [L] 2001a).

**Terrestrial Mammals**

The Hawaiian hoary bat has the potential to occur on DMR (PCSU 2001). It is the only native terrestrial mammal on the Hawaiian Islands. The following nonnative species may
6.10 Biological Resources

occur on DMR: feral pig, feral cat, feral dog, Norway rat, black rat, Polynesian rat, and house mouse.

**Birds**
The following indigenous forest bird species have been recorded on DMR: Hawaiian duck (*Anas wyvilliana*), Hawaiian coot (*Fulica alai*), Hawaiian goose (*Branta sandvicensis*), and Hawaiian moorhen (*Gallinula chloropus*). The pueo (*Asio flammeus sandwichensis*) is believed to occur on DMR, based on the presence of adequate habitat and prey.

Nonnative bird species believed to occur in DMR include the red-billed leiothrix, white-rumped shama, Japanese bush warbler, rock dove, spotted dove, zebra dove, common myna, red-vented bulbul, and Japanese white-eye. The nutmeg manikin, red-crested cardinal, barn owl, Ercel’s francolin, ring-necked pheasant, and northern cardinal are also species that have been introduced by humans on O‘ahu. This list of nonnative species is based on those species present on the nearby Mā‘ili Military Reservation which has areas of corresponding habitat (R. M. Towill Corp. 1997b).

**Fish**
There are no documented studies of fish in DMR streams (USARHAW and 25th ID[L] 2001a).

**Marine Biological Resources**
Since DMR is adjacent to a small segment of beachfront, a portion of the DMR ROI is extended to include this portion of the coast and the nearshore waters adjacent to the coast in order to address potential impacts on marine biological resources. This area is outside the Hawaiian Islands Humpback Whale National Marine Sanctuary waters (see Figure 3-13). The sanctuary does encompass marine waters in north O‘ahu near, but not adjacent to, the Dillingham ROI.

There are no coral reef “hot spots” in the DMR ROI, that is, no specific coral reef areas of management concern (CRAMP 2003). There are, however, coral reefs in the coastal waters of the DMR ROI within a half a mile of the shoreline.

Marine wildlife does occur in the coastal and marine portion of the DMR ROI. The adjacent beachfront/coastline area of DMR may provide shore habitat for some marine wildlife, such as sea turtles or monk seals.

Distribution and abundance of marine mammals and sea turtles in Pacific waters vary seasonally and spatially; that is, the numbers and types of animals may vary in the nearshore versus the offshore regions, as well as by the time of year (Calambokidis et al. 1997; Leatherwood et al. 1982; Mobley et al. 1999, 2000; NMFS 2000a to 2000bb). All marine mammal species are protected under the MMPA, regardless of their status under the ESA. Informal consultation with NOAA Fisheries has been initiated for marine mammals in the DMR ROI. Both MMPA and ESA protected marine wildlife species that may occur in the DMR ROI seasonally, permanently, or as transients, are listed in Table 6-18.
### Table 6-18

**Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Current</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cetaceans and Pinnipeds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Balaenoptera acutorostrata</em></td>
<td>Minke whale</td>
<td>E*</td>
<td>Known currently</td>
<td>U</td>
<td>Most common northwest of the main seven-island chain or on leeward side of islands. May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>B. borealis</em></td>
<td>Sei Whale</td>
<td>E*</td>
<td>Known currently</td>
<td>U</td>
<td>Rarely sighted in Hawaiian waters.</td>
</tr>
<tr>
<td><em>B. edeni</em></td>
<td>Bryde’s whale</td>
<td>E*</td>
<td>Known currently</td>
<td>U</td>
<td>Most common northwest of the main seven-island chain. May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>B. physalus</em></td>
<td>Fin whale</td>
<td>E*</td>
<td>Known currently</td>
<td>U</td>
<td>Heard in Hawaiian waters.</td>
</tr>
<tr>
<td><em>B. macrocephalus</em></td>
<td>Baird’s beaked whale</td>
<td>*</td>
<td>Known currently</td>
<td>P</td>
<td>May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>Delphinus delphis</em></td>
<td>Common dolphin</td>
<td>*</td>
<td>Known currently</td>
<td>U</td>
<td>May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>Eubalaena glacialis</em></td>
<td>Pacific right whale</td>
<td>E*</td>
<td>Known currently</td>
<td>U</td>
<td>Most likely stray individuals from more northern population.</td>
</tr>
<tr>
<td><em>Feresa attenuata</em></td>
<td>Pygmy killer whales</td>
<td>*</td>
<td>Known currently</td>
<td>C</td>
<td>Occasionally seen in the channels between the main islands. Has been documented off the coast of O‘ahu.</td>
</tr>
<tr>
<td><em>Globicephala macrorhynchus</em></td>
<td>Short-finned pilot whale</td>
<td>*</td>
<td>Known currently</td>
<td>C</td>
<td>Occasionally seen in the channels between the main islands. Common in nearshore or offshore areas in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>Grampus griseus</em></td>
<td>Risso’s dolphin</td>
<td>*</td>
<td>Known currently</td>
<td>U</td>
<td>More common sighted offshore. May be seen in offshore areas in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>Kogia breviceps</em></td>
<td>Pygmy sperm whale</td>
<td>*</td>
<td>Known currently</td>
<td>P</td>
<td>Prefers deeper waters but occasionally seen in the channels between the main islands. May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
<tr>
<td><em>K. simus</em></td>
<td>Dwarf sperm whale</td>
<td>*</td>
<td>Known currently</td>
<td>P</td>
<td>Prefers deeper waters but occasionally seen in the channels between the main islands. May be incidentally sighted in waters adjacent to DMR.</td>
</tr>
</tbody>
</table>
Table 6-18
Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence (continued)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>(^{1}\text{Federal} ) Status</th>
<th>(^{2}\text{State} ) Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monachus schauinslandi</td>
<td>Monk seal</td>
<td>E*, CH, D</td>
<td>-</td>
<td>More common in nearshore waters or hauled out on the coast.</td>
<td>Known currently</td>
<td>C</td>
<td>Most common northwest of the main seven-island chain. Incidental individuals may haul out along the coast of the islands’ north shores. Anecdotal sighting on DMR beach.</td>
</tr>
<tr>
<td>Megaptera novaeangliae</td>
<td>Humpback whale</td>
<td>E*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Occurs throughout the main seven-island chain January through April. Occurs in waters adjacent to the islands' north shores.</td>
</tr>
<tr>
<td>Mesoplodon densirostris</td>
<td>Blainsville’s whale</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Prefers deeper offshore waters but has been sighted off coast of O'ahu.</td>
</tr>
<tr>
<td>Orcinus Orca</td>
<td>Killer whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Occasionally seen, especially in the channels between the main islands and at the northwest island chain. May be incidentally sighted in nearshore or offshore waters adjacent to DMR.</td>
</tr>
<tr>
<td>Peponocephala electra</td>
<td>Melon-headed whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Occurs especially in the channels between the main islands and at the northwest island chain. May also occur in nearshore or offshore areas adjacent to DMR.</td>
</tr>
<tr>
<td>Physeter macrocephalus</td>
<td>Sperm whale</td>
<td>E*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>U</td>
<td>Most common off the north and eastern shores of the main seven islands. May be sighted in waters adjacent to the islands’ north shores.</td>
</tr>
<tr>
<td>Pseudorca crassidens</td>
<td>False killer whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Occasionally seen in the channels between the main islands. May be sighted in nearshore or offshore waters adjacent to DMR.</td>
</tr>
<tr>
<td>Stenella attenuata</td>
<td>Spotted dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in nearshore, leeward coastal waters</td>
<td>Known</td>
<td>C</td>
<td>Common along the coastline, especially on the leeward sides of the island. Occurs in nearshore or offshore areas in waters adjacent to DMR.</td>
</tr>
<tr>
<td>S. coeruleoalba</td>
<td>Striped dolphin</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>P</td>
<td>More strandings sighted than live individuals.</td>
</tr>
<tr>
<td>S. longirostris</td>
<td>Spinner dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in nearshore, leeward coastal waters</td>
<td>Known</td>
<td>C</td>
<td>Common along the coastline. Occurs in nearshore or offshore areas in waters adjacent to DMR.</td>
</tr>
<tr>
<td>Steno bredanensis</td>
<td>Rough toothed dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Prefers deeper offshore waters but has been sighted off coast of O'ahu.</td>
</tr>
</tbody>
</table>
Table 6-18
Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence (continued)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>1Federal Status</th>
<th>2State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tursiops truncatus</em></td>
<td>Bottlenose dolphin</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>Current</td>
<td>C Common along the coastline. Occurs in nearshore or offshore areas in waters adjacent to DMR. Also common offshore in project area waters.</td>
</tr>
<tr>
<td><em>Ziphius cavirostris</em></td>
<td>Cuvier's beaked whale</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>Current</td>
<td>C** Most common of the beaked whales in project area waters. Prefers deeper offshore waters but can be common in nearshore or offshore areas in waters adjacent to DMR.</td>
</tr>
</tbody>
</table>

**Sea Turtles**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>1Federal Status</th>
<th>2State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Caretta caretta</em></td>
<td>Loggerhead turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Considered uncommon in DMR waters.</td>
</tr>
<tr>
<td><em>Chelonia mydas</em></td>
<td>Green turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Nests annually on Hawaiian beaches; common in nearshore areas of any of the main seven islands. Most abundant sea turtle in DMR waters.</td>
</tr>
<tr>
<td><em>Dermochelys coriacea</em></td>
<td>Leatherback turtle</td>
<td>E</td>
<td>-</td>
<td>In project area; prefers offshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Primarily occurs over deep oceanic waters; sighted equally as frequently off any of the main seven islands.</td>
</tr>
<tr>
<td><em>Eretmochelys imbricata</em></td>
<td>Hawksbill turtle</td>
<td>E</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Considered uncommon; a small number nest on the island of Hawai'i.</td>
</tr>
<tr>
<td><em>Lepidochelys olivacea</em></td>
<td>Olive ridley turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers offshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Infrequently seen in Hawaiian offshore waters.</td>
</tr>
</tbody>
</table>

Sources: NMFS 2000a-bb; ONR 2000.

**Status:**

1Federal:
- E = Endangered
- * = Protected under MMPA
- D = Depleted under the MMPA
- CH = Critical habitat designated or proposed for designation

2State
- /-/ = No Status

**Likelihood of occurrence in the project site**
- C = Confirmed
- P = Potentially may occur
- U = Unlikely to occur
**Whales and Dolphins Potentially Occurring in Hawaiian Waters of the Dillingham Military Reservation Region of Influence**

Non-ESA listed but MMPA protected marine mammals considered to have the potential to be found in Hawaiian waters, or in waters off the DMR ROI, include the following:

- Bryde’s whales (*Balaenoptera edeni*);
- Minke whales (*B. acutorostrata*);
- Pygmy sperm whales (*Kogia breviceps*);
- Dwarf sperm whales (*K. simus*);
- Killer whales (*Orcinus orca*);
- False killer whales (*Pseudorca crassidens*);
- Pygmy killer whales (*Feresa attenuata*);
- Pilot whales (*Globicephala macrorhynchus*);
- Beaked whale species (*Mesoplodon* and *Ziphius* spp.);
- Baird’s beaked whale (*Berardius bairdii*);
- Melon-headed whales (*Peponocephala electra*);
- Bottlenose dolphins (*Tursiops truncatus*);
- Spinner dolphins (*Stenella longirostris*);
- Rough-toothed dolphins (*Steno bredanensis*);
- Risso’s dolphin (*Grampus griseus*);
- Striped dolphin (*Stenella coeruleoalba*);
- Common dolphin (*Delphinus delphis*); and
- Several species of spotted dolphins, the most common of which is *Stenella attenuata*.

The natural history of these species, as well as specific documented locations either in or near the DMR ROI (if known), are described in Appendix I-1. (Note: As marine mammals are mobile and rapid movers, if they have been documented near the DMR ROI [within 2 to 5 nautical miles], they are assumed to occur in the ROI).

Most of the species listed above are not expected to occur in the DMR ROI, with the exception of the humpback whale and several of the dolphin species.

**Sensitive Species**

Sensitive species include special status, or regulated, species such as USFWS or State of Hawai‘i listed endangered, threatened, candidate, or proposed species; MMPA species; federal and state species of special concern; and locally regulated species. Also considered sensitive are rare species that have had rapid population decline or whose habitat has markedly decreased in recent years. Potential sensitive species on DMR were identified by the State of Hawai‘i DLNR (HDLNR 2002a), USARHAW biologists and surveys, and the Hawai‘i Natural Heritage Program (HINHP 1994).
A list of all sensitive vegetation and wildlife and any critical habitat found in the region, according to USFWS and DLNR records, is found in Tables 6-19 and 6-20. An assessment of the likelihood of a species occurring on DMR was made, where possible, based on the habitat requirements and geographic distribution of the species, on-site habitat quality, and the results of biological surveys of DMR. Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, can be found in Appendix I-1 (Recovery Plans 1-1a; Plants I-1b; Wildlife I-1c).

**Sensitive Plant Species**
The rare plants found on DMR outside of the ROI include federal species of concern, candidates for federal listing, and state-ranked rare plants. *Bobea sandwicensis, Hibiscus brackenridgei ssp. mokuleianus, H. kokio ssp. kokio,* and *Schiedea kealiae* are all sensitive species with the potential to occur within the ROI. The remaining native ecosystems near or adjacent to the ROI have low densities of native species and are fragmented and disturbed. A 1977 survey found unique populations of *Lonomea* and *Reynoldsia sandwicensis* near the base of the cliffs. Though not endangered, these species are rare and represent the only example of closed canopy *Sapindus oahuensis* forest known in the world.

Sensitive plants and their likelihood of occurrence in the DMR ROI are shown in Table 6-19.

**Sensitive Wildlife Species**
The following discussion includes a profile of sensitive wildlife species considered likely to be found in the project area. This information is primarily based on information from the O'ahu INRMP (USARHAW and 25th ID[LI] 2001a), the ESMPR (R. M. Towill Corp 1997b), and the Biological Inventory of DMR (HINHP 1994). The first extensive zoological surveys of DMR were conducted in 1976 and 1977 (Shallenberger and Vaughn 1978). More recent studies were conducted in 1995 by HINHP, in search of rare and sensitive species on DMR, and by PCSU natural resource staff in 2000 and 2001. The latest USFWS and HINHP survey information on species and habitat in the SBCT ROI has been incorporated into this evaluation of biological resources. Table 6-20 lists sensitive terrestrial wildlife and their potential to occur in the DMR ROI. Figure 6-18 shows the documented locations of sensitive terrestrial wildlife recorded in the DMR ROI.

**Marine Wildlife**
Six species of endangered whales occur in the Pacific tropical waters of Hawai'i. only one of these is considered likely to occur in the waters adjacent to DMR (in the DMR ROI), the humpback whale (*Megaptera novaeangliae*). The other listed species are the fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), sei (*Balaenoptera borealis*), and pacific right (*Eubalaena glacialis*), and sperm whale (*Physeter macrocephalus*).

There is one federally listed endangered seal, the monk seal (*Monachus schauinslandi*), which is considered to have the potential to occur. The monk seal has critical habitat in the northwestern portion of the Hawaiian Island chain, which is outside of the ROI.
### Table 6-19

**Sensitive Plant Species Occurring or Potentially Occurring at DMR ROI**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/Common Name</th>
<th>Federal Status</th>
<th>State Status</th>
<th>Global Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bobea sandwicensis</em></td>
<td>'ahakea/-</td>
<td>-</td>
<td>-/G2</td>
<td></td>
<td>Ridges and gulch slopes of dry to moist lowland forests</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Cyperus trachysanthos</em></td>
<td>pu'ula'a/-</td>
<td>E, CH</td>
<td>-/G1</td>
<td></td>
<td>Wet slopes and pond margins in lowland areas</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Hibiscus brackenridgei</em></td>
<td>Koki'o ke'oke'o, ma'o hau hele ma'o hau hele</td>
<td>E, CH</td>
<td>-/G1</td>
<td></td>
<td>Lowland dry forests</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>H. kokio</em> ssp. kokio</td>
<td></td>
<td>SOC</td>
<td>-/-</td>
<td></td>
<td>Wet or dry forests adjacent to DMR</td>
<td>2000</td>
<td>P</td>
</tr>
<tr>
<td><em>Lepidium bidentatum var. owatianum</em></td>
<td>'āinaunau, naunau, kūnānā/-</td>
<td>SOC</td>
<td>-/-</td>
<td></td>
<td>Steep dry coastal slopes in low elevations</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Lipochaeta remyi</em></td>
<td>nehe/-</td>
<td>SOC</td>
<td>-/G1</td>
<td></td>
<td>Wet sites in dry forests</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Nototrichium humile</em></td>
<td>kulu'i/-</td>
<td>E, CH</td>
<td>-/G2</td>
<td></td>
<td>Dry forest understory and cliff faces</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Schiedea kealiae</em></td>
<td>NCN</td>
<td>E, CH</td>
<td>-/G1</td>
<td></td>
<td>Dry cliff faces and steep slopes</td>
<td>2000</td>
<td>P</td>
</tr>
</tbody>
</table>

Sources: USFWS 2002a; USARHAW and 25th ID [L] 2001a; PCSU 2000

Notes:

NCN = No Common Name

**Status:**

- **Federal:**
  - E = Endangered
  - G1 = Species critically imperiled globally (typically 1-5 current occurrences)

- **State:**
  - SOC = Species of concern
  - G2 = Species imperiled globally (typically 6-10 current occurrences)

- **Heritage Global Rank:**
  - CH = Critical habitat designated or proposed for designation

- **Likelihood of occurrence on the project site:**
  - C = Confirmed
  - P = Potentially may occur
### Table 6-20

**Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at Dillingham Military Reservation Region of Influence**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/ Common Name</th>
<th>Federal Status</th>
<th>State(^2)/Global(^3) Status</th>
<th>Habitat</th>
<th>Date last observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Megalagrion xanthomelas</em></td>
<td>-/orange-black damselfly</td>
<td>C</td>
<td>-/G2</td>
<td>Breeds in coastal wetlands, perennial streams, reservoirs, ponds.</td>
<td>2000</td>
<td>U*</td>
</tr>
<tr>
<td><em>Anas wyvilliana</em></td>
<td>kolo maoli/Hawaiian duck</td>
<td>E</td>
<td>E/G1</td>
<td>Lowland marshes, reservoirs, taro patches, pastures, drainage ditches, agricultural lands below 1,000 feet (305 meters), stream and river valleys in densely wooded areas at higher elevations, mountain pools, mountain bogs, forest swamps, natural and human-made ponds, wetlands. Nests on ground near water in well-concealed site, primarily on small islets.</td>
<td>1995</td>
<td>C*</td>
</tr>
<tr>
<td><em>Asio flammeus sandwichensis</em></td>
<td>pueo/Hawaiian short-eared owl</td>
<td>SOC, +</td>
<td>E**/G5T3</td>
<td>Pastures, grasslands, dry and wet forests that are dominated by either native or nonnative vegetation, sea level to 7,900 feet (2,408 meters).</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Chasiempis sandwichensis ibidis</em></td>
<td>O'ahu 'elepaio/-</td>
<td>E, CH</td>
<td>E/G4T1</td>
<td>Native Hawaiian forest.</td>
<td>Unknown</td>
<td>P</td>
</tr>
<tr>
<td><em>Fulica alai</em></td>
<td>'alae ke'oke'o/Hawaiian coot</td>
<td>E</td>
<td>E/G2</td>
<td>Herbaceous wetland, lagoon, river mouth/tidal river, low gradient, pool, shallow water, herbaceous wetland.</td>
<td>Unknown</td>
<td>C*</td>
</tr>
<tr>
<td><em>Gallinula chloropus sandvicensis</em></td>
<td>'alae'ula/Hawaiian common moorhen</td>
<td>E</td>
<td>-/-</td>
<td>Freshwater marshes, taro patches, reedy margins of water courses, reservoirs, wet pastures.</td>
<td>Unknown</td>
<td>C*</td>
</tr>
<tr>
<td><em>Himantopus mexicanus knudseni</em></td>
<td>ae'o/black-necked stilt</td>
<td>E</td>
<td>-/G5T2</td>
<td>Shallow salt or freshwater with soft muddy bottom; grassy marshes, wet savanna, mudflats, shallow ponds, flooded fields, borders of salt ponds and mangrove swamps. Nests along shallow water of ponds, lakes, swamps, or lagoons. May nest on the ground or in shallow water on a plant tuft.</td>
<td>Unknown</td>
<td>C*</td>
</tr>
<tr>
<td><em>Paroreomyza maculata</em></td>
<td>'ahualilo/O'ahu creeper</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, bogs.</td>
<td>Unknown</td>
<td>U</td>
</tr>
<tr>
<td><em>Vestiaria ocellata</em></td>
<td>'iwi/Hawaiian honeycreeper</td>
<td>+</td>
<td>E/G4</td>
<td>Native forests, especially 'ōhū'a (Metrosideros) forest.</td>
<td>Unknown</td>
<td>U</td>
</tr>
</tbody>
</table>
### Table 6-20
**Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at Dillingham Military Reservation Region of Influence (continued)**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/ Common Name</th>
<th>Federal Status</th>
<th>State Global Status</th>
<th>Habitat</th>
<th>Date last observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lasiurus cinereus semotus</em></td>
<td>Hawaiian hoary bat</td>
<td>E</td>
<td>E/G5T2</td>
<td>Bare rock, cliff, hardwood forest, grassland/herbaceous, hardwood woodland, riparian habitats.</td>
<td>Unknown</td>
<td>P</td>
</tr>
</tbody>
</table>

**Sources:** USARHAW and 25th ID(L) 2001a; HDLN 2002a; HINHP 1994; R. M. Towill Corp. 1997b; NatureServe 2001; Virginia Tech 1998; PCSU 2001

**Notes:**
- NCN = No Common Name
- *The species record is based on an attempted reintroduction, which subsequently failed. This species has not been identified in this location since.*
- **The state endangered listing refers only to the populations on O‘ahu, Lana‘i, and Moloka‘i.**
- ^These four waterbirds have been documented at DMR, however, there have been extensive surveys for them and it has been determined that they are not resident species.

1**Federal:**
- E = Endangered
- SOC = Species of concern
- C = Candidate
- /-/- = No Status
+ = Birds of Conservation Concern

3**Heritage Global Rank:**
- G1 = Species critically imperiled globally (typically 1-5 current occurrences).
- G2 = Species imperiled globally (typically 6-10 current occurrences).
- G4 = Species apparently globally secure.
- G5 = Species demonstrably globally secure.
- T1 = Subspecies critically imperiled globally (typically 1-5 current occurrences).
- T2 = Subspecies imperiled globally (typically 6-10 occurrences).
- T3 = Subspecies either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range, or because of other factors making it vulnerable to extinction throughout its range (21-100 occurrences).

2**State**
- E = Endangered
- /- = No Status

**Likelihood of occurrence on the project site**
- C = Confirmed
- P = Potentially may occur
- U = Unlikely to occur
Figure 6-18

Sensitive Wildlife Species in the Dillingham Military Reservation Region of Influence
There are five listed sea turtles that could occur in the Pacific tropical waters of Hawai’i, two of which are more common and could occur in the DMR ROI. These are the green sea turtle (*Chelonia mydas*), which is federally threatened, and the leatherback sea turtle (*Dermochelys coriacea*), which is federally endangered. The green sea turtle is expected to occur in the ROI. The leatherback turtle could occur but most likely would not because it prefers offshore waters. Adult leatherbacks are commonly sighted in the waters off the outer Hawaiian Islands (NOAA Fisheries 2000z). The loggerhead (*Caretta caretta gigas*), hawksbill (*Eretmochelys imbricata*), and olive ridley (*Lepidochelys olivacea*) are not expected to occur. Hawksbills and green sea turtles nest annually on Hawaiian beaches (ONR 2000), though no nests for either species have been documented in the ROI, and no hawksbills are expected to occur there. This species is considered uncommon in Hawaiian waters, but does have nesting sites on Hawai’i and Moloka’i (NOAA Fisheries 2000y), which are distant from the ROI. Loggerheads and olive ridleys are known to occur in Hawaiian waters as they occur as bycatch in the longline fishery, but they are pelagic (open sea) species and as such are not expected in the DMR ROI. Loggerheads are known to spend 40 percent of their time at the surface, and olive ridleys are only at the surface 20 percent of the time and tend to be found in shallower waters than loggerheads (Polovina et al. 2000). Olive ridleys are the most abundant sea turtles in the world (Polovina et al. 2000), though they are less common in Hawaiian waters. Most records of olive ridley are from entanglements and strandings (NOAA Fisheries 2000aa).

**Humpback Whale (FE/MMPA)**

The waters off the coasts of the Hawaiian Islands are known for their seasonal population of humpback whales, which are also the most abundant marine mammal throughout the Hawaiian waters (Mobley et al. 2001). The Hawaiian Islands are an important breeding ground for this species (Calambokidis et al. 1998). The humpback whale is the only one of the five endangered baleen whales potentially occurring in Hawaiian waters that is known to be present in reasonably large numbers. The International Whaling Commission and NOAA Fisheries consider the Hawaiian population of humpbacks to be a separate stock (NOAA Fisheries 2000a). Humpback whales are found throughout the island chain and are most abundant in coastal waters of the main Hawaiian Islands, including Hawai’i and O’ahu, from November through April, with peak abundance from late February through mid-March (Baker and Herman 1981). Approximately two-thirds of the entire North Pacific humpback whale population (approximately 4,000 to 5,000) migrate to Hawaiian waters to breed, calve, and nurse (NOAA Fisheries 2000a). These whales are generally found in shallow waters shoreward of the 600-foot (183-meter) depth contour (ONR 2000).

Humpback whale mothers and calves prefer the calmer shallower waters often found on the leeward sides of the islands (Smultea 1992), and they prefer very shallow water less than 60 feet (18 meters) (ONR 2000; Smultea 1992). Some research suggest that habitat use patterns of females and calves in nearshore areas may decrease as a result of increasing vessel traffic and human activities (ONR 2000). Humpback whales are vulnerable to human disturbance in Hawaiian waters and possibly to vessel strikes. Hawai’i regulations prohibit boats from approaching within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs. Humpback whales (of varying pod sizes and types, including mother and calf pods) are commonly sighted off the O’ahu coast and are confirmed in project area
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waters, though with unknown frequency, from January through April (Pickering 2003; Clark and Tyack 1998).

**Monk Seal (E/MMPA,D)**

The monk seal is the only pinniped (seal species) known to occur in the Hawaiian archipelago, where it is endemic. This species may occasionally occur in the waters or shore of the ROI, but it is more common in the northwest island chain. Incidental transients are known at all of the main seven islands and there is a small uncounted population on the island of Ni‘ihau (NOAA Fisheries 2000w). The species was designated as depleted under the MMPA in 1976, following a large decline in animal counts from the late 1950s and mid 1970s. The monk seal was also listed as endangered under the ESA in 1976. In 1988, NOAA Fisheries designated critical habitat for the Hawaiian monk seal, but this habitat is quite distant from the ROI, in the northwestern Hawaiian Islands, extending from shore to a distance offshore that is 20 fathoms (180 feet, or 55 meters) deep. The species is managed as one stock, though each island may in fact have its own subpopulations (NOAA Fisheries 2000w). Virtually nothing is known about its distribution and movement patterns when it is at sea. Current estimates indicate that the monk seal population is declining and is believed to include approximately a thousand animals. Hawaiian monk seals breed primarily at Laysan Island, Lisianski Island, and Pearl and Hermes Reefs but also are known to use the Midway Islands, among other northwest Hawaiian Islands (NOAA Fisheries 2000w).

**Green sea turtle (FT)**

The green sea turtle is considered the most abundant turtle in Hawaiian waters (Zug et al. 2002; ONR 2000; NOAA Fisheries 2000x-z, 2000aa, 2000bb). The Hawaiian population of nesting green sea turtle makes up a distinct genetic unit (Zug et al. 2002). Except during their post-hatching pelagic phase, this species spends most of its time in coastal waters, shallow bays, and nearshore areas where foraging is optimal (Brill et al. 1994; Zug et al. 2002). Juveniles and subadult green turtles are especially abundant in the nearshore areas. These turtles have nested on all of the seven main islands (Dollar 1999). The most accurate abundance estimates for adult female green turtles, which nest annually on Hawaiian beaches, are from 450 to 475 animals, with reproduction taking place mostly at the French Frigate Shoals (Balazs 1980; NOAA Fisheries 2000x, 2000y). Submergence intervals vary by behavior. When the animals are resting, they have regular, long submergence intervals. When feeding, submergence intervals are short and irregular (Brill et al. 1994). In Hawaii, 40 to 60 percent of immature green sea turtles suffer from fibropapillomatosis, a disease that causes tumor growth (Work et al. 2003). Studies are ongoing to assess the impacts of these tumors on the animals’ behavior.

Green sea turtles are expected to occur in the ROI, in waters off DMR or on the beach. This species is known to feed on marine plants that occur in the ROI and in the nearshore areas at DMR. The DMR ROI could serve as sea turtle foraging and resting areas. Green sea turtles have been shown from some Hawaiian areas to remain within a small portion of a habitat area, if foraging and rest habitat is optimal there, and to have short submergence intervals (Brill et al. 1994). During the breeding season, adult green sea turtles undertake long-distance oceanic migrations from feeding areas throughout the Hawaiian archipelago to nesting beaches at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl Reef and
Hermes Reef, Cure Atoll, and Midway Island. Ninety percent of green turtle nesting in the Hawaiian Islands occurs far from the ROI at the French Frigate Shoals, the portion of the islands that is 800 miles (1,482 kilometers) northwest of the main Hawaiian Islands and consisting of a string of 11 small island regions.

**Leatherback sea turtle (FE)**

Leatherbacks do not nest regularly or in great numbers in the Hawaiian Islands (NOAA Fisheries 2000x, 2000aa). Adult leatherbacks are commonly sighted in the Pacific Ocean near the Hawaiian archipelago, primarily over deep oceanic waters. Leatherbacks could occur equally as frequently off any of the main seven islands, but they are often sighted off the north shores of both O‘ahu and the island of Hawai‘i (NOAA Fisheries 2000z; ONR 2000). They are considered unlikely in ROI waters, as they are more typically sighted along the north shore or in offshore waters (NOAA Fisheries 2000z). However, transients could occur in the waters off DMR and, rarely, on the coastline.

Of these marine mammals, the only likely occurrence in the ROI would be the humpback whale, the monk seal, and the green sea turtle. Table 6-18 lists the likelihood of occurrence of these species within the project area and associated habitat and regulatory information. The natural history of these species, as well as specific documented locations either in or near the DMR ROI (if known), are described in Appendix I-1. (Note: As marine mammals are mobile and rapid movers, if they have been documented near the DMR ROI [within 2 to 5 nautical miles], they are assumed to occur in the ROI.)

**Sensitive Habitats**

**Critical Habitat**

Army lands were excluded from the latest critical habitat designations for plants based on the essential contribution that Army-led natural resource conservation actions play in the stabilization of threatened and endangered species. There is no USFWS critical habitat that may occur within the DMR ROI.

**Hawaiian Islands Humpback Whale National Marine Sanctuary**

The Hawaiian Islands Humpback Whale National Marine Sanctuary was designated under the National Marine Sanctuaries Act (16 U.S.C. 1431 et seq., P.L. 106-513). This act was passed to designate and manage areas of the marine environment with special national significance as National Marine Sanctuaries. The primary objective of this law is to protect marine resources. The act also directs the Secretary of Commerce to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection. Sanctuaries are managed according to site-specific management plans prepared by the NOAA Fisheries. The sanctuary waters are composed of five separate areas abutting six of the major islands. Designated sanctuary waters encompass marine waters in north O‘ahu near, but not adjacent to, the Dillingham ROI. Designated sanctuary waters also occur outside of O‘ahu at Penguin Banks (see Figure 3-13).

**Biologically Significant Areas**

Classifications of BSAs are defined in Section 5.10-1.
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- **BSA1**: On DMR, Lonomea lowland dry forest is classified as a BSA1 rare natural community, with Global Heritage Ranking G2.

- **BSA2**: There is one BSA2 area on DMR, adjacent to the BSA1 area and in the southern portion of DMR in an area of sloping cliffs.

- **BSA3**: There are no BSA3 areas in DMR.

A wetland delineation of DMR was conducted in the spring and summer of 2002 following procedures outlined in the ACOE 1987 wetland delineation manual; results were published in a report dated August 2002 (USACE 2002d). Those conducting the survey identified one jurisdictional wetland on DMR (USACE 2002d). The wetland is spring fed, is dominated by primrose willow, and is approximately 287 square yards (240 square meters) (USACE 2002d). This perched wetland is within the ROI but outside of the area that will be used for maneuver training.

An additional wetland area was investigated at DMR. Based on an evaluation by the Corps of Engineers, Honolulu District, Regulatory Branch, dated September 4, 2002, the wetland area was determined to be non-jurisdictional and, therefore, not regulated under Section 404 of the Clean Water Act. (See Appendix E).

6.10.2 **Environmental Consequences**

In response to the agency and public comments received during the Draft EIS comment period we reevaluated our analysis of the biological resources. As a result of considering these comments and a reanalysis of the available information, we recognize that the impact to biological resources from fire could not be mitigated to the less than significant level. However, these impacts will be substantially reduced as a result of mitigation.

This section identifies potential biological impacts that may result from the Proposed Action, Reduced Land Acquisition, and No Action. The methodology and significance criteria used to determine the level of impact on biological resources are described in Section 4.10.1.

The Army and USFWS have not yet agreed on a final ROI. Changes to the present ROI, depicted in Figure 6-15, could alter the qualitative and quantitative analyses within this environmental consequences section.

**Summary of Impacts**

Impacts on biological resources would occur as a result of fire if it occurs, construction, the elevated use of areas by Soldiers and the intensification of training including off-road mounted maneuvers, and the increase in nonlive-fire training. All biological resources have been assessed for potential impacts from project activities. For a full description of the impact methodology used to determine impact on a resource please refer to chapter 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of impacts is provided in Table 6-21.
Significant impacts mitigable to less than significant are fire effects on sensitive species and sensitive habitat; impacts from construction and training activities on sensitive species and habitat; and impacts on sensitive species and habitat from the spread of nonnative species. Less than significant impacts involve impacts from training activities and construction on general habitat and wildlife at DMR and along Dillingham Trail, threats to migratory birds from FTI construction, and noise and visual impacts on wildlife.

Table 6-21
Summary of Potential Biological Impacts at DMR

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts from fire on sensitive species and sensitive habitat.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Impacts from construction and training activities on sensitive species and sensitive habitat.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Impacts from the spread of nonnative species on sensitive species and sensitive habitat.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Impacts from construction and training activities on general habitat and wildlife.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Threat to migratory birds.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Noise and visual impacts.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
<tr>
<td>Runoff impacts on marine wildlife and coral ecosystems.</td>
<td>⊘</td>
<td>⊘</td>
<td>⊘</td>
</tr>
</tbody>
</table>

**LEGEND:**

- ⊘ = Significant
- ⊘ = Significant but mitigable to less than significant
- ⊘ = Less than significant
- ⊘ = No impact
- + = Beneficial impact
- N/A = Not applicable

**Proposed Action (Preferred Alternative)**

**Significant but Mitigable to Less than Significant Impacts**

**Impact 1: Impacts from fires on sensitive species and sensitive habitat.** Although no live-fire exercises are proposed at DMR, human-induced fires could occur as a result of the Proposed Action. Sources of fire include engines, pyrotechnics, nonlive fire, and cigarettes. Fires are a great threat to the natural communities in Hawai‘i and could cause major impacts on biological resources, as discussed extensively in Section 5.10.2 of this report. Construction, training, and use of the Dillingham Trail would increase the threat of wildfire in the Wai‘anae Mountains. The rugged terrain can limit the suppression and control of fires, which are likely to spread unchecked into areas that contain sensitive species.
Vegetation communities that could be affected by the spread of fire include those within the DMR ROI, such as those that follow:

- Nonnative vegetation (approximately 6,847 acres [2,771 hectares]);
- Lowland dry forest and shrubland (approximately 29 acres [11.7 hectares]);
- Coastal dry shrubland and grassland (approximately 56 acres [22.6 hectares]); and
- Lowland mesic forest and shrubland (approximately 194 acres [78.5 hectares]).

Impacts of fire on vegetation communities are discussed in Section 5.10.2 and could include the following:

- Removal of aboveground biomass;
- Soil erosion;
- Changes in community composition resulting from changes in soil texture and composition, moisture, light availability, and nutrient availability; and
- Invasion of nonnative species.

Federally listed and sensitive species have the potential to occur in the southern portion of the DMR ROI, on the northern edge of the Wai‘anae Mountains (Tables 6-19 and 6-20). These species could be adversely affected by the spread of fire into their habitats. Approximately 14 acres (5.6 hectares) of BSAs also occur within the DMR ROI and could be affected in the event that a wildland fire occurred at DMR.

The Proposed Action would not directly affect threatened or endangered species, but, due to the risk of fire ignition associated with military activities, the disturbance or destruction of federally listed species resulting from a wildland fire is considered a potentially significant and mitigable impact.

To help prevent the ignition and spread of fire, the Army would follow guidelines in the IWFMP, O‘ahu and Pōhakuloa Training Areas. This includes the construction of two firebreak roads at DMR and would help prevent the spread of training-induced fires. The mitigation measures listed below would decrease the impacts of fire on sensitive species from construction and the increased use of the DMR military vehicle trail to less than significant levels.

**Regulatory and Administrative Mitigation I.** The Army will implement the terms and conditions identified in the Biological Opinion for current force and SBCT proposed training on the island of O‘ahu including the development and implementation of the O‘ahu Implementation Plan to aid in the stabilization of listed species. The BO is available upon request.

The Integrated Wildland Fire Management Plan for Pōhakuloa and O‘ahu Training Areas was updated on October 2003. The Army will fully implement this plan for all existing and
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new training areas to reduce the impacts associated with wildland fires. The plan is available upon request.

Additional Mitigation 1. No additional mitigation measures were identified for this impact.

Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat. The Proposed Action would have a significant but mitigable impact on sensitive species and sensitive habitat.

The effects of fire, as described in Impact 1, would have the most significant impacts on listed species and their habitat. Federally listed and sensitive species are known to occur or have the potential to occur in the southern portion of the DMR ROI (Figures 6-17). This includes the Hawaiian common moorhen, Hawaiian duck, Hawaiian coot, the black-necked stilt, the Hawaiian hoary bat, *Hibiscus brackenridgei ssp. mokuleianus*, *Schiedea kealiae*, and *Nototrichium humile*. These species would be adversely affected by the spread of fire into their habitats. (The Army has surveyed for bird species listed above annually over the last nine years but none have been identified as occurring on DMR during this time.)

Impacts from noise associated with use of the Dillingham trail would affect sensitive waterfowl if any were present in the project area.

Regulatory and Administrative Mitigation 2. The Army will implement all the terms and conditions defined in the Biological Opinions issued by USFWS for current force and SBCT proposed actions on the islands of O‘ahu and Hawai‘i. The terms and conditions which implement the reasonable and prudent measures determined during this consultation will be incorporated into the proposed action. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementation of the proposed action. The Biological Opinions are available upon request.

The Army will implement land management practices and procedures described in the ITAM annual work plan to reduce erosion impacts (US Army Hawai‘i 2001a). Currently these measures include: implementation of a training requirement integration (TRI) program; implementation of an Integrated Training Area Management (ITAM) program; Sustainable Range Awareness (SRA) program; development and enforcement of range regulations; implementation of an Erosion and Sediment Control Management Plan; coordinating with other participants in the Koolau Mountains Watershed Partnership (KMWP); and continued implementation of land rehabilitation projects, as needed, within the Land Rehabilitation and Maintenance (LRAM) program. Examples of current LRAM activities at KTA include: revegetation projects involving site preparation, liming, fertilization, seeding or hydroteeeding, planting trees, irrigation, and mulching; a combat trail maintenance program (CTP); coordination through the Troop Construction Coordination Committee (TCCC) on road maintenance projects; and development of mapping and GIS tools for identifying and tracking progress of mitigation measures.

Additional Mitigation 2: The Army proposes to fence or flag where practicable any sensitive plant communities from activities that may take place in the ROI. The Biological Opinions
Outline fencing for the majority of the sensitive species. USARHAW will evaluate if additional fencing may be necessary.

**Impact 3: Impacts from the spread of nonnative species on sensitive species and sensitive habitat.** The construction of Dillingham Trail and its use would introduce more invasive species to the area, which would have both short-term and long-term impacts on sensitive plants and wildlife.

Trail construction would increase the number of people in the area, which would increase the introduction and spread of nonnative species, particularly plant species whose seeds can be easily carried by humans on their shoes, clothing, equipment, and vehicles. Activities associated with Dillingham Trail and activities along this trail could facilitate the spread of nonnative species into the native wiliwili forest and the adjacent rare Lonomea forest. The Lonomea forest supports sensitive species *Schiedea kealiae* (a federally listed plant), ʻahakea, and kokiʻo.

Invasive plants have an advantage in a stressed environment and can often out-compete native species, which are not adapted to an environment created through human activity. Nonnative species that can survive in a foreign habitat often have evolutionary adaptations that allow them to better withstand human-related effects on the environment and are more tolerant of habitat degradation. These species can spread rapidly throughout a disturbed habitat and, in doing so, alter the habitat and its associated ecosystem. Native wildlife would be drastically affected by the alteration of landscape and vegetative cover, particularly if the native vegetation that they feed on were reduced.

Long-term elevated use of Dillingham Trail resulting from the Proposed Action would lead to long-term increases in the spread of nonnative species at DMR and habitats along the proposed Dillingham Trail. There would be an increase of conventional trucks and Strykers on the roads to DMR and the proposed Dillingham trail. Soil and wind erosion would increase as a result of the introduction of these larger, heavier vehicles and the increase in total vehicles needed to go to and from DMR to support the elevated training. (See section 6.9) The Proposed Action would increase the likelihood of a fire in the ROI, as detailed in Impact 1. Nonnative species often benefit from fires, due to their ability to colonize areas following a burn. Also, the presence of nonnative species often provides fuel for wildfires, makes fires larger, and facilitates the spread of fire.

Changes in vegetation can also adversely affect wildlife at sensitive times of their lifecycles by altering elements that they depend on, such as shelter. The threat of animals introduced into the areas surrounding the military vehicle trail by construction and use of the Dillingham Trail is considered low due to the relative absence of risk factors. The airport at DMR is mainly used recreationally by gliders and is not used regularly for inter-island or international transportation. This means there is a low risk that nonnative species will be brought directly to DMR from outside the state, and therefore introduction of vector species and material is not likely. The Proposed Action would not be expected to affect the populations of feral ungulates or other nonnative mammals. However, increased transport of troops among sub-installations and between islands could increase the likelihood of nonnative plants or
invertebrates colonizing new areas. Nonnative invertebrates may be introduced into these areas as a result of construction and increased traffic, which would provide a vector for nonnative species in the area. An example of a potential invasive invertebrate is the black twig borer, which is not currently found in DMR. If this species were introduced there, it would find the host *Bobea* species, which is a commonly available host species for the borer in other locations.

In summary, increasing training at DMR, constructing the Dillingham Trail, increasing the number of people, increasing the number of vehicles, and increasing total usage of the trail could increase the number and type of nonnative plants and animals at DMR, causing an increase in the impact on sensitive species.

**Regulatory and Administrative Mitigation 3.** As required in the terms and conditions of the Biological Opinions, the Army will:

- Educate soldiers and others potentially using the facilities and roads in the importance of cleaning vehicles, equipment and field gear.

- Educate contractors and their employees about the need to wear weed-free clothes and to maintain weed-free vehicles when coming onto the construction site and to avoid introducing non-native species to the project site.

- Prepare a one-page insert to construction contract bids informing potential bidders of the requirement.

- Inspect and wash all military vehicles at wash rack facilities prior to leaving SBMR, KTA, or PTA to minimize the spread of weeds, such as fountain grass, and animal (invertebrate) relocations.

USARHAW will follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines Federal Agency duties in regards to preventing and compensating for invasive species impacts. USARHAW will agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. The Implementation of an Environmental Management System will further improve the identification and reduction of environmental risks inherent in mission activities.

In accordance with USDA regulations and requirements, cargo originating outside of Hawai‘i will be inspected by USDA and certified to ensure it is not carrying the brown tree snake or other reptiles before transporting cargo for use on training ranges.

**Additional Mitigation 3:** The Army proposes to use native plants in any new landscaping or planting efforts where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.
Less than Significant Impacts

Impacts from construction and training activities on general habitat and wildlife. General SBCT training would occur on established roads or trails, as well as areas designated for maneuver training throughout the installation. Biological resources would not be expected to be affected by maneuvers on existing roads and trails. In addition, the use of the UAV would not be expected to affect biological resources during general operation. No new areas would need to be cleared for the use of the UAV.

As part of the Proposed Action, off-road training using the Stryker vehicle would occur within DMR. Wildlife in these areas would be expected to sustain minor adverse impacts as a result of off-road maneuvers. Wildlife would generally be expected to vacate areas that are being used for off-road maneuvers, but wildlife that do not vacate areas being used for maneuver could sustain injuries. The most likely species to be affected by off-road maneuvers would be ground-nesting birds or small mammals. There are no native ground-nesting birds breeding in the off-road maneuver area, or native small mammals occurring in this area, so the impact on general terrestrial wildlife is considered less than significant.

Off-road training would occur only in previously disturbed areas and would not affect native ecosystems. Approximately 98 percent of the land area at DMR is dominated by nonnative species. The natural communities within the boundary of DMR are two types of lowland dry communities that are on the cliff slopes at the southern end of the training area. These areas would not be used for maneuver training and therefore would not be affected by the use of the Stryker vehicle. The construction of Dillingham Trail would not fragment any natural vegetation communities. The trail is located in areas of agricultural use, and the vegetation that surrounds these areas is primarily nonnative species with some common natives.

A wetland delineation of DMR was conducted in the spring and summer of 2002 following procedures outlined in the ACOE 1987 wetland delineation manual; results were published in a report dated August 2002 (USACE 2002d). Those conducting the survey identified one jurisdictional wetland on DMR (USACE 2002d). The wetland is spring fed, is dominated by primrose willow, and is approximately 287 square yards (240 square meters) (USACE 2002d). This perched wetland is within the ROI but outside of the area that will be used for maneuver training.

An additional wetland area was investigated at DMR. Based on an evaluation by the Corps of Engineers, Honolulu District, Regulatory Branch, dated September 4, 2002, the wetland area was determined to be non-jurisdictional and, therefore, not regulated under Section 404 of the Clean Water Act. (See Appendix E).

Threat to migratory birds. The presence of the FTI antennas could significantly affect migratory bird species known to occur in the DMR ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai‘i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000). The
FTI antennas would be no taller than 100 feet (33 meters) and would be mounted on existing structures where practicable. A full description of the FTI antennas is in Appendix D.

Migratory bird species known to occur at DMR that could be adversely affected by the Proposed Action include the white-tailed tropicbird, black-crowned night heron, barn owl, golden plover, and northern cardinal (USARHAW and 25th ID [L] 2001a). USFWS tower guidelines (USFWS 2000), attached in Appendix I-2, would be integrated into the Proposed Action to ensure that MBTA species would not be affected by the construction and placement of antennas in the SBCT ROI. Key avoidance measures include using no lighting or guy wires on the towers and keeping all towers below 199 feet. UAVs would fly over the training area as discussed Section 5.4. The UAV activity is not anticipated to threaten migrating birds.

**Noise and visual impacts.** Increased movement of vehicles along Dillingham Trail would lead to an increase in human noise, which could have adverse effects on wildlife by deterring them from using the land to forage, rest, or breed. General SBCT training would occur only in areas already used for training at DMR. No new helicopter use would be added to that now used at Dillingham. There will be new use of UAV flights, but this would be over military ranges and would have minimal impact. Airfield use is ongoing and thus aircraft noise is not expected to significantly affect wildlife species at DMR.

These impacts are expected to be less than significant based on the highly developed nature of much of the proposed trail area and the limited use of the trail once it is built. Noise produced as part of proposed training activities would be mitigated by ongoing Army environmental management (Section 2.2.4). Additionally the Army has agreed in the Biological Opinion to notify USFWS if it observes any threatened or endangered avian species at DMR. The Army, in coordination with USFWS, also will establish natural noise barriers if federally listed wetland bird species are present at the nearby Dillingham Ranch pond and will conduct surveys of the pond near the DMR trail to determine presence of and federally listed wetland bird species. If any are present the Army will determine if these species are nesting and if trail noise is having an adverse impact. These measures would ensure that noise and visual impacts on sensitive species would be less than significant.

Less than significant impacts on marine wildlife resources in the DMR ROI are expected as a result of military aircraft noise. UAVs are unlikely to occur over water in the DMR ROI due to difficulty of deployment in the proximity of civilian aircraft. The air-water surface is an extremely effective barrier for noise. Airborne noise is transmitted to the underwater environment only when the noise source is essentially directly overhead (Richardson et al. 1995). Ambient noise levels on shorelines are already quite high naturally, and marine mammals and sea turtles have adapted to this. No aircraft are known to land on the beach or shoreline. Flights at DMR ROI would be relatively infrequent, short-lived, and unlikely to traverse the same section of coast or offshore area every time.

Less than significant impacts on marine wildlife resources in the DMR ROI are expected as a result of SBCT related military aircraft visual events because there would be no change in aircraft use at DMR except for the introduction of UAVs. The probability of significant
aircraft visual impacts on marine wildlife at a population level as a result of SBCT aircraft activities in the coastal waters or shoreline of the DMR ROI is considered to be low and less than significant based on flight use patterns described above.

**No Impacts**

Runoff impacts on marine wildlife and coral ecosystems. No impacts from potential runoff are expected for marine wildlife resources or coral. No increase in run-off as a result of SBCT activities is expected. DMR is on the leeward side of the island, so storm runoff is minimal. The expected increase in erosion, described in Section 6.08, would be within the natural range due to rainfall and runoff variation, and no impacts are expected on marine wildlife. Short-term impacts from construction and use of the trail would be reduced to less than significant levels by implementing standard construction BMPs for runoff control. There are no contaminants moving off the ranges, and surface water and groundwater are not expected to be contaminated (see Section 6.8, Water Quality). There is not expected to be any runoff carrying contaminants from UXOs to nearshore ocean waters. There are no UXOs in the marine ROI. No water-contaminating activities are occurring in the upland portions of the marine ROI habitat, so there would be no direct effects from runoff on marine wildlife or coral reefs and their associated organisms.

The Army initiated an informal consultation with NOAA Fisheries in accordance with Section 7 of the ESA. NOAA Fisheries concurred with the Army’s determination that the proposed action was not likely to adversely affect federally listed species, marine mammals, or designated essential fish habitat. (See Appendix E).

**Reduced Land Acquisition Alternative**

The impacts associated with RLA would be identical to those described for the Proposed Action.

**No Action Alternative**

No Action would result in no new impacts on biological resources, but would involve a continuation of existing impacts. An in-depth analysis of current force training impacts on DMR biological resources can be found in the *O‘ahu Training Areas INRMP* (USARHAW and 25th ID[L] 2001a) and the *Endangered Species Management Plan Report (ESMPR) for O‘ahu Training Areas* (R. M. Towill Corp. 1997b). All conservation measures detailed in the 2003 BO for Routine Military Training and Transformation of the 2nd Brigade 25th ID(L) at U.S. Army Installations on the island of O‘ahu (USFWS 2003d) will be enacted under this alternative as well. A synopsis of No Action Alternative impacts is given below.

**Significant but Mitigable to Less than Significant Impacts**

**Impact 1: Impacts from fire on sensitive species and sensitive habitat.** Impacts from fire on sensitive species and sensitive habitat would continue under No Action. Several current force actions are potential sources of fires at DMR, including vehicle traffic (R.M. Towill, Corp. 1997b). There is a high risk of fire due to troop training in the DMR dry Mokule‘ia region (R.M. Towill, Corp. 1997b). To reduce potential impacts from fire, the Army will implement the terms and conditions identified in the Biological Opinion for current force and SBCT proposed training on the island of O‘ahu including the development and implementation of
6.10 Biological Resources

the O’ahu Implementation Plan to aid in the stabilization of listed species. In addition, the Army has developed an Integrated Wildland Fire Management Plan (IWFMP) to minimize impacts from fire by undertaking the following:

- Constructing two firebreak roads at DMR;
- Regularly updating incident command system contact personnel and reviewing fire control protocols;
- Posting signs about the Army’s regulations concerning ignition sources; and
- Improving fire education and awareness by preparing educational materials on fire hazards and preventive measures.

Impact 2. Impacts from construction and training activities on sensitive species and sensitive habitat. There have been and would continue to be impacts on the listed plants and wildlife. Vehicle and dismounted maneuvers, along with nonlive-fire training at DMR, occurs primarily on disturbed portions of the ROI that are of low value to Hawai’i’s listed species. However, the effects of fire, spread of nonnative species, noise pollution and visual presence of humans in or nearby designated and sensitive habitats negatively affects listed species that use or would potentially use this area.

The Army has completed ESA Section 7 consultation for the impacts on federally listed species from routine training at DMR; the same mitigation measures described under the Proposed Action would apply here. Ongoing programs that would lessen the impact on listed species and their sensitive habitat include the ecosystem management plan, endangered species management plan, and INRMP (USARHAW and 25th ID[LI] 2001a; R. M. Towill Corp. 1997b). The measures outlined in these plans (for example, monitoring and outplanting) would help avoid effects and would compensate for impacts on listed species that would result directly and indirectly from implementing the No Action.

Impact 3. Impact from the spread of nonnative species on sensitive species and sensitive habitat. The impact on sensitive species resulting from the spread of nonnative species would continue under No Action. Nonnative plants and animals, some of which may be invasive, have likely been introduced and would continue to be introduced into natural areas at DMR. Under the status quo of No Action, impacts on biological resources would continue at current levels. In compliance with the BO and EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize the risk of harm caused by invasive species. Several habitat-modifying introduced plants are documented as having invaded DMR’s natural areas. Species such as koa haole, guinea grass (Panicum maximum), and Christmas berry (Schinus terebinthifolius) are particular threats. These species, along with other invasive plant species, are expected to continue to spread further as a result of current actions. Introduced invertebrates at DMR could include the invasive black twig borer, which is a known pest of plant species that occur at DMR and is suspected to be at the site. Provisions are made for reducing these impacts in the O’ahu Training Areas INRMP (USARHAW and 25th ID[LI] 2001a) by surveying for nonnatives, fencing out invasive mammals, increasing weed eradication, and removing nonnative invertebrates. These impacts are minimized by limiting training areas, keeping inventories of species of concern with the
potential to occur at SBMR, and promoting conservation by educating the military and the general public, all of which are included in ongoing Army environmental management programs (Section 2.2.4).

**Less than Significant Impacts**

*Impacts from construction and training activities on general habitat and wildlife.* Troop and other foot traffic in or adjacent to native forests would continue to impact natural communities, plants, and snails (R. M. Towill Corp. 1997b). These impacts are minimized by limiting training areas, keeping inventories of species of concern with the potential to occur at DMR, and promoting conservation by educating the military and the general public, all of which are included in ongoing Army environmental management programs (Section 2.2.4). Training impacts would continue to be managed to limit trampling and overall loss of habitat range (R. M. Towill Corp. 1997b).

*Threat to migratory birds.* Current force activities would continue to have a less than significant impact on migratory birds. Status quo activities in the ROI may incidentally affect migratory birds but are unlikely to severely disturb birds, considering the highly disturbed nature of the present training area.

*Noise and visual impacts.* Noise would continue to be produced as a result of current activities. Noise would have an adverse impact on animals in the area due to disturbance but would not significantly affect their behavior and would not lead to a population level decline. Studies such as the *Final Report: A Study to Determine the Effects of Noise from Military Training on the Endangered O'ahu 'Elepaio* (HINHP 1998) show that Army-related noise on O'ahu has not significantly affected species, including sensitive species, such as the 'elepaio. There are no visual impacts under this alternative.

**No Impacts**

*Runoff impacts on marine wildlife and coral ecosystems.* SBCT activities at DMR are not expected to result in runoff impacts on marine wildlife and coral ecosystems due to limited activities that would occur there.

The Army initiated an informal consultation with NOAA Fisheries in accordance with Section 7 of the ESA. NOAA Fisheries concurred with the Army’s determination that the proposed action was not likely to adversely affect federally listed species, marine mammals, or designated essential fish habitat. (See Appendix E).
6.11 Cultural Resources

6.11.1 Affected Environment

Region of Influence
The ROI for this project area includes DMR and the proposed easement for Dillingham Trail from SBMR to DMR.

Native Hawaiian History and Tradition
The most important places associated with spiritual beings, myths, legendary stories, and oral histories in the vicinity of DMR are located along the shoreline, above the installation on the upper slopes of the mountains, and to the west in Ka'ena.

Perhaps the best known traditional spiritual association with this region is at its westernmost end, Ka'ena Point, where the souls of the dead were believed to begin their journey into the afterlife at Leinaaka'uhane. Every Hawaiian island was said to have such a place; on O'ahu it was this great stone whose name literally means “the leaping off place of ghosts.” Also at the point, the demigod Maui is said to have tried to hook the island of Kaua'i with his fishhook, named Manaiakalani, to bring it closer to O'ahu; the Pohaku o Kaua'i remains offshore, the only souvenir of the failed effort.

Farther east, the name of the ahupua'a Kawaihāpai (lifted or carried water) commemorates the water that was sent in response to prayers for deliverance from a terrible drought. To combine a number of versions of the legend: After most people had fled the region, two priests who had stayed behind to pray finally saw a hog-shaped cloud coming toward them from the direction of Kahuku; soon after, they saw water pouring from a cliff. The upland spring that watered the region after this miracle was said never to fail.

Several of the ahupua'a of the western Waialua coast, where DMR is located, recognize a fishing god named Kāne'aukai who is said to have floated to the island in the form of a log or a stone looking for his sisters. They in turn were looking for their brother who had been banished from their faraway home. When Kāne'aukai arrived at O'ahu, he turned himself into human form, manifested himself to the fishermen, and became their deity.

Of the archaeological sites on DMR, six appear to have been primarily agricultural in function, with temporary habitation structures frequently included among the terraces or other agricultural field features. The presence of one sacred site, the Site 191 heiau, indicates the possible ceremonial/symbolic importance of the area and the use of at least a portion of the area in traditional Hawaiian ritual activities. Information gathered by McAllister from informants concerning this heiau indicated that its traditional name is Kawailoa Heiau. Yoshinaga (1977) has recommended that Site 416, the Ke'alii-Kawaihāpai Complex, be preserved as an example of a traditional Hawaiian agricultural complex. Sand deposits underlie the northern (coastal) portion of DMR, and it is possible that Hawaiian burials may be located in these deposits. Burials have been found in the coastal sand dunes north of the installation (Bath 1987).
Historic Overview

Four ahupua'a (traditional land units, as discussed in Section 3.11) cross DMR. Most of the installation lies within Ke'aila and Kawaihapa'i, but the western end extends into Ka'ena and the eastern tip barely reaches into Mokule'ia. DMR is located on the western shore of Waialua District, a region noted in the pre-Contact era as the home of many kahuna (magicians, teachers, experts of various kinds) and their schools. This fertile region was a major food supplier for Honolulu markets as the city grew in the 19th century.

Waialua was home during the traditional era to some of O'ahu’s best and worst rulers. Mā'ilikūkahi, who ruled in the 14th or 15th century, was raised partly in Waialua and is said to have maintained a kulanakauhale (village) there. Mā'ilikūkahi is credited on O'ahu with establishing land divisions that lasted through the traditional era. He is also known for ending human sacrifice and for a benevolent reign that was followed by generations of peace.

The district also saw its share of bad times, including a particularly cruel chief who was eventually driven off by his people. One interpretation of the name Waialua, which may reflect that episode, is “doubly disgraceful.” The legendary cannibals of Helemenō, more often associated with the Helemenō area on the central plateau area, are also said to have tried to settle first in Waialua but to have been driven off.

Archaeological evidence of prehistoric land use and settlement on DMR is limited. Offshore were rich deep water fishing grounds, no doubt exploited by residents of this region. Along the coast fronting DMR was a line of sand dunes in which Hawaiians buried their dead. Evidence of the use of the level area behind the dunes has largely been obliterated by the runway construction, but Handy and Handy indicate that Kawaihapa'i once had a sizeable area of lo'i fields for growing taro, while in Ke'aila, where the coastal plain is narrower, taro was grown in a narrow strip of land behind the dunes (Handy and Handy, 1972). Along the slope at the foot of the Wai'anae Mountains are a number of agricultural features, including terraces, indicating the cultivation of crops along the gulches that cut through the area. Handy and Handy mention sweet potatoes, sugar cane, bananas, and 'awa as crops that would have been planted here (Handy and Handy, 1972). Part of the slope area was set aside as a sacred place, on which Kawailoa Heiau was constructed. The well-watered slopes behind DMR were a source of water that was channeled down the mountainside into the irrigated taro fields below.

The fertile region was home to a thriving community of small land-holders until the advent of large-scale ranching. Missionary John Emerson, who arrived in Waialua in 1832, witnessed serious conflict between native inhabitants and upland ranchers. Cattle and horses, allowed to roam free, damaged or destroyed native gardens and homes; the Hawaiians protested to no avail.

After the Great Mahele, a number of Hawaiians claimed land (often familiar family grounds) from the government. In an 1863 mission report, Emerson claimed that more “common natives” owned land in Waialua than anywhere else on O'ahu. Both Native Hawaiians and western residents obtained grants of land covering all of DMR. On these lands they cultivated sugar cane and newly introduced crops: wheat, corn, rice, and coffee.
The land that now makes up DMR became a ranch in the 1800s and was also used for sugar farming. DMR was established by EO of the President in 1927, but it did not come into its full use as a military airfield until World War II. In 1948 the Air Force took over administration of DMR. Subsequently the reservation was transferred to the Army, under whose administration it remains (Tomonari-Tuggle 2002).

**Previous Consultations and Reports**

*Traditional Cultural Properties Surveys*
No study has been undertaken to identify Native Hawaiian traditional cultural places on DMR, although Anderson (1998) has conducted archival research of Hawaiian traditions and early historic land grants and noted the cultural importance of Site 191, Kawaiola Heiau.

*Historic Buildings Surveys*
No historic buildings surveys have been undertaken at DMR, although the remnants of some structures were recorded during the archaeological surveys (see discussion below).

*Archaeological Surveys*
DMR and adjacent areas have received numerous archaeological investigations of varying intensities (Anderson 1998; Bath 1987; Drolet and Schilz 1992; McAllister 1933; McGerty and Spear 2001; Moblo 1991; Rosendahl 1977), in addition to field checks by IARII, which used GPS to record accurate location data for archaeological sites (IARII 2003). The Bishop Museum surveyed 65 acres (26.3 hectares) of DMR in 1977. More recently, McGerty and Spear surveyed close to 100 percent of DMR and conducted shovel tests to determine the presence or absence of cultural deposits, to obtain dating and functional information, and to assess site significance. Based on their subsurface testing, McGerty and Spear concluded that the likelihood of finding subsurface traditional Hawaiian deposits increases along the stream banks at the north end of the military reservation, despite World War II land modifications in the area (McGerty and Spear, 2001, 135). The present field check for the SBCT transformation project identified three additional historic or military structures.

*Known Prehistoric and Historic Resources*
Nineteen archaeological sites have been identified on DMR, of which three are newly located. Two sites are centrally located and 17 are in the south; four of those are on the southeast boundary near where Dillingham Trail would enter the installation. One site (a ranching period cattle chute, Site 5480) is at the installation boundary where Dillingham Trail would enter DMR (IARII 2003, Chapt. IV).

Anderson (1998) identifies most of the edges of Dillingham as high probability areas, particularly the hill slopes in the southern portion, where several sites have already been recorded and the area has remained relatively undisturbed.

A series of historic dredged channels lie between the base of the mountain range and the flats at the bottom of the mountains in the southern and southeastern portion of DMR. These historic channels represent an important period of DMR history (see McGerty and Spear 2001). The northern flats of DMR were found to have archaeological sites of possible
historical military significance. During the survey by McGerty and Spear (2001), several historic features were recorded, including a loading dock and 11 runway, taxiway, and apron surfaces (IARII 2003). GANDA conducted the first survey of the proposed easement for Dillingham Trail (GANDA 2003b), and they recorded five historic period sites within the corridor. The sites included the Wilson Ditch, an irrigation ditch dated to the early part of the 20th century, the Halstead Mill, consisting of a basalt and mortar smokestack dated to the last part of the 19th century, and three historic bridges constructed in 1952 (GANDA 2003b).

Table 6-22 provides an overview of prehistoric and historic archaeological sites identified at DMR and their NRHP status. Archaeological sites identified on the installation include seven traditional Hawaiian (prehistoric and early historic) sites, 11 historic agricultural or military sites, and six military sites (Table 6-23) (IARII 2003; GANDA 2003a). Sixteen sites were recommended as eligible for listing on the NRHP, although two buildings (building numbers 30 and 33) of the Nike-Hercules Missile Battery (Site 5492) were demolished in 1997 (McGerty and Spear 2001). No evaluation has been made of the three sites found during the 2002 survey. Twenty-one military structures on Dillingham are over 50 years of age (Table 6-24). These are all World War II military facilities built in 1942 and should be evaluated for their eligibility for the NRHP. They include air raid/fallout shelters, air field aprons and runways, and range support facilities (IARII 2003). Twelve other structures build during the Cold War era have not yet been evaluated as potentially significant Cold War properties.

<table>
<thead>
<tr>
<th>Archaeological Sites</th>
<th>Sites Listed, Eligible, or needing DE</th>
<th>Area Surveyed for Archaeological Sites</th>
<th>Buildings over 50 Years Old</th>
<th>Buildings Listed, Eligible, or needing DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dillingham and Dillingham Trail</td>
<td>24</td>
<td>24 (DE)</td>
<td>100%</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: IARII 2003, GANDA 2003b

**Potential for Unknown Resources**

Sites in the flat northerly areas of DMR tend to be of historic military significance and are in areas that have been highly disturbed by modern agriculture and runway construction. However, since this area was heavily used in prehistoric and early historic times, there is a possibility of buried archaeological sites, particularly in areas unaffected by modern land use (Handy 1940; Handy and Handy 1972; Rosendahl 1977). Sand deposits in portions of DMR may contain burials, as these have been found in dune deposits on the coastal side of Farrington Highway (Bath 1987). Figure 6-19 shows archaeological sensitivity areas at DMR.
## Table 6-23
### Archaeological Sites at DMR

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Description</th>
<th>Use</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>191</td>
<td>Paved platforms, terraces, Kawailoa Heiau</td>
<td>Religious</td>
<td>Prehistoric</td>
</tr>
<tr>
<td>416</td>
<td>Terraces, stacked stone walls, walled enclosures, Keālia-Kawaiāpāi Complex</td>
<td>Agriculture</td>
<td>Prehistoric/historic</td>
</tr>
<tr>
<td>5479</td>
<td>Concrete buildings (2)</td>
<td>Communication</td>
<td>WW II</td>
</tr>
<tr>
<td>5480</td>
<td>Wooden structure</td>
<td>Cattle chute</td>
<td>ranching</td>
</tr>
<tr>
<td>5481</td>
<td>Cement structures (4)</td>
<td>Waste water</td>
<td>Military</td>
</tr>
<tr>
<td>5482 **</td>
<td>Cement-lined well</td>
<td>Agriculture</td>
<td>Historic</td>
</tr>
<tr>
<td>5483</td>
<td>Terraces, walls, mounds</td>
<td>Habitation, agriculture, ranching</td>
<td>Traditional, historic</td>
</tr>
<tr>
<td>5484</td>
<td>Terraces, modified boulders</td>
<td>Traditional agriculture, temporary habitation, historic</td>
<td>Traditional, historic</td>
</tr>
<tr>
<td>5485</td>
<td>Terraces, enclosures, walls</td>
<td>Agriculture, ranching</td>
<td>Traditional, historic</td>
</tr>
<tr>
<td>5486</td>
<td>Terraces, modified overhangs, walls</td>
<td>Temporary habitation, agriculture</td>
<td>Traditional</td>
</tr>
<tr>
<td>5487</td>
<td>Terraces, roads</td>
<td>Military, early agriculture</td>
<td>Historic</td>
</tr>
<tr>
<td>5488</td>
<td>Roads, cement structures</td>
<td>Military</td>
<td>WW II, 1960s</td>
</tr>
<tr>
<td>5489</td>
<td>Cement, basalt structures</td>
<td>Military</td>
<td>1940s-1970s</td>
</tr>
<tr>
<td>5490</td>
<td>Excavated channels</td>
<td>Water control</td>
<td>Historic</td>
</tr>
<tr>
<td>5491</td>
<td>Terraces, modified wet cave</td>
<td>Agriculture</td>
<td>Traditional, historic</td>
</tr>
<tr>
<td>5492</td>
<td>Concrete buildings (2)</td>
<td>Nike missile installation</td>
<td>1960s</td>
</tr>
<tr>
<td>D1</td>
<td>Underground cement tank</td>
<td>Military</td>
<td>Historic</td>
</tr>
<tr>
<td>D2</td>
<td>Cement foundation</td>
<td>Military</td>
<td>Historic</td>
</tr>
<tr>
<td>D3</td>
<td>Cement bunker with lookout</td>
<td>Military</td>
<td>WWII</td>
</tr>
<tr>
<td>G-1</td>
<td>Wilson ditch</td>
<td>Agricultural - irrigation</td>
<td>Historic</td>
</tr>
<tr>
<td>G-2</td>
<td>Halstead mill</td>
<td>Agricultural - milling</td>
<td>Historic</td>
</tr>
<tr>
<td>G-3</td>
<td>Concrete bridge</td>
<td>Transportation</td>
<td>Historic</td>
</tr>
<tr>
<td>G-4</td>
<td>Concrete bridge</td>
<td>Transportation</td>
<td>Historic</td>
</tr>
<tr>
<td>G-5</td>
<td>Concrete bridge</td>
<td>Transportation</td>
<td>Historic</td>
</tr>
</tbody>
</table>

Sources: IARI 2003; GANDA 2003s
Table 6-24

Historic Military Buildings on DMR

<table>
<thead>
<tr>
<th>Facility No.</th>
<th>Description</th>
<th>Year Built</th>
<th>Historical Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>00316</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00343</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00638</td>
<td>Range support facility</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00651 **</td>
<td>Range support facility</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00700</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00701 **</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00702</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>00703</td>
<td>Air/fallout shelter</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>1111B</td>
<td>Fw runway surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11201</td>
<td>Fw taxiway surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11202</td>
<td>Fw taxiway surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11203</td>
<td>Fw taxiway surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11204</td>
<td>Fw taxiway surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11301</td>
<td>Fw pk apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11302</td>
<td>Fw pk apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11303</td>
<td>Fw pk apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11304</td>
<td>Fw pk apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11310</td>
<td>Fw pk apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>11601 **</td>
<td>Ac maint apron surface</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>12601 **</td>
<td>Truck loading/unloading</td>
<td>1942</td>
<td>World War II</td>
</tr>
<tr>
<td>84100 **</td>
<td>Water treatment building</td>
<td>1942</td>
<td>World War II</td>
</tr>
</tbody>
</table>

**Structure is listed on the DPW real property list but is not shown on the installation real property map.
Source: IARI 2003
Figure 6-19
Archaeological Sensitivity Areas, Dillingham Military Reservation
6.11.2 Environmental Consequences

Summary of Impacts

There could be significant impacts on archaeological resources from training activities at DMR. Significant impacts on ATIs could also result from construction and training. As explained in the mitigation sections below, the severity of these impacts will be mitigated by compliance with the PA the Army has developed in consultation with the Hawai‘i SHPO, the ACHP, and others. The PA is provided in Appendix J.

Table 6-25
Summary of Potential Cultural Resources Impacts at DMR

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts on historic buildings</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on archaeological resources from range and facility construction</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on archaeological resources from training activities</td>
<td>×</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on archaeological sites from construction of FTI</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on ATIs</td>
<td>×</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on archaeological sites from road or trail construction</td>
<td>×</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Impacts on archaeological sites from road use</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

* Impacts may be mitigable to less than significant.

LEGEND:

○ = Significant
○ = Significant but mitigable to less than significant
× = Less than significant
○ = No impact

+ = Beneficial impact
N/A = Not applicable

There are significant but mitigable to less than significant impacts on archaeological resources from the construction of roads and trails. Mitigation measures for archaeological resources that may be affected by road or trail construction will include evaluation of NRHP eligibility and avoidance or data recovery of significant eligible sites.

Less than significant impacts are expected on archaeological sites from constructing the FTI antenna and from using Dillingham Trail.
Proposed Action (Preferred Alternative)

Significant Impacts

Impact 1: Impacts on archaeological resources from training activities. Training would be conducted at DMR by squad-, platoon-, and company-size units of the Stryker Brigade. In general, this training would involve the same size units and the same training activities as are currently conducted by the Army at DMR. The difference between current use and proposed use concerns the use of Stryker vehicles, which have the potential to affect archaeological sites in ways that current maneuvers do not, potentially damaging cultural resources. Most of the unconstrained area for off-road maneuvers with Strykers consists of the level ground in the north and central portion of DMR, although a small area in the southeast corner of the installation is also mapped as unconstrained. If tactical vehicles are permitted to move freely in all areas now mapped as unconstrained, some sites that are recommended as eligible for the NRHP could be adversely affected.

Training would occur in areas that are marked as moderate or high sensitivity in regard to the probability of encountering archaeological sites. However, in the level areas, the main concern is the potential for subsurface cultural deposits, especially human burials. Unless these deposits are near the surface, adverse effects from tactical vehicle training should be minimal.

Because most archaeological sites at DMR are on the densely vegetated steep slopes of the Wai‘anae Mountains in the south portion of the installation, Strykers will not be able to maneuver off-road in the vicinity of these sites. However, in one area in the southeast, with gentler slopes and less dense vegetation, natural conditions will not restrain Stryker mobility.

Sites 5481, 5484, and 191 are within or adjacent to this unconstrained area. Native Hawaiians consider Site 191, Kawailoa Heiau, sacred.

In addition to the potential impact on archaeological sites, a series of dredged channels lie below the sites at the higher elevations, in the area between the base of the mountain range and the flats. McGerty and Spear (2001) note that the features “average 4.50 m (14.8 ft), bottom width, to 9.00 m (30 ft) top width, by 3.00 m (9.8 ft) to 5.00 m (16.5 ft) high on each side.” These channels at the bottom of the mountains in the southern and southeastern portion of DMR will be avoided by the Proposed Action because they protect the northern flats from possible flooding (McGerty and Spear 2001).

As mentioned above, one of the major cultural resource concerns at DMR is the potential for human burials and buried cultural deposits in the sand deposits in the coastal half of the installation. The primary area of concern would be the high sensitivity areas around the runways. The mitigation measures below will reduce the severity of the impact but not to less than significant levels.

Regulatory and Administrative Mitigation 1. The Army will evaluate archaeological sites within training areas related to SBCT. Sites determined to be eligible for the NRHP and sites pending evaluation will be identified and avoided through protective measures, to the full
extent practicable. If avoidance of identified archaeological sites or newly discovered sites is not feasible, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

The Army will monitor any subsurface excavations in the coastal area and the high sensitivity area around the runways area. The Army will place constraints on any training activities that might involve substantial below surface impacts.

Impact 2: Impacts on Areas of Traditional Importance. The archaeological survey of the proposed alignment has not necessarily identified TCPs or ATIs, although some of the archaeological sites identified might be considered ATIs, including gravesites and temples or heiau. Site 191, in the southeast of DMR, Site 191, the Kawailoa Heiau, is known as a sacred site. Construction activities and use of Dillingham Trail could damage or destroy such resources as a result of direct or indirect activities, as described in Impact 1. The mitigation measures below will reduce the severity of the impact but not to less than significant levels.

Regulatory and Administrative Mitigation 2. Facility construction or training area uses will be designed to avoid identified traditional places and limit visual impacts on TCPs by site location, design, and orientation, where feasible.

If avoiding identified TCPs or ATIs is not feasible because of interference with the military mission or risk to public safety, the Army will consult with the SHPO and Native Hawaiians in accordance with the PA to identify impacts and to develop appropriate mitigation measures. Mitigation for impacts on the cultural landscape could include consulting with Native Hawaiians and having a cultural monitor oversee construction.

The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with AIRFA and Executive Order 13007, on a case-by-case basis. This access program will be expanded to include new land acquisitions.

The Army previously identified Native Hawaiian burial sites in the SBCT ROI. The Army completed notification and consultation for these burial sites, in accordance with NAGPRA, and left these human remains in place. To address any impacts on any burial sites, or an inadvertent discovery of Native Hawaiian human remains or funerary objects, the Army will abide by all notification and consultation requirements outlined in Section 3 of NAGPRA.

Significant Impacts Mitigable to Less Than Significant

Impact 3: Impacts on archaeological resources from Dillingham Trail construction. Construction of Dillingham Trail between DMR and SBMR would involve a corridor 15 feet (4.6 meters) wide with 3-foot-wide (0.9-meter-wide) shoulders on both sides.

Constructing Dillingham Trail would involve vegetation removal and grading soil, as well as the regular use of heavy equipment. All of these activities could result in destruction or damage of archaeological resources or indirect damage by contributing to soil erosion.
Additionally, construction activities could expose or disturb previously undiscovered cultural resources. Dillingham Trail crosses areas with some potential for archaeological resources and several areas with very low potential due to heavy recent agricultural disturbance.

One identified archaeological site, Site 5480 (a ranching period cattle chute), is at the east end of the access road/runway near the sub-installation boundary. If the trail were to connect with the existing road and alterations or widening is required, Site 5480 could be affected. The five historic period sites (Wilson Ditch, Halstead Mill, and the three bridges), discovered along the Dillingham Trail proposed alignment, could be affected if widening is required or from vibrations from heavy equipment. The mitigation measures and implementation of the PA will reduce any impacts on archaeological resources to less than significant.

**Regulatory and Administrative Mitigation 3.** The Dillingham Trail alignment between DMR and SBMR has been surveyed for cultural resources. In accordance with the PA, the Army will identify cultural properties, will evaluate cultural properties for NRHP eligibility, and will implement avoidance strategies to the full extent practicable. GIS and GPS information will be provided to project designers to ensure sites are considered in the design and construction of all the proposed military vehicle trails and training roads in WPAA. If it is not possible to avoid archaeological sites, the Army will consult in accordance with the PA to determine the appropriate mitigation for the damage to the sites, such as data recovery or other mitigation measures. To address the accidental discovery of archaeological sites, human remains, or cultural items, the Army has developed an IDP as part of the PA.

**Less than Significant Impacts**

*Impacts on archaeological sites from construction of FTI.* The FTI project at DMR would construct two antennas within the installation boundary and one on Dillingham Ridge to the southwest of the installation. These would each require construction of a 15-foot (4.5-meter) by 20-foot (6.1-meter) concrete pad supporting an equipment tower and shed. Construction of the pad, shed, and support structure would require vegetation grubbing, site grading and leveling, some subsurface excavation, and the use of heavy construction equipment. These activities could damage or destroy previously undiscovered archaeological resources, as described above. However, the Army has conducted pedestrian surveys of the areas designated for construction and identified no cultural resources on the proposed antenna sites; additionally, indications suggest that no subsurface deposits exist, as at least one of the sites on the installation has been previously disturbed (Zulick and Lucking 2002). To ensure no impact on cultural resources, the Army will monitor to protect subsurface cultural resources discovered during construction activities.

*Impacts of road use on archaeological resources.* The regular use of Dillingham Trail by Army forces would result in increased access by ground troops into the area (resulting in possible vandalism of archaeological sites), possible off-road vehicular movement, and erosion from road use and maintenance. The trail alignment has been surveyed, but it is possible that archaeological sites are within the buffer zone. Troop movements along Dillingham Trail could cause site destruction or damage to archaeological resources directly through vandalism or accidental damage, or indirectly through soil erosion. After construction is completed, installation cultural resources staff will regularly monitor the trail and inspect for
any damage to archaeological sites. Soldiers and installation personnel will receive instruction regarding avoidance of identified sites, as outlined in the IDP.

**Reduced Land Acquisition Alternative**
The impacts associated with RLA Alternative would be identical to those described for the Proposed Action.

**No Action Alternative**
Under No Action, there would be no significant impacts on cultural resources at DMR. Dillingham Trail and the FTI would not be constructed, so there would be no risk of damage to known or undiscovered archaeological resources.

**Less than Significant Impacts**
*Impact on archaeological resources from training activities.* Ongoing training activities at DMR would include continued off-road vehicle use. This would result in ongoing impacts on cultural resources in the training area caused by ground troop activities, off-road vehicle movement, and subsurface excavations. Archaeological resources on the training areas are monitored following exercises to document adverse effects on the sites. Under No Action, current training would continue and there would be no additional impacts on cultural resources or changes in cultural resources management policies. USARHAW will continue efforts to inventory eligible historic properties in compliance with Section 110 of the NHPA, and future project planning will comply with Section 106 and its implementing regulations. Impacts on cultural resources will be mitigated in compliance with these regulatory requirements.

**No Impacts**
Other activities at DMR under No Action include regular use of runways for military exercises; however, these activities have no impact on cultural resources at the installation. Army activities at DMR would include regular inventories and maintenance of cultural resources in compliance with federal law and current management practices. Under the status quo of No Action, impacts on cultural resources would continue at current levels.
Kahuku Training Area is located in northern O'ahu, on the northern terminus of the Ko'olau Mountain Range and is the second largest Army maneuver training area on O'ahu.

Legend
- Blue: Water Bodies
- Orange: Drum Road
- Black: Kahuku Training Area Boundary
- Red: Helicopter Landing Zones
- A1, B2, C2: Training Area Designation


Land Use at Kahuku Training Area

O'ahu, Hawai'i

Figure 7-1
State Land Use District Map
Kahuku and Kawailoa Training Areas
O'ahu, Hawai'i

Figure 7-2
Agricultural Lands of Importance to the State of Hawai‘i Map
Kahuku and Kawaiōa Training Areas

O‘ahu, Hawai‘i

Figure 7-3
Kahuku Training Area is primary nonmilitary land used for recreation, specifically hiking, biking, and hunting.

Legend

- Drum Road
- Roads
- Installation Boundaries

Kahuku and Kawaiola Training Areas

Public & Army Hunting Areas and Hiking Trails

*O'ahu, Hawai'i*

**Figure 7-4**
7.10 **BIOLOGICAL RESOURCES**

7.10.1 **Affected Environment**

Biological resources include plant and animal species and the habitats or communities in which they occur. This section is divided into discussions of general wildlife, vegetation, and habitat types common to KTA and KLOA (Figure 7-20). A discussion of the sensitive wildlife, vegetation, and sensitive habitats known to occur or with the potential to occur in this area is also included. Federal, state, and locally regulated species are included in this report, along with rare species, identified by rapid population decline or whose habitat has markedly decreased in recent years. Figure 7-20 shows the KTA/KLOA ROI, which was based on the potential for fire damage and loss of land due to construction and trampling during SBCT training and the introduction of exotic species from Soldiers moving throughout the installation. The extent of these impacts was determined by the type of vegetation present, human-made and topographic barriers, and buffers in the areas around the proposed actions. The ROI includes SBCT actions occurring on KTA, KLOA, Drum Road, and a buffer area, the size of which depends on the type of training or proposed activities that would occur and the fire risk imposed by vegetation and topography.

In addition to defining the ROI by the firebreak potential, a smaller portion of the ROI is based on the extent of habitat degradation imposed by trampling and by the effect of introducing exotic species associated with human activities. This is because in some areas vegetation is very moist, making the risk to fire extremely low. The ROI does not include any marine habitat. While waters near KTA are part of the Hawaiian Islands Humpback Whale National Marine Sanctuary, no project actions occur in this area nor in the vicinity of the coastline, in the nearshore, in the offshore marine habitat, or upland from the nearshore marine habitat.

**Recovery Plan**

There are 36 plant and 1 animal species with recovery plans that are known to occur or have the potential to occur within the ROI. These species are listed in Appendix I-1a.

**Vegetation**

KTA, a total of 8,528 acres (hectares), is at the end of the Koʻolau Mountains, on the northern tip of Oʻahu. Private, agricultural, and additional Army training lands border it. Botanical surveys to identify rare plants, communities, and potential threats to these resources have been conducted intermittently since 1977. HINHP surveys in 1989, 1993, and 1994 provided the foundation for much of the botanical information used in this EIS.

KLOA is to the north of SBER and to the south of KTA in the Koʻolau Mountains. It consists of 23,348 acres (9,449 hectares). KLOA was surveyed in 1976 and 1977 by the Environmental Impact Study Corporation and later by HINHP (1989 to 1993). Additional botanical and zoological information had been collected on KLOA and adjacent land. Kawailoa is an area of incredible biological richness, with areas of significance for protecting and managing these resources.
Figure 7-20
Kahuku/Kawailoa Training Areas Biological Region of Influence
The vegetation communities identified in the KTA/KLOA ROI are described below and are shown in Figure 7-21.

Portions of the KTA/KLOA ROI contain valuable native vegetation communities, but much of the lower lying vegetation is composed of introduced and invasive plants. Several of these widespread species create dense single-species stands (Christmas berry, ironwood, strawberry guava) that shade out understory species. Two of the plants recently discovered in the ROI that are potentially devastating to the native communities of KTA are manuka (Leptospermum scoparium) and moho (Heliocarpus popeyanensis). Disturbed moist forests are most at risk from these invasions, and efforts are needed to protect the native communities within these boundaries.

Native natural community types within the KTA/KLOA ROI fall into six general categories: montane wet, lowland wet, lowland forest, lowland moist, lowland dry, and intermittent aquatic natural communities, none of which contain known wetlands (USARHAW and 25th ID [L] 2001a).

Within the montane wet communities there are three community types. The mixed fern/shrub community is a fairly restricted community in the topmost reaches of the Ko‘olau Mountains, and rainfall generally exceeds 150 inches (381 centimeters) (USARHAW and 25th ID [L] 2001a). Common fern species in the area include Sadleria spp., Cibotium spp., and Dicranopteris spp. Common shrub species include Hedyotis spp., ‘ōhi‘a (Metrosideros polymorpha), ‘ōhelo (Vaccinium spp.) and köpiko (Psychotria spp.). Rare plants listed within this community are ha‘iwale (Cytandra viridiflora), and kölea (Myrsine fosbergii), (M. juddii). The ‘ōhi‘a mixed bog community is also restricted to the upper elevations (above 2,800 feet [853.4 meters]) of the Ko‘olau Mountains. Annual rainfall exceeds 150 inches (381 centimeters), and the soils are poorly drained, acidic, and part clay. ‘Ōhi‘a is the dominant species, whether as dwarf form in open shrubland or as dense shrub thicket. The herbaceous understory is composed of sedges, grasses, and mosses, including Oreobolus, kuolohia (Rhynchospora), Dichanthelium, ‘uki (Machaerina), and Racomitrium. This community is critically imperiled.

‘Ōhi‘a shrubland falls between 2,400 and 2,800 feet (731.5 and 853.4 meters). The steep windswept ridges have shallow soil, and rainfall is generally between 100 and 200 inches (254 and 508 centimeters) per year. Dwarfed native trees and shrubs thrive here. In addition to ‘ōhi‘a, this community frequently consists of manono (Hedyotis terminalis), ‘alani (Melicope spp.), kölea (Myrsine spp.), and other plants. Common herbaceous species in this community include Trematochloa spp. and Clermontia spp., and ferns are represented by Cibotium spp. and ‘ama‘u (Sadleria spp.). Documented rare plants in this community include ha‘iwale (Cytandra viridiflora), wawae‘iole (Phlegmanrius nutans), Hesperomantia arboresens, kölea (Myrsine spp.), heae (Zanthoxylum oahuense), and O‘ahu violet (Viola oahuense).

The lowland wet community type in KTA is ‘ōhi‘a shrubland. It is found between 1,640 and 2,000 feet (500 and 610 meters). The steep windswept ridges have shallow soil, and rainfall is generally between 100 and 200 inches (254 and 508 centimeters) per year. Dwarf native tree
Vegetation Communities in the Kahuku/Kawailoa Training Areas Biological Region of Influence

Rivers within the Kahuku/Kawailoa Training Areas Region of Influence are one of several native natural communities in the affected environment.

Legend
- Drum Road
- Installation Boundaries
- Region of Influence
- Rivers
- Roads

COMMUNITY
- Lowland Mesic Forest & Shrubland
- Lowland Wet Forest & Shrubland
- Nonnative
- Wet Cliff

Source: HINHP 2002, CEMML 2002

O‘ahu, Hawai‘i
Figure 7-21
and shrub species thrive here. In addition to ʻōhiʻa, this community frequently consists of manono (Hedyotis spp.), ʻalani (Melicope spp.), and kōlea (Myrsine spp.). Common herbaceous species in this community include Trematochloa spp. and Clermontia spp., and ferns are represented by Cibotium spp. and ʻamaʻu (Sadleria spp.). Documented rare plants in this community include hāhā (Cyanea koolauensis) and nāʻū (Gardenia mannii).

Within the lowland forest zone is the native ʻōhiʻa forest. The general conditions are warm, moist to wet, and wind sheltered in this area below the Koʻolau summit (1,900 to 2,000 feet [579 to 610 meters]). In addition to the dominant ʻōhiʻa, other common tree species include manono (Hedyotis terminalis), mehame (Antidesma platyphyllum), and kōlea (Myrsine spp.), as well as the possible codominant species olapa (Cheirodendron spp.). Amau (Cibotium spp.) species are the dominant ferns. Herbaceous plants are māmaki (Pipturus albidius), naupaka kuahiwi (Scaevola spp.), and naʻenaʻe (Dubautia spp.). The only rare plant documented in this area is nāʻū (Gardenia mannii).

Also within the lowland forest zone is the uluhe shrubland, which is widespread on many of the Hawaiian Islands, usually in wet lowland areas below 2,200 feet (671 meters). The dominant plants in this community include two ferns, uluhe (Dicranopteris linearis) and uluhe lau nui (Diplopterygium pinnatum). No rare plants were observed in this community.

The KTA/KLOA ROI contains two lowland moist communities. Koa/ʻōhiʻa forest is below 2,100 feet (640 meters) and in leeward areas of good drainage; the annual rainfall is between 35 and 75 inches (84 and 191 centimeters). Besides the dominant koa (Acacia koa) and ʻōhiʻa, native trees in this community include kōpiko (Psychotria spp.), mehame (Antidesma platyphyllum), ʻōhiʻa hā (Syzygium sandwicensis), ʻahakea (Bohea elatior), and halapepe (Plumele halapepe). Uluhe (Dicranopteris linearis) is the dominant understory species, but naupaka kuahiwi (Scaevola gaudichaudiana), aloheʻe (Canthium odoratum), and ʻākia are common. Also documented are ferns, such as palaʻa (Odontosoria chinensis, Elaphoglossum crassifolium, and Neophlyctis ecalta), vines, such as maile (Alyxia oliviformis) and ʻieʻie (Frycinctia arborea), and sedges (Carex wahiensis, C. meyenii, and Gahnia beechyi). Rare plants in the KTA community are kaulu (Pteralyxia macrocarpa) and ʻoheʻohe (Tetraplasandra gymnocarpa). Rare plants in the KLOA community are nāʻū (Gardenia mannii), heau (Exocarpus gaudichaudii), and ʻalani (Melicope lydgatei).

ʻŌhiʻa lowland mesic forest is an additional community dominated by ʻōhiʻa. Annual rainfall averages about 75 inches (191 centimeters), and though ʻōhiʻa makes up about 70 percent of the canopy layer, many other native plants are included in the community. ʻAhakea (Bohea elatior), halapepe (Plumele halapepe), kōlea (Myrsine spp.), and lama (Diaspyros sandwicensis) are all represented. The rare plant in this community is niiʻoi (Eugenia koolauensis).

Lama forest is the only lowland dry community type in the KTA/KLOA ROI. It is confined to cliffs and harsh ʻaʻa lava flows in the Hawaiian Islands, and threats from pigs and exotic plants are low. KTA has small stands of this community type between 600 and 900 feet (183 and 274 meters). The canopy is dominated by Diaspyros sandwicensis, though other native trees are common. The understory is commonly made of aloheʻe (Canthium odoratum), ʻākia (Wikstroemia spp.), pūkiawe (Styphelia taneameiae), and ʻakoko (Chamaesyce multiflora). Native
vines are maile and huehue (*Cocculus trilobus*). Rare plant species in this community in KTA are nīoi (*Eugenia koolauensis*) and keahi (*Nesoluma polyneicum*).


Drum Road begins at HMR and continues through the Ko’olau Mountains to various sites in the KTA via KLOA. The trail generally follows the western border of KLOA. The vegetation alongside this trail is composed mainly of nonnative species in the lower elevations with the native plants (‘ie’ie, ‘ōhi’a, uluhe, koa) increasing in distribution toward the upper elevations. Rainfall and cloud cover is not uncommon along this trail. There are occasional cleared, flat grassy areas along the trail. These areas have been subjected to grazing pressure from cattle for many years and are either still in use or are maintained as helicopter landing zones.

The Army seeks to preserve and expand the populations of federally listed plants on lands under their management. The pest management and endangered species management programs overlap and reduce the negative impacts of introduced species on the landscape (USARHAW and 25th ID[L] 2001a). Control of noxious weeds is required by the State of Hawai’i Noxious Weed Rules (USDA, no date) and is supported by the AR 200-5 Pest Management (HQDA 1999).

Invasive and noxious weeds that are proposed for control in the KTA/KLOA ROI include *Acacia confusa*, hāmākua pāmakani (*Ageratina riparia*), *Aleurites moluccana*, broomsedge (*Andropogon virginicus*), Oriental vessel fern (*Angiopteris evecta*), shoebutton (*Ardisia elliptica*), pink fringe (*Arthrostema ciliatum*), daisy fleabane (*Erigeron karvinskianus*), Kāhīli ginger (*Hedychium gardnerianum*), heirba del solado (*Melochia umbellata*), fountain grass (*Pennisetum setaceum*), and Chinese violet (*Asystasia gangetica*). Widespread weed species would be controlled where they threaten native plants and communities. Current control methods have focused on palm grass (*Setaria palmifolia*), strawberry guava (*Psidium cattleianum*), princess flower (*Tibouchina urvilleana*), manuka, teatree (*Leptospermum flavescens*), and holly (*Ilex cassine*).

Native plants are directly affected by populations of feral pigs (*Sus scrofa scrofa*), which contribute to numerous ecological problems (Juvik 1998). The effects of these wild pigs include trampled and grazed native plants and advanced erosion and landslides (USARHAW and 25th ID[L] 2001a; PCSU 1999, 2000, 2001). Water collects in the rutted ground, providing a perfect breeding place for mosquitoes, which can carry avian malaria (HINHP 1994). Browsing and otherwise destroying the native vegetation encourages nonnative plants to become established, which can severely alter the habitat for native plants (Atlas 1998).
A possible additional threat to Melicope lydgatei is the nonnative black twig borer (*Xylosandrus compactus*). The pest burrows into branches and introduces a pathogenic fungus that often kills the host.

Introduced snails and slugs pose a threat to rare Hawaiian plants by preying on the seedlings, stems, and fruit, which reduces regeneration of the host. Rats (*Rattus rattus* and *R. exulans hawaiensis*) also are known to eat the fruit of certain species of native plants, seriously affecting the reproduction of *Pritchardia* spp, and plants in the *Campanulaceae* and *Gesneriaceae* families (Atlas 1998).

Habitat in the KTA/KLOA ROI could be disturbed by military training activities, and trampling associated with training activities could affect populations of rare plants (R. M. Towill Corp. 1997b). Nonmilitary impacts on the area include cultivation of illegal plants along the KTA boundary, pig hunting, mountain biking, horseback riding, and motocross use. Schofield-Waikane and Pupukea hiking trails are within the ROI, and hiking activities are monitored to reduce potential human impacts. Cigarette litter, campfires, arson, and vehicle activity are nonmilitary impacts that could affect the area.

Fire threat is high in KTA. Fire has been known to occur in the neighboring KLOA and is a threat to native plants and ecological communities. Areas along the lower boundary of the native plant zones are mostly highly flammable introduced species. Additionally the rugged terrain of the training area limits access for fire suppression and control. The Army has standard operating procedures meant to reduce the threat of fire in these remote areas.

One important component of Army resource management is ITAM and the individual projects that are assigned under that heading (see Chapter 2, Section 2.1.5 for an overview). The ITAM LCTA program has not been fully implemented at KLOA or KTA. KLOA is most often used for aviation training and is at a low priority for general monitoring. Vegetation surveys and erosion studies have been done on KTA. These data provided the LRAM program with priority areas for rehabilitation. KLOA also includes areas that are targeted by LRAM as needing improvement. TRI seeks to find the best most efficient uses of the training lands on KTA and KLOA, while being sensitive to the natural resources. Wildfire management plans are in production for KTA and KLOA.

**Wildlife**

Most of the wildlife inhabiting the landscape that makes up the KTA/KLOA ROI are nonnative. The Army has been conducting regular zoological field surveys on KTA and KLOA that have focused on special status invertebrates, mammals, and birds. There have been no specific reptile or amphibian surveys on KTA due to the absence of native terrestrial reptiles and amphibians on the Hawaiian Islands. Surveys conducted by the University of Hawai'i, Bishop Museum Hawaiian Heritage Program, and the HINHP (1994) are cited in the following section. These natural resource surveys have been used for the resource assessments in the *Biological Inventory and Management Assessment at KTA for USARHAW* (HINHP 1994), *Biological Inventory and Management Assessment at KLOA for USARHAW* (HINHP 1994), *Endangered Species Management Plan Report, O'ahu Training Areas* (R. M. Towill Corp. 1997b), as well as the more recent *O'ahu Training Areas INRMP* (USARHAW and 25th
Zoological information on Drum Road is less extensive because there are few known surveys focused on wildlife in these areas. Information on this section was gathered in association with the environmental assessment for improvements to Drum Road, and a site visit by a Tetra Tech biologist on January 30, 2003. The following sections describe the general presence of species within the invertebrate, mammal, bird, and fish species. Sensitive species are listed in Tables 7-20 and 7-21.

Invertebrates

The following are native snails observed in the ROI: O'ahu tree snails (Achatinella curta, A. dimorpha, A. soveryana, and A. livida), achatinellid land snails (Anuicella perpusilla, A. pulchra, and Tornatellides spp.), and the subulinid land snail (Lamellidea spp.) (R. M. Towill Corp. 1997b). Other native invertebrates known to KTA include springtails (Entomobyra spp. and Seira spp.), flies (Cam6icnemus ornatus, Drosophila suzukii group spp., F. kaneohe, Limonia hawaiiensis, L. jacobae L. perkinsi, L. stygipennis,Orthocladius spp., and Scaptomyza spp.), and three species of true bugs (Hyaloptephus pellucidus, Microvelia vagans, and Nabis keraspheorus) (USARHAW and 25th ID[L] 2001a). Also observed on KTA have been four native species of butterflies and moths (Hyposmocoma spp. undetermined, Mestolobes minuscula, Schrankia spp., and Scotorythra rara), native planthoppers (Trioza spp.), bees, wasps, and ants (Enicosopilus spp.), and an undetermined member of the Enoelidae family. There are three native species of dragonflies and damselflies found on KTA (Anax strenuus, Megalgrion koelense, and Neogonia blackburni). The common stream shrimp (Atyoida bisulcata) and freshwater sponge (Heteromyenia bailleyi) are native aquatic invertebrates that occur on KTA (R. M. Towill Corp. 1997b; USARHAW and 25th ID[L] 2001a). Additional native invertebrate species known to KLOA include the O'ahu tree snails A. livida and A. pulcherima.

Zoological surveys of KTA have detected the following nonnative invertebrates: cannibal snail (Englandina rosea), beetles (Diomus notescens and Orcas australasae), springtail (Salina celebensis), and flies (Allograpta exotica, Atrichopogon jacobsoni, and Letoera spp.). There are also nonnative planthoppers (Heterypsylla mimosea), bees (Diadegma spp.), grasshoppers (Elimaea punctiftera), and the two-spotted leafhopper (Sophonia rufofascia) (R. M. Towill Corp. 1997b; USARHAW and 25th ID[L] 2001a). Flatworms, amphipods, isopods, and thairid snails were found in Paumalā Stream (USARHAW and 25th ID[L] 2001a). Humans have purposely or accidentally introduced these species to O'ahu. They now threaten the native invertebrate species through competition for resources, predation, and the spread of disease. The cannibal snail is especially destructive to the native snail population that it preys on.

Amphibians

There are no native terrestrial amphibians on the Hawaiian Islands.

Nonnative amphibians found on O'ahu and potentially on KTA are the bullfrog (Rana catesbeiana), wrinkled frog (R. rugosa), giant toad (Bufo marinus), coqui frog (Eleutherodactylus coqui), Cuban tree frog (Osteopilus septentrionalis), and green and black dart-poison frogs (Dendrobates auratus). These species were introduced into O'ahu from other countries and have inhabited areas where adequate aquatic habitat and surrounding vegetation exists.
Reptiles

There are no native terrestrial reptiles on the Hawaiian Islands.

Nonnative reptiles found on O‘ahu include the green anole (*Anolis carolinensis*), mourning gecko (*Lepidodactylus lugubris*), stump-toed gecko (*Gephyra multilata*), tree gecko (*Hemiphyllodactylus typus*), Indo-Pacific gecko (*Hemidactylus garnotii*), house gecko (*H. frenatus*), metallic skink (*Lampropholis delicata*), and gold dust day gecko (*Phelsuma laticauda laticauda*). There is only one known terrestrial snake occurring on the Hawaiian Islands, the island blind snake (*Ramphotyphlops braminus*).

Terrestrial Mammals

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) has the potential to occur on KTA (USARHAW and 25th ID[IL] 2001a). It is the only native terrestrial mammal on the Hawaiian Islands.

The following nonnative species may occur on KTA: feral pig (*Sus scrofa scrofa*), Indian mongoose (*Herpestes auropunctatus*), feral dog (*Canis familiaris*), Norway rat (*Rattus norvegicus*), black rats (*R. rattus*), Polynesian rat (*R. exulans hawaiiensis*), and house mouse (*Mus musculus*).

Birds

The following indigenous forest bird species have been recorded on KTA: O‘ahu ‘elepaio (*Chasiempis sandwichensis ibidis*), O‘ahu ‘amakihi (*Loxops virens chloris*), great frigatebird (*Fregata minor palmerstoni*), Pacific golden-plover (*Pluvialis fulva*), and the Hawaiian short-eared owl (*Asio flammeus sandwichensis*).

Nonnative bird species known to occur in KTA include the red-billed leiothrix (*Leiothrix lutea*), white-rumped shama (*Copsychus malabaricus*), Japanese bush warbler (*Cettia diphone*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), common myna (*Acridotheres tristis*), red-vented bulbul (*Pycnonotus sinensis*), and the Japanese white-eye (*Zosterops japonicus*). Introduced species on KTA are nutmeg manikin (*Lonchura punctulata*), red-crested cardinal (*Paroaria coronata*), common waxbill (*Estrilda astrild*), house finch (*Carpodacus mexicanus*), white cockatoo (*Cacatua galerita*), barn owl (*Tyto alba*), ring-necked pheasant (*Phasianus colchicus*), and northern cardinal (*Cardinalis cardinalis*).

Fish

The aquatic natural communities in the **KTA/KLOA ROI** are mostly intermittent streams. Mälaekahana Stream is not intermittent, but it goes underground before reaching the ocean. HINHP conducted biological assessments of selected streams in 1997, and the USGS collects data from stream gages at ʻŌpae ula and Kamananui streams. Fish identified as part of the Anahulu River, Waimea River, and Paukauila Stream survey include endemic gobies (Awaous guamensis, Lentipes concolor, and *Stenogobius hawaiiensis*), Sandwich Island sleeper (*Eleotris sandwichensis*), Hawaiian flagtail (*Kuhlia sandvicensi*) and ‘o’opu nōpili (*Sicyopterus stimpsoni*) (AECOS 2002; USARHAW and 25th ID[IL] 2001a).

One introduced fish, *Geotomus*, was observed at Paumalū Stream (USARHAW and 25th ID[IL] 2001a).
7.10 Biological Resources

Sensitive Species

Potential sensitive species in the KTA/KLOA ROI were identified by USFWS, the State of Hawai‘i DLNR (2002a), USARHAW biologists and surveys, and the HINHP (1994).

A current list of all sensitive vegetation and wildlife and any critical habitat in the region is found in Tables 7-20 and 7-21. An assessment of the likelihood of a species occurring on KTA was made based on the habitat requirements and geographic distribution of the species, existing on-site habitat quality, and the results of biological surveys. Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, can be found in Appendix I-1 (Recovery Plans 1-1a; Plants: I-1b; Wildlife I-2c; Critical Habitat I-1d).

Sensitive Plant Species in the KTA/KLOA ROI


Although the native vegetation on O‘ahu’s central plateau has been almost completely replaced by agriculture, the KTA/KLOA ROI hosts a very important cache of endangered species and natural communities. The terrain is characterized by deep gulches and high cliffs covered with dense vegetation. Sensitive plants and their likelihood of occurrence in the KTA/KLOA ROI are shown in Table 7-20; documented occurrences of sensitive plant species in the KTA/KLOA ROI are shown in Figure 7-22.

Sensitive Wildlife Species

The following discussion includes a profile of only those sensitive wildlife species that are considered likely to be found in the project area. This information is based heavily on information from the O‘ahu INRMP (USARHAW and 25th ID[LJ] 2001a), ESMPR (R.M. Towill Corp. 1997b), and the biological inventories of KTA and KLOA (HINHP 1994). HINHP biologists and qualified individuals conducted surveys of KTA in 1993 and 1994. Shallenberger conducted special status species surveys of O‘ahu training areas, including KTA, in 1977. The latest USFWS and survey information on species and habitat in the SBCT ROI has been incorporated into this evaluation of biological resources. Sensitive terrestrial wildlife and their likelihood of occurrence at the KTA/KLOA ROI are listed in Table 7-21. Figure 7-23 shows the locations of documented sensitive terrestrial wildlife identified in the KTA/KLOA ROI. Sensitive species outlined in the table below are most likely to occur in the higher elevations in the Ko‘olau Mountains and are unlikely to occur in the disturbed lowland areas that make up a large portion of the ROI.
### Table 7-20

**Sensitive Plant Species Occurring or Potentially Occurring in the KTA and KLOA ROI**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/Common Name</th>
<th>Federal Status</th>
<th>State/Global Status</th>
<th>Habitat</th>
<th>Date Last Observed or Confirmed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamaesyce rockii</td>
<td>'akoko, koko, kōkōmāle</td>
<td>E</td>
<td>-/G1</td>
<td>Cloud-swept summit and deep wet gulches</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Cyanea acuminata</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>E</td>
<td>-/G1</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. crispa</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>E</td>
<td>-/G1</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. humboldtiana</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>E</td>
<td>-/ -</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. koolauensis</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. lanceolata</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>C</td>
<td>-/G1</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. st.-johnii</td>
<td>'ōhā, hāhā, 'ōhāwai</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Cloud-swept ridges</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Cyrtandra dentata</td>
<td>ha'iwale</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Moist forest slopes</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>C. viridi flora</td>
<td>NCN</td>
<td>E</td>
<td>-/ -</td>
<td>Windy wet ridge tops</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Delissea subcordata</td>
<td>NCN</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Moist to wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Donaha lyoni</td>
<td>NCN</td>
<td>SOC</td>
<td>-/G1</td>
<td>Moist to wet forest floors, streambanks</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>Eugenia koolauensis</td>
<td>nioi</td>
<td>E</td>
<td>-/G1</td>
<td>Dry gulches and slopes</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td>Exocarpus gaudichaudii</td>
<td>heau/whiskbroom sandalwood</td>
<td>SOC</td>
<td>-/G1</td>
<td>Moist ridges and shrublands, wet forests, usually associated with 'ōhā</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Gardenia mangii</td>
<td>nānū, na'ū</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Moist to wet forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Hedyotis fluitatii</td>
<td>NCN</td>
<td>C</td>
<td>-/G1</td>
<td>Moist to wet forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Hesperomamia arborosens</td>
<td>NCN</td>
<td>E, CH</td>
<td>-/ -</td>
<td>Moist to wet forest slopes and ridges</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Hilaria kokio ssp. kokio</td>
<td>Kokio ula</td>
<td>SOC</td>
<td>-/ -</td>
<td>Dry to wet forest</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>Ixertilago ascendens ssp. ascendens</td>
<td>ohe</td>
<td>C</td>
<td>-/G5</td>
<td>Wet forest and intermittent streams</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>Labelia gaudichaudii ssp. koolauensis</td>
<td>NCN</td>
<td>E</td>
<td>-/G4</td>
<td>Cloudswept wet forest</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>L. hypoleuca</td>
<td>NCN</td>
<td>SOC</td>
<td>-/G3</td>
<td>Moist to wet forest</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>Melicope biakae</td>
<td>NCN</td>
<td>C</td>
<td>-/ -</td>
<td>Native-dominated moist forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>M. lydgatei</td>
<td>NCN</td>
<td>E</td>
<td>-/G1</td>
<td>Native-dominated moist forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Myrsine fosbergii</td>
<td>NCN</td>
<td>C</td>
<td>-/G2</td>
<td>High elevation Ko'olau forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>M. juddii</td>
<td>Kolea</td>
<td>E</td>
<td>-/G1</td>
<td>Cloudswept wet forest</td>
<td>2004</td>
<td>C</td>
</tr>
<tr>
<td>Nesoluma polynesicum</td>
<td>keahi</td>
<td>SOC</td>
<td>-/G2</td>
<td>Native-dominated moist forest</td>
<td>2000</td>
<td>C</td>
</tr>
</tbody>
</table>
## Table 7-20
### Sensitive Plant Species Occurring or Potentially Occurring in the KTA and KLOA ROI (continued)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/Common Name</th>
<th>Federal Status¹</th>
<th>State²/Global Status³</th>
<th>Habitat</th>
<th>Date Last Observed or Confirmed⁴</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phlegmariurus nutans (Lycopodium nutans)</td>
<td>wāwae'iole/</td>
<td>E, CH</td>
<td>-/-</td>
<td>Wet forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Phyllostegia hirsuta</td>
<td>NCN</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Steep, shaded, moist to wet slopes</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Platystegma ornata var. cornuta</td>
<td>pilo kea/-</td>
<td>C</td>
<td>-/G2</td>
<td>Moist forests</td>
<td>2001</td>
<td>C</td>
</tr>
<tr>
<td>Psychotria hexandra ssp. oahuensis</td>
<td>NCN</td>
<td>C</td>
<td>-/G4</td>
<td>Moist to wet forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Pteris lidigatei</td>
<td>NCN</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Steep banks in wet forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Pteralyxia macrocarpa</td>
<td>kaulu</td>
<td>C</td>
<td>-/G1</td>
<td>Native-dominated moist forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Sanicula purpurea</td>
<td>NCN</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Mossy slopes and open bogs</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Stenogyne kaakae spp. herfii</td>
<td>NCN</td>
<td>SOC</td>
<td>-/-</td>
<td>Mesic forest</td>
<td>2000</td>
<td>U</td>
</tr>
<tr>
<td>Tetraplasandra gymnocarpa</td>
<td>'ohe'ohe/-</td>
<td>E</td>
<td>-/G1</td>
<td>Summit forests</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Thelypteris boydii</td>
<td>NCN</td>
<td>C</td>
<td>-/G1</td>
<td>Moist forest slopes</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>V. oahuensis</td>
<td>olopu</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Cloud-swept summits</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td>Zanthoxylum oahuense</td>
<td>a6</td>
<td>C</td>
<td>-/G2</td>
<td>Mesic forest</td>
<td>2000</td>
<td>C</td>
</tr>
</tbody>
</table>

Sources: USFWS 2002a; USARHAW and 25th ID(L) 2001a and b

Notes:
NCN = No common name

Status:

¹Federal:
E = Endangered
SOC = Species of concern
C = Candidate species for listing
CH = Critical habitat designated or proposed for designation

²State
-/- = No Status

³Heritage Global Rank:
G1 = Species critically imperiled globally (typically 1-5 current occurrences)
G2 = Species imperiled globally (typically 6-10 current occurrences)
-/-/ = No Status

⁴Date last observed and recorded in one of the above references, or confirmed by USFWS in comment letter dated Jan 5, 2003 and provided to the preparers in Jan 2004.

Likelihood of occurrence on the project site
C = Confirmed
P = Potentially may occur
U = Unlikely
Table 7-21
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring on KTA/KLOA ROI

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/ Common Name</th>
<th>Federal Status¹</th>
<th>State²/Global Status³</th>
<th>Habitat</th>
<th>Date last observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Invertebrates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Achatinella aperplexa</em></td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>2001</td>
<td>C</td>
</tr>
<tr>
<td>A. byronii decipiens</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>2001</td>
<td>C</td>
</tr>
<tr>
<td>A. curta</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>1986</td>
<td>C</td>
</tr>
<tr>
<td>A. bīla</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>2001</td>
<td>C</td>
</tr>
<tr>
<td>A. livida</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/GH</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>2001</td>
<td>C</td>
</tr>
<tr>
<td>A. pulcherima</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>1974</td>
<td>P</td>
</tr>
<tr>
<td>A. sowerbyana</td>
<td>pūpū kuahiwi, pūpū kanioe, kāhūli/O‘ahu tree snail</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs above 1,000 feet (305 meters)</td>
<td>2000</td>
<td>P</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Asio flammeus sandwichensis</em></td>
<td>pueo/Hawaiian short-eared owl</td>
<td>SOC+</td>
<td>E*/G5T3</td>
<td>Pastures, grasslands, dry and wet forests that are dominated by either native or nonnative vegetation. Sea level to 7,900</td>
<td>1985</td>
<td>C</td>
</tr>
<tr>
<td><em>Chasiempis sandwichensis</em></td>
<td>O‘ahu ‘elepaio/-</td>
<td>E, CH</td>
<td>E/G4T1</td>
<td>Native Hawaiian forest</td>
<td>1977</td>
<td>P</td>
</tr>
<tr>
<td><em>Himatione sanguinea</em></td>
<td>‘apapane/-</td>
<td>+</td>
<td>-/G4</td>
<td>Hardwood forest, primarily native ‘ō‘hia and ‘ō‘hia-koa and mixed native-exotic forest at high elevations.</td>
<td>1993</td>
<td>C</td>
</tr>
<tr>
<td><em>Panoromys maculata</em></td>
<td>ʻalaauhi/O‘ahu creeper</td>
<td>E</td>
<td>E/G1</td>
<td>Native Hawaiian shrublands, forests, and bogs</td>
<td>1985</td>
<td>C</td>
</tr>
<tr>
<td><em>Vestiaria coccinea</em></td>
<td>‘i‘wi/Hawaiian honeycreeper</td>
<td>E</td>
<td>E*/G4</td>
<td>Native forests, especially ‘o‘hia forest</td>
<td>2000</td>
<td>C</td>
</tr>
</tbody>
</table>
### Table 7-21

**Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring on KTA/KLOA ROI (continued)**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/ Common Name</th>
<th>Federal^1 Status</th>
<th>State^2/Global^3 Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lasiurus cinereus</em> senatus</td>
<td>Hawaiian hoary bat</td>
<td>E</td>
<td>E/GST2</td>
<td>Bare rock, cliff, hardwood forest, grassland/herbaceous, hardwood woodland, and riparian habitats</td>
<td>1976</td>
<td>P</td>
</tr>
<tr>
<td><em>Lentipes concolor</em></td>
<td>‘o’opu ‘alamo’o</td>
<td>-</td>
<td>-/G3</td>
<td>Freshwater, brackish, and marine habitats, depending on life stage</td>
<td>2000?</td>
<td>C</td>
</tr>
</tbody>
</table>

**Sources:** USARHAW and 25th ID(L) 2001a; HDLNR 2002a; HINHP 1994; R. M. Towill Corp. 1997; NatureServe 2001; Virginia Tech 1998

**Notes:**
- NCN = No common name
- ^1The state endangered listing refers only to the populations on O‘ahu, Lana‘i, and Moloka‘i
- Status: /-/- = No Status

**^1Federal:**
- E = Endangered
- SOC = Species of concern
- CH = Critical habitat designated or proposed for designation
- + = Birds of Conservation Concern

**^2State**
- E = Listed as endangered

**^3Heritage Global Rank:**
- G1 = Species critically imperiled globally (typically 1-5 current occurrences)
- G3 = Species rare with restricted range (typically 21-100 current occurrences)
- G4 = Species apparently globally secure
- G5 = Species demonstrably globally secure
- GH = Species known only from historical occurrences
- T1 = Subspecies critically imperiled globally (typically 1-5 current occurrences)
- T2 = Subspecies imperiled globally (typically 6-10 occurrences)

**Likelihood of occurrence on the project site**
- C = Confirmed
- P = Potentially may occur
- U = Unlikely to occur
Forty one sensitive plant species have been recorded within the Kahuku/Kawailoa Training Areas Region of Influence.

**Legend**
- Drum Road
- Installation Boundaries
- Region of Influence
- Roads

**Source:** HINHP 2002, CEMML 2002

**Sensitive Plant Species in the Kahuku/Kawailoa Training Areas Biological Region of Influence**

O‘ahu, Hawai‘i

Figure 7-22
Figure 7.23
Sensitive Wildlife Species in the Kahuku/Kawailoa Training Areas Biological Region of Influence
Nine federally listed endangered species and five species globally or locally threatened have been recorded in KTA or its vicinity (R.M. Towill Corp. 1997b). These species are listed on Table 7-21 and are described further below. This includes eight invertebrates, five birds, and an endangered terrestrial mammal (USARHAW and 25th ID[L] 2001a).

**Sensitive Habitats**

**Critical Habitat**
There are 681 acres of designated plant critical habitat within the KTA/KLOA ROI but there is no designated critical habitat on the Army installations. The plants for which critical habitat has been designated on KTA are listed in Appendix I-1d and are shown in Figure 7-24. There are 4,812 acres of critical habitat for the 'elepaio in the KTA/KLOA ROI (see Figure 7-25).

**Ecologically Sensitive Areas**
There are two areas on KTA that have been determined by elevation, topography, and prevailing ecological conditions to be ecologically sensitive. They contain vegetation communities that are considered rare or threatened.

The wet summit crest zone is considered sensitive and exists in areas above 1,640 feet (500 meters), along the northern Koʻolau summit. The relatively gentle ridges are cut by steep-sided gulches in this cool, wet cloud-swept region. The vegetation community in this part of the ROI is almost exclusively ʻōhiʻa lowland wet shrubland; this community is not considered rare and has a Global Heritage ranking of G3. Loulu hiwa lowland wet forest had been labeled a rare natural community (Global Heritage ranking of G1) and occurs in one steep-sided drainage area within the ROI. An additional rare natural community known in this area is ʻōhiʻa mixed montane bog, which has a Global Heritage ranking of G1.

The second sensitive area is the lowland forest zone. It exists from ridge tops to gulch bottoms at elevations of 590 to 2,200 feet (180 to 671 meters). This area is generally less windy, with conditions being warmer, and moisture ranging from moist to wet as rainfall diminishes increasingly with distance from the summit. ʻŌhiʻa lowland wet forests are present in higher elevations, with gradation to koa/ʻōhiʻa lowland moist forest. Adjacent areas are generally a mosaic of moist forest types, with somewhat diverse canopy constituents, though they are generally dominated by ʻōhiʻa. The drier zones are moist to dry shrublands dominated by *Dodonea viscosa* (ʻaʻaliʻi). The steeper slopes at this elevation are dominated by uluhe (*Dicranopteris*) lowland wet shrubland. These natural communities represent relatively widespread vegetation types that occur on most of the main islands; none are considered rare (Global Heritage rankings of G3 and G4).

There is one aquatic natural community (Mālaekahana Stream) on KTA with a vegetation community rank of G4.
Figure 7-24
Federally Designated Plant Critical Habitat in the Kahuku/Kawailoa Training Areas Biological Region of Influence
Figure 7-25
Federally Designated Critical Habitat for the O'ahu 'Elepaio at the Kahuku/Kawainoa Training Areas
Biological Region of Influence
Biologically Significant Areas

The Hawai‘i Natural Heritage Program has defined three types of BSAs for managing important natural communities. All are found in the KTA/KLOA ROI and are shown in Figure 7-26.

BSA1: Contains a high density of federally listed endangered, proposed endangered, or candidate species.

Approximately 1,000 acres (405 hectares) of the KTA/KLOA ROI in KLOA are designated as BSA1. This includes much of the wet summit crest ecological zone and the two rare natural communities. Twenty-six of the 28 endangered plant species at KLOA are in this area.

BSA2 contains all or some of the following: lower densities of current occurrences of federally listed endangered or proposed endangered species, current occurrences of candidate species or other species of concern that are expected to be upgraded to federal protected status within the next few years, and areas judged likely to contain high densities of federally listed species based on habitat assessment, despite the lack of any record of such occurrence to date.

There are five BSA2 areas in KTA, three of which are in the northern portion of the training area and contain populations of Eugenia koolauensis. At the southern tip of KTA is a BSA2 that includes in its vegetative community populations of the federally listed as endangered Gardenia mannii, Cyanea koolauensis, and Hesperomannia arborescens. In the northwest of KTA is an additional BSA2 that harbors the endangered tree Tetraplasandra gymnocarpa, as well as Gardenia mannii. An additional BSA2 zone within the ROI is composed mostly of potential habitat for the endangered land snail, Achatinella. This area covers all the remaining wet summit crest zone that was not included in BSA1. These endangered plant species are known to occur in this region: Eugenia koolauensis, Cyanea longiflora, Delissea subordata, Gardenia mannii, Phlegmariurus nutans, Melicope hydgatei, Myrsine juddii, Phylllostegia hirsute, and Viola oahuensis.

BSA3 is stands of intact native vegetation with few or no known occurrences of rare elements.

KTA’s BSA3 area is large and continuous and adjoins all but one of the BSA2 areas. The dominant vegetation types are ‘ōhi‘a lowland wet forest and uluhe lowland wet shrubland, which are potential habitats for endangered tree snails and native forest birds. As of 1997, seven plants in the BSA3 region were upgraded to federal status, and it is possible that boundary areas have been revised. Although there are no rare communities in the BSA3, the forests in these locations are native dominated and provide potential habitat for species reintroduction.
There are 22,940 acres of Biological Sensitive Areas and 19,435 acres of sensitive snail habitat within the Kahuku/Kawailoa Training Areas Region of Influence.

Biologically Significant Areas in the Kahuku/Kawailoa Training Areas Biological Region of Influence

O'ahu, Hawai'i

Figure 7-26
Also found within the ROI is sensitive snail habitat. Although this habitat has not been federally designated or proposed as critical habitat, it has been identified as containing the habitat requirements necessary for supporting the federally listed and snail species of concern on O’ahu. This area is shown with the BSAs in Figure 7-26.

7.10.2 Environmental Consequences

In response to the agency and public comments received during the Draft EIS comment period we reevaluated our analysis of the biological resources. As a result of considering these comments and a reanalysis of the available information, we recognize that the impact on biological resources from fire could not be mitigated to the less than significant level. However, these impacts will be substantially reduced as a result of mitigation.

Summary of Impacts

Biological resources that have been considered include vegetation communities, wildlife, sensitive species, and sensitive habitats. Significant impacts include impacts from fire on sensitive species and habitat at KTA but these impacts are mitigable at KLOA. Construction of facilities and training activities including the use of the Drum Road and the impacts from nonnative species will have a significant but mitigable to less than significant impact on sensitive species and sensitive in the ROI. Less than significant impacts are expected on general habitat and wildlife from construction and training, on migratory birds from construction of FTI antennas and UAV use, and on wildlife from noise and visual impacts of project activities.

All biological resources have been assessed for potential impacts from project activities. For a full description of the impact methodology used to determine impact to a resource please refer to Section 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of impacts is provided in Table 7-22.

Proposed Action (Preferred Alternative)

Significant Impacts

Impact 1: Impacts from fire on sensitive species and sensitive habitat. SBCT activities within the KTA/KLOA ROI would increase the likelihood of wildland fire. This impact would be significant at KTA and significant and mitigable to less than significant at KLOA. At KTA, training would include use of certain pyrotechnics and SRTA ammunition, which is technically classified as live-fire ammunition and carries an increased threat of fire. There is less of a potential for fire at KLOA as training is limited to nonlive fire and consists mostly of dismounted maneuvers. There are direct and indirect ways in which fires would adversely affect sensitive species and habitat.

Sources of fire include cigarettes, vehicles, pyrotechnics, and nonlive fire training. Cigarettes discarded during mounted and dismounted training would be a risk with the increase in Soldiers and training at KTA and KLOA. Use of the roads by military vehicles would increase with the proposed renovation and construction. An increase in the traffic flow from Drum Road would increase the potential for fire that could affect sensitive species.
Specifically, the proposed Drum Road alignment traverses lowland wet and lowland moist forests and shrublands in KTA. Lastly, the increase in intensity in training, including the proposed SRTA live-fire training at KTA, would increase the probability that fire could originate in the ROI. The increased likelihood of wildfires and the potential SBCT risk factors are discussed in more detail in Section 7.12.2.

### Table 7-22
Summary of Potential Biological Impacts at KTA/KLOA

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts from fire on sensitive species and sensitive habitat</td>
<td>☒/☒</td>
<td>☒/☒</td>
<td>☒/☒</td>
</tr>
<tr>
<td>Impacts from construction and training activities on sensitive species and sensitive habitat.</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Impacts from the spread of nonnative species on sensitive species and sensitive habitat.</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Impacts from construction and training on general vegetation, wildlife, and habitat.</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Threat to migratory birds</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Noise and visual impacts</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Runoff impacts on marine wildlife and coral ecosystems.</td>
<td>☒</td>
<td>☒</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**LEGEND:**

- ☒ = Significant
- ☒ = Significant but mitigable to less than significant
- ☒ = Less than significant
- ☒ = No impact
- + = Beneficial impact
- N/A = Not applicable

Because natural sources of fire ignition are relatively rare in Hawai‘i, many native Hawaiian plants are not adapted to fire and are adversely affected by it. Nonnative species, particularly nonnative grasses and shrubs, typically invade areas after they have burned. This inhibits the regeneration of native plants. The removal of native species and the spread of nonnative species are potential impacts associated with wildland fires and is discussed under Impact 3. In general, most fires in Hawai‘i are caused by humans and are fueled primarily by nonindigenous grasses. If native species withstand an initial fire, they are often destroyed by later fires influenced by the invasion of highly flammable grasses. The potential spread of nonnative species resulting from wildfires is considered a significant impact because nonnative species often out-compete native species and destroy native communities. Wildfires that burn into native communities or sensitive habitats could take listed animal species and destroy listed plant species and sensitive habitats. There is no assurance that fires or other threats associated with the Proposed Action would not reach or otherwise threaten populations of listed species on KTA.
Vegetation communities within the ROI include the following:

- Nonnative vegetation communities (approximately 7,534 acres [3,049 hectares]);
- Lowland mesic forest and shrubland (approximately 379 acres [153 hectares]); and
- Lowland wet forest and shrubland (approximately 1,496 acres [605 hectares]).

The rare plants found in these communities are *Chamaesyce rockii*, *Cyanea acuminate*, *C. crispa*, *C. humboldtiana*, *C. koolauensis*, *C. lanceolata*, *C. st.-johnii*, *Cyrtandra dentata*, *C. viridiflora*, *Doodia hyoni*, *Eugenia koolauensis*, *Exocarpus gaudichaudii*, *Gardenia mannii*, *Hedyotis fluviatilis*, *Heusermannia arborescens*, *Hibiscus kokio* ssp. *kokio*, *Jainvillea ascendens* ssp. *ascendens*, *Labelia gaudichaudii* ssp. *koolauensis*, *L. hypoleuca*, *Melicope hiakae*, *M. hydgatei*, *Mrysinie fishegii*, *M. juddii*, *Nesoluma polynesicum*, *Phlegmarious nutans*, *Phyllotegia hirsuta*, *Platydesma cornutum var. cornutum*, *Psychotria hexandra* ssp. *oahensis*, *Pteralyxia macrocarpa*, *Pteris lidgatei*, *Sanicula purpurea*, *Stenogyne kaaka* ssp. *sherfii*, *Tertaplasandra gymnocarpa*, *Thekptos boydii*, *Viola oahensis*, and *Zanthoxylum oahensis*. These are areas of highly flammable nonnative plants (such as *Andropogon virginicus*) along the lower boundaries of areas dominated by native plants (R. M. Towill Corp. 1997b, 6-27; USARHAW and 25th ID[IL] 2001a, 290). BSAs that occur within the ROI and that could be affected by a wildfire are BSA2, at 214 acres (87 hectares), and BSA3, at 2,747 acres (1,112 hectares). The rugged terrain can limit the suppression and control of fires, and they can easily spread unchecked into areas that contain sensitive species.

Fires started as a result of any of these SBCT-proposed actions could adversely affect sensitive wildlife by killing them directly or indirectly by destroying their habitat. The sensitive wildlife species listed in Table 7-22 as potential or confirmed in the ROI could be affected by a wildfire, depending on its extent and duration.

In conclusion, sensitive species and habitat occurring within the ROI would be significantly affected by the likely increase in fires that would result from the Proposed Action. Although most sensitive species and sensitive habitats found on KTA and KLOA occur at high elevations, where fire vulnerability is relatively low because of higher levels of rainfall and less fire-prone vegetation, these areas are still considered at risk from fire. The outbreak of fire in portions of the ROI where sensitive species and habitat exist would be a significant impact that would be substantially lessened by regulatory and administrative mitigation, but would still be considered significant.

**Regulatory and Administrative Mitigation** 1. The effects of the Proposed Action on listed species in the ROI have been evaluated in the ESA Section 7 Consultation with USFWS. The Army will implement all the terms and conditions defined in the Biological Opinions issued by USFWS for current force and SBCT Proposed Actions on O‘ahu and Hawai‘i. The terms and conditions that implement the reasonable and prudent measures determined during this consultation will be incorporated into the Proposed Action. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the Proposed Action. The Biological Opinions are available upon request.
The IWFMP for Pōhakoloa and O‘ahu Training Areas was updated in October 2003. The Army will fully implement this plan for all existing and new training areas to reduce the impacts from wildland fires. The plan is available upon request.

Additional Mitigation 1. No additional mitigation has been identified for this impact.

**Significant but Mitigable to Less than Significant Impacts**

**Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat.** Loss and degradation of sensitive species and sensitive habitat would result from project activities and construction in the KTA/KLOA ROI, specifically in the KTA portion. The use of Drum Road as part of SBCT actions would adversely affect the environment by increasing the amount and intensity of traffic in the KTA/KLOA ROI. Though much of the area surrounding Drum Road is already dominated by nonnative plants, the roads bring humans closer to biologically sensitive areas that exist in the ROI (Section 7.10.1, Figure 7-26). Sections of Drum Road cross biologically sensitive areas, with stands of intact native vegetation. Part of the reason that these communities still exist is due to their remoteness. Opening this area up to the more direct effects of humans threatens these communities and their diversity. Hawaiian plant communities evolved without the environmental pressures that are prevalent on major land masses and thus have no defense mechanisms to cope with these stresses. By fragmenting these sensitive communities, corridors for natural species dispersal are interrupted, nonnative plants are encouraged to spread, and the potential for native species to be reintroduced to areas dominated by nonnative species is limited. Troop and other foot traffic in or adjacent to native forest areas could harm rare natural communities, plants, and snails (R. M. Towill Corp. 1997b). Dozens of federally listed and sensitive species are known to occur or have the potential to occur within the KTA/KLOA ROI (Figures 7-22 and 7-23). This includes thirty-six plants, O‘ahu creeper, Hawaiian hoary bat, and O‘ahu tree snails (Tables 7-20 and 7-21). There is also plant critical habitat and ‘elepaio critical habitat within the KTA/KLOA ROI (Figures 7-24 and 7-25), which could be negatively affected by training. *Tetraplasandra gymnocarpa*, a federally listed plant species was identified approximately 492 feet (150 meters) down a slope from Drum Road. This individual is unlikely to be affected directly by use of Drum Road but would be threatened by trampling if people were allowed to move off the proposed road or if a fire started as a result of vehicle use or a discarded cigarette. Because the slope is very steep, the likelihood of dismounted maneuver occurring along this portion of Drum Road is extremely small.

Increased use of Drum Road would result in direct and indirect impacts to sensitive species and habitat. The present trail is a rutted dirt road that sees little activity. The use of an upgraded Drum Road would fragment habitat for general and sensitive wildlife, ultimately reducing the quantity and quality of habitable lands. The presence of large loud vehicles would limit wildlife migration and would interrupt corridors for natural dispersal of species among these areas. Dust, soil erosion, and runoff would continue to adversely affect the areas that surround the road, including valuable freshwater resources. The loss in habitat value occurs primarily in those areas surrounding the trail, which are exposed to increased noise, car fumes, general activity, and invasive species, and areas downstream that are subject to runoff and erosion problems.
Dismounted and mounted training would occur on approximately 621 acres, (251 hectares) in multiple areas at KTA. Mounted training would occur and would almost double the present vehicular usage (7,211 MIMS currently, 13,772 MIMS predicted). Mounted maneuver proposed in portions of northern KTA (Figure 2-5) would destroy vegetation, possibly federally listed plants and would disturb wildlife, including federally and state listed species. The increased dismounted training proposed for KTA and along Drum Road would result in trampling and habitat degradation in sensitive areas. Dismounted training would involve a greater area at KLOA, expanding the present 0 acres to 5,064 (2,049 hectares) as part of the Proposed Action. Impacts would be significant and mitigable to less than significant by following mitigation procedures:

Regulatory and Administrative Mitigation 2. The Army will implement all the terms and conditions defined in the Biological Opinions issued by USFWS for current force and SBCT Proposed Actions on O'ahu and Hawai'i. The terms and conditions that implement the reasonable and prudent measures determined during this consultation will be incorporated into the Proposed Action and will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the Proposed Action. The Biological Opinions are available upon request.

The Army will implement land management practices and procedures described in the ITAM annual work plan to reduce erosion impacts (US Army Hawai'i 2001a). Currently these measures include implementing a TRI program; implementing an ITAM program; implementing an SRA program; developing and enforcing range regulations; implementing an Erosion and Sediment Control Management Plan; coordinating with other participants in the KMWP; and continuing to implement land rehabilitation projects, as needed, within the LRAM program. Examples of current LRAM activities at KTA include revegetation projects involving site preparation, liming, fertilization, seeding or hydroseeding, trees planting, irrigation, and mulching; a CTP; coordination through the TCCC on road maintenance projects; and development of mapping and GIS tools for identifying and tracking progress of mitigation measures.

Regulatory and Administrative Mitigation measures identified as part of Chapter 7, Section 7.8, Water Resources, and Section 7.9, Geology, will also lessen this impact on sensitive species and habitat.

Impact 3: Impacts from the spread of nonnative species on sensitive species and sensitive habitat. In general, both plant and animal nonnative species pose a threat to Hawaiian native ecosystems. The proposed actions on KTA could affect the introduction and spread of nonnative species in the following ways:

- Troops and equipment moving into Hawai'i from other countries, states, or islands and between subinstallations within Hawai'i increase the likelihood of nonnative plant/animal introductions.
- Construction could introduce nonnative species and other weeds through the use of sand and gravel that potentially contains nonnative plant seeds.
The use of Drum Road would introduce more invasive species to the area, which would have both a short-term and long-term impact on sensitive plants and wildlife.

A long-term increase in the use of Drum Road is associated with the Proposed Action. This includes increasing Stryker and conventional truck traffic (trucks and HMMWVs) on the proposed road. There would be 275 vehicles, 114 of which would be Strykers, that would travel on either trails or roads, from SBMR to KTA 12 times per year. Most of the travel would be on trails, but Drum Road would carry ten percent of all Stryker travel and 40 percent of all trucks between these two bases. There would be a net increase of 195 vehicles traveling on roads and trails between SBMR and KTA, four times per year, and 235 vehicles eight times per year. Transformation-related increases in the number of vehicles that would traverse Drum Road increase the likelihood that nonnative plants would be introduced or spread. The Proposed Action would increase the likelihood of a fire in the ROI, as discussed in Impact 1. Nonnative species often benefit from fires, due to their ability to colonize areas following a burn. Also the presence of nonnative species often provides fuel for wildfires, makes fires larger, and facilitates its spread. Nonnative plants pose a tremendous threat to sensitive plants and native vegetation communities.

Although most of the plant species in and around the proposed Drum Road are nonnative, the area could be further disturbed than it already is and would adversely affect the recovery of sensitive species. Sensitive plant species and sensitive wildlife species are likely to occur within the KTA/KLOA ROI.

Satinleaf (Chrysophyllum oliviforme), manuka, and melochia (Melochia umbellata) are nonnative plants that have not yet established within the KTA/KLOA ROI. The habitat degradation associated with the construction projects could lead to these very aggressive species becoming established throughout the project area. They can spread rapidly in a disturbed habitat, which could alter the original habitat and its associated ecosystem, adversely affecting native wildlife. Altering vegetative type and cover can devastate species that have evolved alongside another specialized species or cover type. Changes in vegetation can also adversely affect wildlife at sensitive times of their lifecycles by altering elements that they depend on, such as shelter.

When it arrives in Hawai‘i, all Army cargo is thoroughly checked for nonnative species, such as the brown tree snake. It is unlikely that use of Drum Road and the vehicle tactical wash would introduce nonnative vertebrate animal species into the area. Discrete quantities of sensitive native plant species that are especially threatened by nonnative species’ invasion include the following:

- Ninety-five percent of the remaining nioi (Eugenia koolauensis) plants exist within the KTA/KLOA ROI. There is a high threat to these plants from nonnative species invasions associated with the proposed activities.
- Twelve individuals of the native gardenia nānū (Gardenia mannii) exist in the KTA/KLOA ROI. There is a moderate threat to these plants from nonnative species invasions associated with the proposed activities.
Two to five percent of the remaining ‘ōhe’ōhe plants (*Tetrapalasandra gymnopcarpa*) exist in the KTA/KLOA ROI. There is a low to moderate threat to these plants from nonnative species invasions associated with the proposed activities.

There are several sensitive wildlife species occurring within that ROI that could be affected by the spread of nonnative species: *Achatinella curta*, *A. livida*, *A. pulcherrima*, *A. sowerbyana*, *Auricula pulchra*, O‘ahu ‘elepaio, and the ‘i‘iwi (Figure 7-23). These species would be adversely affected by the introduction or increase in the spread of nonnative species within the KTA/KLOA ROI.

**Regulatory and Administrative Mitigation 3.** As required in the terms and conditions of the Biological Opinions, the Army will implement the following:

- Educate soldiers and others potentially using the facilities and roads in the importance of cleaning vehicles, equipment, and field gear;
- Educate contractors and their employees about the need to wear weed-free clothes and to maintain weed-free vehicles when coming onto the construction site and to avoid introducing nonnative species to the project site;
- Prepare a one-page insert to construction contract bids informing potential bidders of the requirement; and
- Inspect and wash all military vehicles at wash rack facilities prior to leaving SBMR, KTA, or PTA to minimize the spread of weeds, such as fountain grass, and animal (invertebrate) relocations.

USARHAW will follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines federal agency duties to prevent and compensate for invasive species impacts. USARHAW will agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. Implementing an Environmental Management System will further improve the identification and reduction of environmental risks inherent in mission activities.

In accordance with its regulations and requirements, the USDA will inspect and certify cargo originating outside of Hawai‘i to ensure it is not carrying the brown tree snake or other reptiles before the cargo is transported to training ranges.

**Additional Mitigation 3:** The Army proposes to use native plants in any new landscaping or planting efforts where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.

**Less than Significant Impacts**

*Impacts from construction and training activities on general habitat and wildlife.* The Proposed Action is expected to have a less than significant impact on general habitat and wildlife at KTA and
KLOA. The slopes at KTA and KLOA are steep and training activities are generally limited by the topography to dismounted maneuvers and vehicle travel on established roads. Vegetative regrowth in the ROI is fairly rapid. The majority of the training area is nonnative vegetation and common native plants, primarily grasses and shrubs, which typically colonize denuded areas quickly and thoroughly. The proposed CACTF would be constructed at KTA in previously disturbed areas containing primarily nonnative vegetation, and approximately 187 acres (76 hectares) of vegetation would be removed.

Approximately 621 acres (251 hectares) on KTA would be used for off-road maneuvers under the Proposed Action. Off-road vehicle maneuvers would be allowed in areas of less than 30 percent slope and would be expected to result in adverse impacts on biological resources.

Operation of the ranges would likely displace various wildlife species, such as birds and mammals by displaying an increased human presence in the area and by elevating noise levels. Animal species in the project areas would be expected to vacate during construction, off-road maneuver activities, and in areas immediately adjacent to the ranges while the ranges are in use. The most likely species to be affected by these activities are ground-nesting birds or small mammals.

The UAV would be flown over portions of KTA/KLOA already allowing aircraft and would follow AR 95-1, Aviation Flight Regulations, which restrict elevation of UAVs about Noise Sensitive Areas to minimum of 2,000 feet, unless mission essential. This would limit the effect of UAVs on sensitive biological resources during normal operation. Due to the nature of the UAV, accidents would be possible and could cause wildfires. The impact of potential wildfires within the ROI is discussed above as Impact 1.

Regulatory and Administrative Mitigation: Programs to benefit sensitive species and habitats listed under mitigation for Impact 2, including the actions outlined in the BO, would enhance general vegetation and wildlife communities as well. Regulatory and administrative mitigation measures identified in Section 7.8, Water Resources, and Section 7.9, Geology, would lessen this impact on general vegetation, wildlife, and habitat.

Threat to migratory birds. The presence of the FTI antennas could significantly affect migratory bird species known to occur in the KTA/KLOA ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai‘i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000). Less than significant impacts are expected because monopole antennas will be under 100 feet (33 meters) and, where possible, will be sited on buildings or towers, and no guy wires will be used. A full description and a map of proposed locations of the FTI antennas are in Appendix D.
UAVs would fly over the training area, as discussed Section 7.4. The UAV activity is not anticipated to threaten migrating birds.

**Noise and visual impacts.** No threatened or endangered species are known to occur within the immediate areas of the proposed CACTF. Sensitive species are primarily located at higher elevations, in areas where training generally does not occur. Maneuvers would not take place in areas known to contain sensitive species or sensitive habitats.

Dismounted (on foot) training includes walking in formations on roads or trails or in a dispersed fashion overland. Dismounted training on existing roads and trails would have no impact on biological resources, while those maneuvers that do not follow roads or trails could affect biological resources, particularly in the southern portion of the ROI where native species and natural communities are located. Most training would occur in the disturbed flatlands of KTA, which are dominated by nonnative and invasive species. The impact on general vegetation and wildlife is therefore considered less than significant.

**No Impacts**

**Runoff impacts on marine wildlife and coral ecosystems.** SBCT activities at KTA/KLOA are not expected to result in runoff impacts on marine wildlife and coral ecosystems due to limited activities that would occur there.

**Reduced Land Acquisition Alternative**

The impacts associated with RLA are identical to those described for the Proposed Action.

**No Action Alternative**

No Action would result in no new impacts on biological resources but would involve a continuation of existing impacts. An in-depth analysis of current force training impacts on KTA and KLOA biological resources can be found in the O‘ahu Training Areas INRMP (USARHAW and 25th ID[L] 2001a) and the Endangered Species Management Plan Report (ESMPR) for O‘ahu Training Areas (R. M. Towill Corp. 1997b). All conservation measures detailed in the 2003 BO for Routine Military Training and Transformation of the 2nd Brigade 25th ID(L) at US Army Installations on O‘ahu (USFWS 2003d) will be enacted under this alternative as well. A synopsis of No Action Alternative impacts is given below.

**Significant Impacts**

**Impact 1: Impacts from fire on sensitive species and sensitive habitat.** Under the status quo of No Action, current training threatens native habitat and sensitive species in the KTA/KLOA ROI. New measures of mitigation for wildland fires will be the same as those listed in the 2003 BO for O‘ahu Army Installations and described for this impact under the Proposed Action. In addition, the following current force fire avoidance and mitigation would be continued:

- Reevaluating and revising KTA and KLOA’s current fire control plan and program for inclusion in the O‘ahu general fire management plan;
• Regularly updating Incident Command System (ICS) contact personnel and reviewing fire control protocols;
• Posting signs about the Army’s regulations concerning ignition sources;
• Addressing fire control in an island-wide fire management plan;
• Improving fire education and awareness by preparing educational materials on fire hazards and preventative measures; and
• Maintaining fire access roads and fire breaks.

**Significant but Mitigable to Less than Significant Impacts**

**Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat.** There have been and would continue to be impacts on the listed plants and wildlife. Vehicle and dismounted maneuvers along with live-fire and nonlive fire training at KTA and KLOA occurs primarily on disturbed portions of the ROI that are of low value to Hawai’i’s listed species. However, the effects of fire, spread of nonnative species, noise pollution, and visual presence of humans in or nearby designated and sensitive habitats negatively affects listed species that use or would potentially use this area.

The Army has completed ESA Section 7 Consultation for the impacts on federally listed species and their designated critical habitat from current force and proposed SBCT training at KTA/KLOA. The designation of plant critical habitat is part of the consultation. The terms and conditions of the BO will be incorporated into this alternative, as well as the Proposed Action. Ongoing programs that would lessen the impact on listed species and their designated critical habitat include the ecosystem management plan, endangered species management plan, and INRMP (USARHAW and 25th ID)[L] 2001a; R. M. Towill Corp. 1997b). These measures would help avoid effects and would compensate for impacts on listed species that would result directly and indirectly from implementing the No Action Alternative.

**Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat.** Under the status quo of No Action, current force training would continue use of an upgraded Drum Road. Nonnative plants and animals, some of which could be invasive, have likely been and would continue to be introduced and spread into natural areas on KTA and KLOA. There would be no increase in the number of vehicles or Soldiers, but the impact of vehicle traffic on the road would continue to be considered significant. Troop transport and vehicle entry into the KTA/KLOA ROI could spread invasive species via clothing and vehicles. Invasive species can spread rapidly in a habitat disturbed by human activities, such as troop maneuvers or construction. In compliance with EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize risk of harm caused by invasive species. Army environmental management programs (described in Chapter 2, Section 2.2.4 of this document), including research, monitoring, stabilization projects, and measures outlined in the 2003 BO for O'ahu Army Installations, would reduce these impacts to the less than significant level.
Less than Significant Impacts

Impacts from construction and training activities general habitat and wildlife. Under the status quo of No Action current force training would result in the same impacts as those described for the Proposed Action. Construction would be undertaken on a case-by-case basis in support of current training. Non-Stryker tactical vehicle use would continue, though MIMS would not increase. Continued use of Drum Road would have similar impacts as that described in the Proposed Action. Army environmental management programs (Section 2.2.4 of this document), including research, monitoring, stabilization projects, and measures outlined in the 2003 BO for O'ahu Army Installations, would reduce the intensity and extent of these impacts.

Threat to migratory birds. Current force activities would continue to have a less than significant impact on migratory birds. Status quo activities in the ROI may incidentally affect migratory birds but are unlikely to severely disturb birds, considering the disturbed nature of the present training area.

Noise and visual impacts. Noise would continue to be produced as a result of current force activities. Noise would adversely affect animals in the area but would not significantly affect their behavior and would not lead to a population level decline.
8.10  **BIOLOGICAL RESOURCES**

8.10.1  **Affected Environment**

*Introduction/Region of Influence*

Biological resources include plant and animal species and the habitats or communities in which they occur. This section is divided into discussions of general wildlife, vegetation, and habitat types common to PTA, including sensitive species and habitats known to occur or with the potential to occur in this area. Federal, state and locally regulated species are included in this report, along with rare species, identified by rapid population decline or whose habitat has markedly decreased in recent years.

The terrestrial portion of the PTA ROI (Figure 8-32) was based largely on the potential for damage from fires during training and, in the case of the military vehicle trail, damage due to the expansion of and increased activity on the trail. Fire has been evaluated to be the most far-reaching impact on PTA, with the exception of PTA Trail, because of its ability to affect a large area. Degradation of habitat due to physical activities around PTA Trail would have the greatest potential impact on the area due to the nature of activities proposed and allowed in their vicinity. The terrestrial portion of the PTA ROI also includes a 164-foot (50-meter) buffer on either side of the proposed trail, as well as a portion of the coast over which aircraft maneuvers may occur.

The marine portion of the PTA ROI (Figure 8-32 and Figure 3-13) involves the nearshore and offshore Pacific waters between O'ahu and the island of Hawai'i, the Pearl Harbor area of O'ahu, the Kawaihae Harbor area of the island of Hawai'i, and adjacent coastlines to the harbors. Marine habitat was considered because there will be continuing and slightly increased vessel transport of troops back and forth from O'ahu and the island of Hawai'i. Portions of this area are within the Hawaiian Islands Humpback Whale National Marine Sanctuary waters. Also, the construction of a fixed tactical tower at the Kawaihae Harbor area could potentially impact marine habitat. No harbor construction work is considered as part of this project action as impact analyses of that action would occur under separate NEPA documentation. The location and sensitivity of these marine ecosystems were taken into account when determining the marine portion of the PTA ROI for the Proposed Action.

Biological data were collected from numerous sources, including the USFWS, NMFS, HDLNR, HBS, HINHP, US Army PTA, and various biological surveys and environmental documents that are cited throughout this document. For details on pertinent regulations see Appendix N.

**Recovery Plans**

Thirteen plant and six animal species with recovery plans are known to or have the potential to occur within the PTA ROI. These species are listed in Appendix I-1a.
Figure 8-32
Terrestrial and Aquatic Biological Region of Influence at the Pōhakuloa Training Area
Vegetation

PTA is on the island of Hawai‘i, on the west side of Humu‘ula Saddle, a plateau formed by Mauna Kea and Mauna Loa. The surrounding lands are mostly designated as conservation district and are managed or leased by a variety of private landowners and the State of Hawai‘i. Studies of the vegetation communities in the saddle region of Hawai‘i date from 1861. The next study was in 1888, and these continued through the 1930s. A 1977 EIS by Environmental Impact Survey, Inc., provided a baseline vegetation listing, and the floristic inventory of PTA by CEMML began in 1988 and continues today. Approximately 38 percent of the plants found on PTA are indigenous or endemic and thousands of hours have been spent collecting information on their location and distribution. Endangered and threatened species and species of concern (all defined according to federal guidelines) are found on PTA. Vegetation communities occurring in the PTA ROI are identified in Figure 8-33 and described below.

Though PTA is the largest military training area outside of the continental US, almost one-third of the land has been deemed unsuitable for training. The impact area accounts for almost 50 percent of PTA, and no troop movement is permitted in this area. Additionally some of the terrain is inhospitable and unusable for training. Twenty-three separate training areas at PTA support a variety of military exercises. Outside of the PTA boundaries are grassy rangelands and pastures dominated by introduced vegetation (Figure 8-33). Mature native plants are rarely found in these communities disturbed by cattle though they can be found in rocky areas where cattle movement is unlikely. There is a unique vegetation community in the lower south end of the parcel, specifically *Leptecophylla-Ostomeles-Dubautia* shrubland, a lowland mesic shrubland community.

The Army uses the Kawaihae Military Reservation as its port facility for shipping equipment and ammunition from O‘ahu. A trail stretches from the Kawaihae Harbor to the installation, but it is seldom used. This trail is heavily weeded and described as extremely stony with a very fine sandy loam that is prone to erosion if not vegetated.

There are 24 vegetation communities on PTA (Shaw and Castillo 1997). It is important to note that numerous introduced plant species make up a significant portion of many of these habitats, and, additionally, introduced plants are components in all habitats on PTA. About 62 percent of the plants found at PTA are introduced species. Barren lava covers 25 percent of the installation. Lichens, such as *Stereocaulon vulcani*, and ferns, such as *Pella ternifolia*, are the first colonizers of these flows, though fountain grass (*Pennisetum setaceum*) is invading barren areas.

There are four types of *Metrosideros* treeland, ranging from sparse to mixed intermediate. The dominant canopy vegetation in these areas is generally ‘ōhia. The mixed intermediate treeland has a second canopy layer made up of primarily *Myrsine lanatensis* and naio (*Myoporum sandwicense*). Understory species include different densities of ʻalii, *Leptecophylla tameiameiae*, and, in some instances, *Osteomeles anthyllidifolia*. Fountain grass is invading all of these communities.
Figure 8-33
Vegetation Communities at the Pōhakuloa Training Area Terrestrial Biological Region of Influence
There are three types of *Dodonaea* shrubland: open, dense, and mixed. ‘A’ali‘i (*Dodonaea viscosa*) is the dominant plant in each community, along with other native species, including ‘ilima (*Sida fallax*), ‘āheaea (*Chenopodium oahuense*), and naio. Fountain grass is invading all of these communities.

*Leptecophylla* occurs either as a mixed shrubland community or as a component of *Leptecophylla-Dodonaea* shrubland. No rare plants are associated with these communities, though natives like *Leptecophylla taniotameiae*, naio, ‘a‘ali‘i, and *Sophora chrysophylla* are common.

*Chamaesyce* treeland is generally found hosting native species of *Chamaesyce olowaluana* (a species of concern), ‘ilima, ‘āheaea, and ‘a‘ali‘i. *Chenopodium* shrubland and *Eragrostis aptopioides* grassland are similar communities with different dominant species. ‘Āheaea occurs sparsely as shrubs in the grassland, and *Eragrostis aptopioides* is the dominant native grass in the shrubland.

The remainder of the native natural communities is a combination of *Chamaesyce, Myoporum*, and *Sophora* species, with divisions based on the densities of species.

Kīpuka Kalawamauna Endangered Plants Habitat encompasses 7,869 acres (3,185 hectares) in the northwestern area of PTA. The endangered plants documented there are *Haplostachys haplostachya*, *Stenogyne angustifolia*, *Asplenium fragile* var. *insulare*, *Hedyotis coriacea*, *Silene lanceolata*, *Tetramolopium arenarium* var. *arenarium*, and *Zanthoxylum hawaiiense*. Much of the area is fenced and allows limited vehicle access.

The Kīpuka ‘Aalā fenced unit is approximately 5,000 acres (2,023 hectares) and includes the former Multi-Purpose Range Complex in Training Area 23. Training in this area is restricted to small-scale dismounted maneuvers, but it has never been used (Gleason 2003). No SBCT training is planned for the 1,500 acres (607 hectares) containing the MPRC, though dismounted maneuver training would occur at the remaining sections Training Area 23. Rare species in this management area are *Hedyotis coriacea*, *Stenogyne angustifolia*, *Silene hawaiiensis*, *Zanthoxylum hawaiiense*, *Chamaesyce olowaluana*, *Hesperocnide sandwicensis*, *Tetramolopium humile* var. *sublaeve*, and *Haplostachys haplostachya*.

Other special status areas within the training area include palila critical habitat and emergency exclosures for individual or small groups of rare plants. Emergency exclosures currently protect *Hedyotis coriacea*, *Nerandia ovata*, *Portulaca sclerocarpa*, *Schidea hawaiiensis*, *Silene lanceolata*, *Solanum incompletum*, *Tetramolopium arenarium* var. *arenarium*, and *Zanthoxylum hawaiiense*.

**West PTA Acquisition Area**

Adjacent to the northwest corner of PTA is the 22,675-acre (9,176-hectare) WPAA. Biological surveys in spring 2002 and 2003 (Palmer 2003) showed federally listed endangered plant species within the ROI: *Isodendrion hosakae*, *Lipocheta venosa*, *Haplostachys haplostachya*, *Stenogyne angustifolia*, and *Vigna o-wahuluiensis*. The plant communities are similar to those within PTA and include native and nonnative dominated shrublands and drainages of varying density and composition. Fountain grass is the dominant member of several grassland communities that can include a proportion of native shrubs, herbs, and trees. The highly
disturbed communities are identified as *Eucalyptus* woodlots, nonnative forb lands, and pastureland, all of which contain native plants scattered through the area. No critical habitat for plants occurs within this portion of the ROI but Palmer (2003) noted several Significant Botanical Sites within the boundary at pu’u Nohona o Hae and pu’u Papapa. These significant areas support native vegetation communities that support numerous endangered species. There are no documented aquatic natural communities on PTA.

The Army seeks to preserve and stabilize the populations of federally listed plants on lands under their management. The Endangered Species Management program and the installation pest management activities combine and reduce the negative impacts of introduced species on the landscape (USARHAW and 25th ID[L] 2001a). Control of noxious weeds is required by the State of Hawai’i Noxious Weed Rules (USDA, no date) and is supported by AR 200-5, Pest Management (HQDA 1999).

PTA has federal and state listed noxious weeds. Though kikuyu grass (*Pennisetum clandestinum*) is included in this category, it is exceptional at PTA and is not invasive at high elevation dry ecosystems (Gleason 2003). Invasive and noxious weeds that are targeted for control on PTA include banana poka (*Passiflora mollissima*), Fountain grass (*Pennisetum setaceum*) and Russian thistle (*Salsola kali*). Other widespread weed species are controlled where they threaten native plants and communities.

Native plants are directly affected by populations of feral pigs (*Sus scrofa*), goats (*Capra hircus*), sheep (*Ovis aries*), and mouflon (*O. musimon*), which contribute to numerous ecological problems (Atlas 1998). The effects of these wild animals include trampled and grazed native plants and advanced erosion (HIHNP 1994). Browsing and otherwise destroying the native vegetation encourages nonnative plants to become established, severely affecting the habitat for native plants (Atlas 1998). Shooting of game mammals was suspended in 2000 and replaced with non lethal control efforts. Often areas are fenced and the individual animals lured out through one-way gates. Live-trapping is also used. These animals are then tagged and re-located to hunting areas. Aerial driving of sheep and goats was deemed largely unsuccessful as a removal method (USARHAW and 25th ID[L] 2001b).

Rats (*Rattus rattus* and *R. exulans hawaiiensis*) also are known to eat the fruit from certain species of native plants, seriously affecting the plants’ reproduction (Atlas 1998; Shaw 1997; PCSU 2001, 87). An additional concern with rats on PTA is that they could eat newly found native snail populations. Proposed measures to control rats, cats and other small vertebrates include baiting and trapping (USARHAW and 25th ID[L] 2001b).

Human habitat disturbance on PTA includes disturbance by military training and construction activities. Trampling and dust associated with training activities could also adversely affect populations of rare plants and communities (Shaw 1997). Fire threat is high on PTA. Many of the native plant communities are interspersed with highly flammable introduced species. Additionally, the rugged terrain and vastness of the training area limit access for fire suppression and control. The Army has SOPs that reduce the potential for fire from training at PTA and on the lands leased from the neighboring ranch. The SOPs for the
leased lands prohibit smoking and ensure vehicle traffic is confined as much as possible to roads and trails.

In 1989, PTA was the first Army location in Hawai‘i to implement the LCTA component of the ITAM program (described in Chapter 2, Section 2.2.4). Through this program and the other ITAM components, PTA has developed a GIS database that includes data on landing zones, impact areas, firing points, soils, vegetation, and firebreaks, just to name a few. This information supports LCTA land use planning and decision-making and is instrumental in prioritizing potential LRAM projects. The SRA component of ITAM educates the troops and provides installation-specific guidance for maneuvers at PTA as some areas of PTA have significant restrictions on training.

Wildlife
Zoological field surveys that have been made on PTA include those by Shallenberger (1977), David (1995), and Freed (1991). More recent surveys targeting native rare invertebrates, mammals, and birds were also conducted (Gon et al. 1993; HINHP 1998; USARHAW and 25th ID[L] 2001b), as were entomology surveys of the PTA lava tubes (Garcia and Associates 2003). There have been no specific reptile surveys on PTA because there are no native terrestrial reptiles and amphibians on the Hawaiian Islands. Surveys of PTA were made by the University of Hawai‘i, the Bishop Museum Hawaiian Heritage Program, and the HINHP (1994), which are cited in the following section. These natural resource surveys have been used for the resource assessments in the Biological Inventory and Management Assessment on the PTA for USARHAW (HINHP 1994a), as well as the more recent PTA INRMP (USARHAW and 25th ID[L] 2001b). The following section describes the general presence of invertebrate, mammal, bird, and fish species.

Invertebrates
Native and endemic invertebrates on PTA include the Hawaiian helicoverpa moth (*Helicoverpa confusa*) and the Giffards rhyncogonus weevil (*Rhyncogonus giffardi*). Snails documented at PTA are *Letachatina* spp., *Euconulus gaetanoi*, *Nesopupa subcentralis*, *Nesovitrea hawaiiensis*, *Striatura* spp., and *Vitrina tenella*. The helicarionid land snail (*Philonesia* spp.) and succineid land snail (*Succinea konamensis*) were also observed on PTA (HINHP 1994; R. M. Towill Corp. 1997b; USARHAW and 25th ID[L] 2001b). Three endemic caterpillar species, *Schrankia* sp., were noted during recent surveys for native invertebrates at PTA lava tubes (Ganda 2003).

Surveys of PTA by HHP in 1993 detected the following nonnative snails: giant African snail (*Achatina fulica*), bradybaenid land snail (*Bradybaena similaris*), cannibal snail (*Euglandina rosea*), and the zonitid land snail (*Hawaiia minuscula*). Humans have purposely or accidentally introduced these species to the island of Hawai‘i. They now threaten the native snail species through competition for resources, predation, and the spread of disease (PCSU 1999, 155).

Amphibians
There are no native terrestrial amphibians on the Hawaiian Islands. Nonnative amphibians found on the island of Hawai‘i include bullfrog (*Rana catesbeiana*), wrinkled frog (*R. rugosa*), giant toad (*Bufo marinus*), and Cuban tree frog (*Osteopilus septentrionalis*). These species were
introduced into Hawai‘i from other countries and have inhabited areas where adequate aquatic habitat and surrounding vegetation exist. While these species have not been documented in PTA, they could occur in the general PTA ROI, which includes the proposed PTA Trail.

**Reptiles**
There are no native terrestrial reptiles on the Hawaiian Islands. Nonnative reptiles found on the island of Hawai‘i include the green anole (*Anolis carolinensis*), mourning gecko (*Lepidodactylus lugubris*), stump-toed gecko (*Gebyra mutilata*), tree gecko (*Hemiphyllodactylus typus*), Indo-Pacific gecko (*Hemidactylus garnotii*), house gecko (*H. frenatus*), metallic skink (*Lampropelis delicata*), and gold dust day gecko (*Phelsuma laticauda laticauda*). The only known terrestrial snake occurring on the Hawaiian Islands is the island blind snake (*Ramphotyphlops braminus*). While these species have not been documented in PTA, they could occur in the general PTA ROI, which includes the proposed PTA Trail.

**Terrestrial Mammals**
The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is known to occur on PTA (USARHAW and 25th ID[L] 2001b; Cooper et al. 1996). It is the only native terrestrial mammal in the Hawaiian Islands. The following nonnative species have been documented as occurring on PTA: feral pig (*Sus scrofa scrofa*), feral goat (*Capra hircus hircus*), feral cat (*Felis catus*), feral dog (*Canis familiaris*), Norway rat (*Rattus norvegicus*), black rat (*R. rattus*), feral sheep (*Ovis aries*), mouflon sheep (*O. musimon*), mongoose (*Herpestes auropunctatus*), and house mouse (*Mus musculus*). The Polynesian rat (*Rattus exulans hawaiiensis*) may occur in the ROI. Cows (*Bos taurus*) presently graze in the Keamura Parcel.

**Birds**
Endemic species fairly common to PTA are ‘apapane (*Himatone sanguines*) and Hawaiian ‘amakih (Hemignathus virens vires). Endemic species with declining populations less common to but identified on PTA are ‘i‘wi (*Vestiaria coccinea*), ‘elepaio (*Chasiempis sandwichensis s.*), and ‘ōma‘o (*Myadestes obscurus*) (USARHAW and 25th ID[L] 2001b). The dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) is a federally listed endangered species known to occur on PTA. Nonnative bird species known to occur on PTA include Erchel’s francolin (*Francolinus erckelii*), black francolin (*F. francolinus*), California quail (*Callipepla californica*), and Japanese quail (*Coturnix japonica*). The house finch (*Carpodacus mexianus*) and Eurasian sparrow (*Paser domesticus*) are also species that have been introduced by humans on the island of Hawai‘i.

**Fish**
No natural aquatic systems occur on PTA (USARHAW and 25th ID[L] 2001b). Although Waiulaula Gulch and Makeahua Stream cross the proposed PTA Trail alignment, no fish data is available for the PTA ROI.

**Marine Biological Resources**
The marine portion of the PTA ROI is shown in Figures 8-32 and 3-13. The nearshore and offshore Pacific waters between O‘ahu and the island of Hawai‘i, the Pearl Harbor area of O‘ahu, the Kawaihae Harbor area of the island of Hawai‘i, and coastlines adjacent to the harbors are included in the ROI. As part of the Proposed Action, there would be a slight
increase in vessel transit activity between O'ahu and the island of Hawai'i. Boats would launch from Pearl Harbor with troops and equipment and would land at Kawaihae Harbor, and then return at the end of the training action. The 25th ID(L) units would offload and transit from Kawaihae Harbor to PTA. Some of the transit areas for the vessels between the two islands are within or in close proximity to the Hawaiian Islands Humpback Whale National Marine Sanctuary waters (composed of five separate areas abutting six of the major islands; see Figure 3-13). Designated sanctuary waters encompass the entire western portion of the island of Hawai'i and include waters just outside and surrounding Kawaihae Harbor. Designated sanctuary waters also occur outside of O'ahu at Penguin Banks which would be part of the transit route for crew-transporting vessels. Any adjacent coastline areas in the ROI may provide shore habitat for some marine wildlife, such as sea turtles and monk seals.

There is a coral reef area of management concern (known as a “hot spot”) in the PTA ROI. Located at Kawaihae Harbor, this reef is identified as at risk both from extensive development at the commercial harbor and from recent and continued development at the small boat harbor. While the main issue affecting this reef is harbor construction, other causes of decline for this reef system include interruption of long-shore transport due to harbor development, consequent siltation of Pelekane Bay, and close proximity to important cultural sites (i.e. Pu'u Kohola Heiau) that causes increased recreational use and human presence (CRAMP 2003). Any harbor construction impacts would be addressed in a separate NEPA document. In addition to this reef identified as a management concern, there are other coral reefs in the coastal waters of the PTA ROI. One that is well known is Puako reef, approximately 8 to 10 miles (13 to 16 kilometers) from Kawaihae Harbor. There are no coral reef areas of management concern outside Pearl Harbor on O'ahu (CRAMP 2003).

Marine wildlife occurs in the PTA ROI in both the nearshore and offshore regions of Pacific waters. The harbor areas and adjacent coastline areas also provide habitat for marine wildlife. Kawaihae Harbor is on the leeward side of the island where waters are calmer and more protected. These waters provide good habitat for humpback mother and calf pods and for resting dolphin pods as well as sea turtles, potentially monk seals, and other marine wildlife.

Distributions and abundance of marine mammals and sea turtles in Pacific waters vary seasonally and spatially; that is, numbers and types of animals may vary in the nearshore versus offshore regions, as well as by the time of year (Calambokidis et al. 1997; Leatherwood et al. 1982; Mobley et al. 1999, 2000; NMFS 2000a-2000bb). Many marine mammal species occur year-round in Pacific waters. All marine mammal species are protected under the MMPA, regardless of whether they have additional protection under the ESA. Informal consultation with NOAA Fisheries has been initiated for marine mammals in the SBCT ROI. Both MMPA and ESA protected marine wildlife species that may occur in the PTA ROI either seasonally, permanently, or as transients, are listed in Table 8-19.
### Table 8-19

**Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>1Federal Status</th>
<th>2State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Balaenoptera</em></td>
<td><em>Minke whale</em></td>
<td>*</td>
<td></td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>P</td>
<td>Most common northwest of the main seven-island chain or on leeward side of islands. May be incidentally sighted in waters adjacent to or between O'ahu and Hawai'i.</td>
</tr>
<tr>
<td><em>Balaenoptera</em></td>
<td><em>Sei whale</em></td>
<td>E*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Rarely sighted in Hawaiian waters.</td>
</tr>
<tr>
<td><em>Balaenoptera</em></td>
<td><em>Bryde’s whale</em></td>
<td>*</td>
<td></td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>P</td>
<td>Most common northwest of the main seven-island chain. May be incidentally sighted in waters adjacent to or between O'ahu and Hawai'i.</td>
</tr>
<tr>
<td><em>Balaenoptera</em></td>
<td><em>Blue whale</em></td>
<td>E*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Heard in Hawaiian waters.</td>
</tr>
<tr>
<td><em>Balaenoptera</em></td>
<td><em>Fin whale</em></td>
<td>E*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Heard but rarely sighted in Hawaiian waters.</td>
</tr>
<tr>
<td><em>Berardius</em></td>
<td><em>Baird’s beaked whale</em></td>
<td>*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>P</td>
<td>Expected to occur as transients in waters of the PTA ROI.</td>
</tr>
<tr>
<td><em>Delphinus</em></td>
<td><em>Common dolphin</em></td>
<td>*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>U</td>
<td>May be incidentally sighted in waters between O’ahu and Hawai’i.</td>
</tr>
<tr>
<td><em>Eubalaena</em></td>
<td><em>Pacific right whale</em></td>
<td>E*</td>
<td></td>
<td>Unknown if depth is a criterion</td>
<td>Known currently</td>
<td>U</td>
<td>Most likely stray individuals from more northern population.</td>
</tr>
<tr>
<td><em>Feresa</em></td>
<td><em>Pygmy killer whales</em></td>
<td>*</td>
<td></td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C</td>
<td>Known in the channels between the main islands. Has been documented off the coast of O’ahu. May occur in waters adjacent to or between O’ahu and Hawai’i.</td>
</tr>
<tr>
<td><em>Globicephala</em></td>
<td><em>Short-finned pilot whale</em></td>
<td>*</td>
<td></td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C</td>
<td>Known in the channels between the main islands. Common in nearshore or offshore areas in waters adjacent to or between O’ahu and Hawai’i.</td>
</tr>
<tr>
<td><em>Grampus</em></td>
<td><em>Risso’s dolphin</em></td>
<td>*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>P</td>
<td>Most commonly sighted in offshore waters. May be seen in offshore areas in waters adjacent to or between O’ahu and Hawai’i.</td>
</tr>
<tr>
<td><em>Kogia</em></td>
<td><em>Pygmy sperm whale</em></td>
<td>*</td>
<td></td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>P</td>
<td>Prefers deeper waters but occasionally seen in the channels between the main islands. May be seen in offshore waters between O’ahu and Hawai’i.</td>
</tr>
</tbody>
</table>
### Table 8-19

**Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI (continued)**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>1Federal Status</th>
<th>2State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>K. simus</td>
<td>Dwarf sperm whale</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>Currently</td>
<td>P</td>
</tr>
<tr>
<td>Monachus schauinslandi</td>
<td>Monk seal</td>
<td>E*, CH, D</td>
<td>-</td>
<td>More common in nearshore waters or hauled out on the coast.</td>
<td>Known currently</td>
<td>C</td>
<td>Most common northwest of the main seven-island chain. Incidental individuals known to haul out along main seven island shorelines. Anecdotal sighting on Kawaihae Beach.</td>
</tr>
<tr>
<td>Megaptera novaeangliae</td>
<td>Humpback whale</td>
<td>E*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Occurs throughout the main seven-island chain January through April. Occurs in all nearshore and offshore waters to the 100 fathom line adjacent to or between O'ahu and Hawai'i.</td>
</tr>
<tr>
<td>Monodon bactrini</td>
<td>Blainsville's whale</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>Currently</td>
<td>C**</td>
</tr>
<tr>
<td>Orcinus orca</td>
<td>Killer whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>Currently</td>
<td>C**</td>
</tr>
<tr>
<td>Peponocephala electra</td>
<td>Melon-headed whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>Currently</td>
<td>C**</td>
</tr>
<tr>
<td>Physeter macrocephalus</td>
<td>Sperm whale</td>
<td>E*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Most common off the north and eastern shores of the main seven islands. May be sighted in waters adjacent to or between O'ahu and Hawai'i.</td>
</tr>
<tr>
<td>Pseudorca crassidens</td>
<td>False killer whale</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>Currently</td>
<td>C**</td>
</tr>
<tr>
<td>Stenella attenuata</td>
<td>Spotted dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in nearshore, leeward coastal waters</td>
<td>Known</td>
<td>Currently</td>
<td>C</td>
</tr>
</tbody>
</table>
### Table 8-19
Sensitive Marine Wildlife Occurring or Potentially Occurring in Waters of PTA ROI (continued)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>¹Federal Status</th>
<th>²State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. coeruleoalba</td>
<td>Striped dolphin</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>P</td>
<td>More strandings sighted than live individuals. May be sighted in nearshore or offshore waters adjacent to or between O‘ahu and Hawai‘i.</td>
</tr>
<tr>
<td>S. longirostris</td>
<td>Spinner dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in nearshore, leeward coastal waters</td>
<td>Known</td>
<td>C</td>
<td>Common along the coastlines. Occurs in nearshore or offshore areas in waters adjacent to O‘ahu and Hawai‘i.</td>
</tr>
<tr>
<td>Steno bredanensis</td>
<td>Rough toothed dolphin</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Prefers deeper offshore waters but has been sighted off coast of O‘ahu. May be sighted in waters adjacent to or between O‘ahu and Hawai‘i.</td>
</tr>
<tr>
<td>Tursiops truncatus</td>
<td>Bottlenose dolphin</td>
<td>*</td>
<td>-</td>
<td>May occur in nearshore or offshore waters</td>
<td>Known</td>
<td>C</td>
<td>Common along the coastlines. Occurs in nearshore or offshore areas in waters adjacent to or between O‘ahu and Hawai‘i. Also common offshore in project area waters.</td>
</tr>
<tr>
<td>Ziphius cavirostris</td>
<td>Cuvier’s beaked whale</td>
<td>*</td>
<td>-</td>
<td>Most likely in deeper offshore waters</td>
<td>Known</td>
<td>C**</td>
<td>Most common of the beaked whales in project area waters. Prefers deeper offshore waters but can be common in nearshore or offshore areas in waters adjacent to or between O‘ahu and Hawai‘i.</td>
</tr>
</tbody>
</table>

**Sea Turtles**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>¹Federal Status</th>
<th>²State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caretta caretta</td>
<td>Loggerhead turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Considered uncommon in PTA ROI waters</td>
</tr>
<tr>
<td>Chelonota mydas</td>
<td>Green turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Nests annually on Hawaiian beaches; common in nearshore areas of any of the main seven islands. Most abundant sea turtle in PTA ROI waters.</td>
</tr>
<tr>
<td>Dermochelys coriacea</td>
<td>Leatherback turtle</td>
<td>E</td>
<td>-</td>
<td>In project area; prefers offshore waters</td>
<td>Known currently</td>
<td>C</td>
<td>Primarily occurs over deep oceanic waters; sighted equally as frequently off any of the main seven islands. This species is expected in project area waters, especially along the north shores and in offshore waters.</td>
</tr>
</tbody>
</table>

May 2004  
Stryker Brigade Combat Team Final EIS, Hawai‘i
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>(^1)Federal Status</th>
<th>(^2)State Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eretmochelys imbricata</td>
<td>Hawksbill turtle</td>
<td>E</td>
<td>-</td>
<td>In project area; prefers nearshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Considered uncommon; a small number nest on the Island of Hawaii</td>
</tr>
<tr>
<td>Lepidochelys olivacea</td>
<td>Olive ridley turtle</td>
<td>T</td>
<td>-</td>
<td>In project area; prefers offshore waters</td>
<td>Known currently</td>
<td>U</td>
<td>Infrequently seen in Hawaiian offshore waters</td>
</tr>
</tbody>
</table>

Sources: NMFS 2000a-bb; ONR 2000.

**Status:**

\(^1\)Federal:  
E = Endangered  
* = Protected under MMPA  
D = Depleted under the MMPA  
CH = Critical habitat designated or proposed for designation  
** = presence confirmed from aerial surveys but found at a distance offshore from the coastline, as discussed in Appendix I-1.

\(^2\)State:  
/ / = No Status

**Likelihood of occurrence in the project site**  
C = Confirmed  
P = Potentially may occur  
U = Unlikely to occur
Whales and Dolphins Potentially Occurring in Hawaiian Waters of the PTA ROI

Non-ESA listed but MMPA-protected marine mammals considered to have the potential to be found in Hawaiian waters, or in waters of the PTA ROI, include the following:

- Bryde’s whales (*Balaenoptera edeni*);
- Minke whales (*B. acutorostrata*);
- Pygmy sperm whales (*Kogia breviceps*);
- Dwarf sperm whales (*K. simus*);
- Killer whales (*Orcinus Orca*);
- False killer whales (*Pseudorca crassidens*);
- Pygmy killer whales (*Feresa attenuata*);
- Pilot whales (*Globicephala macrorhynchus*);
- Beaked whale species (*Mesoplodon* and *Ziphius* spp.);
- Baird’s beaked whale (*Berardius bairdii*);
- Melon-headed whales (*Peponocephala electra*);
- Bottlenose dolphins (*Tursiops truncatus*);
- Spinner dolphins (*Stenella longirostris*);
- Rough-toothed dolphins (*Steno bredanensis*);
- Risso’s dolphin (*Grampus griseus*);
- Striped dolphin (*Stenella coeruleoalba*);
- Common dolphin (*Delphinus delphis*); and
- Several species of spotted dolphins, the most common of which is *Stenella attenuata*.

The natural history of these species, as well as specific documented locations either in or near the PTA ROI (if known), are described in Appendix I-1.

Sensitive Species

A list of all sensitive vegetation and wildlife and any critical habitat found in the region, according to USFWS and DLNR records, is found in Tables 8-19 through 8-21. An assessment of the likelihood of a species occurring on PTA was made where possible, based on the habitat requirements and geographic distribution of the species, existing on-site habitat quality, and the results of biological surveys of PTA. The Army has undergone ESA Section 7 consultation with USFWS for previous Army training and actions that would affect listed species such as the palila and its federally designated critical habitat (USFWS 1978, USFWS 1983a) as well as other listed species on the premises (USFWS 1986b). Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, are in Appendix I-1 (Recovery Plans I-1a; Plants I-1b; Wildlife I-1c; Critical Habitat I-1d).
**Sensitive Plant Species**
The Army has funded botanical surveys on PTA since 1988, though other surveys date as far back as 1888 (USARHAW and 25th ID[L] 2001b). Approximately 38 percent of the plants found on PTA are indigenous or endemic. Endangered species, threatened species, and species of concern (all according to federal guidelines) are found on PTA, as well as a new species (*Tetramolopium* unnamed sp.) that could be included on the endangered species list as it is known only from three small populations on PTA. State and locally regulated rare species are included in this report, along with species that have experienced rapid population decline or whose habitat has markedly decreased in recent years. Table 8-20 lists sensitive plant species and their potential to occur in the PTA ROI. Documented occurrences of sensitive plant species in the PTA ROI are shown in Figure 8-34.

**Sensitive Wildlife Species**
The following discussion includes a profile of only those sensitive wildlife species considered likely to be found in the project area. This information is based primarily on information from the PTA INRMP (USARHAW and 25th ID[L] 2001b, R. M. Towill Corp. 1997c); special species wildlife information was based on surveys conducted on PTA. In 1990 Dr. Freed conducted bird and mammal surveys at PTA (Freed 1991). Later surveys include David's two endangered and threatened species surveys conducted along designated palila critical habitat (David 1995), Cooper's studies of endangered seabirds and Hawaiian hoary bat (Cooper et al. 1996), and the HINHP's arthropod inventory (USGS 2001b). Annual avian surveys, with a focus on sensitive species, have been conducted on PTA since 1997 (HINHP 1998; Schnell et al. 1998; Schnell et al. 1999). The latest USFWS and survey information on species and habitat in the SBCT ROI has been incorporated into this evaluation of biological resources.

Nineteen sensitive species have been determined to have the potential to occur within the PTA ROI (USARHAW and 25th ID[L] 2001b). Information regarding the locations of sensitive species on PTA is based on previous analyses of PTA natural resources (USARHAW and 25th ID[L] 2001b; R. M. Towill Corp. 1997c; HINHP 2002). The majority of these species observations have been on the west and northwest of PTA where the BSAs are located. Little information is known as to species occurrences within the impact area because zoological surveys have not been conducted due to safety hazards. Table 8-21 lists sensitive terrestrial wildlife and their potential for occurring on the island of Hawai‘i and Figure 8-35 shows the locations of sensitive terrestrial wildlife documented on the PTA ROI.

**Marine Wildlife**
Six species of endangered whales occur in the Pacific tropical waters of Hawai‘i. Of these, only one is considered likely to occur in the PTA ROI waters. This is the humpback whale (*Megaptera novaeangliae*). The other listed species are the fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), sei (*Balaenoptera borealis*), and pacific right (*Eubalaena glacialis*); and the sperm whale (* Physeter macrocephalus*).
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/Common Name</th>
<th>Federal Status¹</th>
<th>State² Global Status³</th>
<th>Habitat</th>
<th>Date Last Surveyed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asplenium fragilis var. insulare</td>
<td>/-fragile fern, lola</td>
<td>E, CH</td>
<td>-/</td>
<td>Dry forest, subalpine shrubland, barren lava, and lava tubes</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Chamaesyce ohawaiana</td>
<td>/akoko, kōkōmāle'i/ Maui milk tree</td>
<td>SOC</td>
<td>-/G2</td>
<td>Multiple tree and shrubland types on PTA</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Cystopteris douglasii</td>
<td>/-</td>
<td>SOC</td>
<td>-/G2</td>
<td>Myoporum forest and shrubland</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Dubautia arborescens</td>
<td>na'ena'e/-</td>
<td>SOC</td>
<td>-/</td>
<td>Subalpine shrub and woodlands and alpine desert</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Eragratis deflexa</td>
<td>Kalamalo/bent lovegrass</td>
<td>SOC</td>
<td>-/G1</td>
<td>Multiple treeland and shrubland habitats on PTA</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Eixcarpus gaudichaudii</td>
<td>heau/whisk broom sandalwood</td>
<td>SOC</td>
<td>-/G1</td>
<td>Multiple treeland communities associated with <em>Metrosideros</em></td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Festuca hawaiiensis</td>
<td>/-Hawaiian fescue</td>
<td>C</td>
<td>-/G1</td>
<td>Multiple treeland and shrubland habitats on PTA</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Haplostachys haplostachya</td>
<td>honohono/Hawaiian mint</td>
<td>E</td>
<td>-/G1</td>
<td>Multiple treeland and shrubland habitats on PTA, though with very small populations</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td>Hedyotis coriacea</td>
<td>Kio'ele/-</td>
<td>E, CH</td>
<td>-/G1</td>
<td><em>Metrosideros</em> treeland communities</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Hesperocnide sandwicensis</td>
<td>/-</td>
<td>C</td>
<td>-/G1</td>
<td>All native vegetation communities at PTA</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Isodendrion hosakae</td>
<td>aupauka/-</td>
<td>E</td>
<td>-/</td>
<td>Several dry shrubland habitats</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td>Lipochaeta venosa</td>
<td>nehe/-</td>
<td>E</td>
<td>-/</td>
<td>Dry shrubland</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Melicope hawaiiensis</td>
<td>manena/-</td>
<td>SOC</td>
<td>-/G2</td>
<td><em>Metrosideros</em> treeland and <em>Dodonaea</em> shrubland</td>
<td>1999</td>
<td>P</td>
</tr>
<tr>
<td>Neronia ovata</td>
<td>ma'aloa, ma'okoa/ spotted nettle brush</td>
<td>E, CH</td>
<td>-/G1</td>
<td><em>Metrosideros</em> treeland and <em>Myoporum</em> shrubland communities</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Portalia scelerocarpa</td>
<td>'ihi, poe/hard fruit purslane</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Barren lava and <em>Metrosideros</em> treeland communities</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td><em>P. villosa</em></td>
<td>/-</td>
<td>-</td>
<td>-/G1</td>
<td><em>Metrosideros</em> treeland communities</td>
<td>1999</td>
<td>P</td>
</tr>
<tr>
<td>Schiedea hawaiiensis</td>
<td>ma'oli'oli/-</td>
<td>SOC</td>
<td>-/</td>
<td>Subalpine dry forests</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Silex hawaiiensis</td>
<td>/Hawaiian catchfly</td>
<td>T, CH</td>
<td>-/G1</td>
<td>Multiple tree, shrub, and grasslands and on barren lava</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td><em>S. lanceolata</em></td>
<td>/lanceleaf catchfly</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Multiple tree, shrub, and grasslands and in dry habitats</td>
<td>1999</td>
<td>C</td>
</tr>
</tbody>
</table>
Table 8-20
Sensitive Plant Species Occurring on or Potentially Occurring at PTA ROI (continued)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name/Common Name</th>
<th>Federal Status(^1)</th>
<th>State/Global Status(^2)</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solanum incompletum</td>
<td>pōpolo kū mai/-</td>
<td>E, CH</td>
<td>-/GH</td>
<td>Sparse <em>Metrosideros</em> treelands and <em>Myoporum</em> shrublands</td>
<td>1997</td>
<td>C</td>
</tr>
<tr>
<td>Spermolepis hawaiensis</td>
<td>-/Hawaiian parsley</td>
<td>E, CH</td>
<td>-/G1</td>
<td>Multiple tree, shrub, and grasslands and in dry habitats</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Stenogyne angustifolia</td>
<td>Ma'ohi'ohi/creeping mint</td>
<td>E</td>
<td>-/G1</td>
<td>Multiple tree and shrublands and on barren lava</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td>Tetramolopium arenarium var. arenarium</td>
<td>-/Mauna Kea pāmakanani</td>
<td>E, CH</td>
<td>-/G1</td>
<td><em>Dodonaea</em> mixed shrubland</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>T. unnamed sp. leptomphyllum var. leptomphyllum</td>
<td>-/narrow leaf pāmakanani</td>
<td>-</td>
<td>-/G1</td>
<td>Multiple tree and shrubland communities</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td>Vigna o-wahensis</td>
<td>mohihihi/-</td>
<td>E, CH</td>
<td>-/-</td>
<td>Lowland shrublands, dry to moist</td>
<td>2002</td>
<td>C</td>
</tr>
<tr>
<td>Zanthoxylum hawaiense</td>
<td>he'a, a'/Hawaiian yellow wood</td>
<td>E, CH</td>
<td>-/G1</td>
<td><em>Metrosideros</em> dominates dry and moist forests and on barren lava</td>
<td>2002</td>
<td>C</td>
</tr>
</tbody>
</table>

Sources: USFWS 2002b; USARHAW and 25th ID[L] 2001b; HINHP 2002; Shaw 1997

Status:

\(^1\)Federal:
- E = Endangered
- T = Threatened
- SOC = Species of concern
- C = Candidate species for listing
- CH = Critical habitat designated

\(^2\)State
- /- = No Status

\(^3\)Heritage Global Rank:
- G1 = Species critically imperiled globally (typically 1-5 current occurrences)
- G2 = Species imperiled globally (typically 6-10 current occurrences)
- GH = Species known only from historical occurrences
- /- = No Status

Likelihood of occurrence on the project site
- C = Confirmed
- P = Potentially may occur
- U = Unlikely to occur
Figure 8-34
Sensitive Plant Species in the Pōhakuloa Training Area Terrestrial Biological Region of Influence
Table 8-21
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at PTA ROI

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Hawaiian Name / Common Name</th>
<th>Federal Status</th>
<th>State Global Status</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Invertebrates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Euconulus</em> (Neuconulus) sp. cf. <em>gastani</em></td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>Helicoverpa confusa</em></td>
<td>Hawaiian helicoverpa moth</td>
<td>SOC</td>
<td>-/G1</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td>Leptachatina spp. (5 species)</td>
<td>snail</td>
<td>SOC</td>
<td>-/G1</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>L. tepala</em></td>
<td>Amastrid land snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>Nemopha</em> (Infranemopha) sibunitasia</td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>Nesovirga hawaiensis</em></td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>P. helicoverpa</em> sp.</td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><em>Rhyncogonus giffardi</em></td>
<td>Giffard’s rhyncogonus weevil</td>
<td>SOC</td>
<td>-/G1</td>
<td>Includes montane dry shrublands, dry to mesic forest and woodland</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td>Striatura (Pseudobythina) sp. cf. <em>Meniscus</em></td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td>Striatura sp.</td>
<td>snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td>Succinea konaensis</td>
<td>-/snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td>Vittina tenella</td>
<td>-/snail</td>
<td>SOC</td>
<td>-/-</td>
<td>Not available</td>
<td>1998</td>
<td>C</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Branta sandvicensis</em></td>
<td>nēnē/Hawaiian goose</td>
<td>E</td>
<td>E/G1</td>
<td>Cropland, pasture, herbaceous rangeland, shrub brush rangeland, mixed rangeland, evergreen forest land, nonforested wetland, bare exposed rock and mixed barren land</td>
<td>1999</td>
<td>C</td>
</tr>
<tr>
<td><em>Buteo solitarius</em></td>
<td>'io/Hawaiian hawk</td>
<td>E</td>
<td>E/G1</td>
<td>Cropland, hedgegrow, hardwood forest, herbaceous grassland and hardwood woodland</td>
<td>1997?</td>
<td>P</td>
</tr>
<tr>
<td><em>Chasiempis sandwichensis sandwichensis</em></td>
<td>'elepaio/-</td>
<td>*</td>
<td>-/G4</td>
<td>Native Hawaiian forest, hardwood woodland and forest, nonnative forest, riparian</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td><em>Hemignathus munroi</em></td>
<td>'akiapōlō'ai/au/-</td>
<td>E</td>
<td>E/G1</td>
<td>Mesic to wet 'ōhi'a, koa-'ōhi'a, and koa-māmane forests, dry māmane and māmane-naio forests; most common in mesic koa forests and woodlands</td>
<td>1997?</td>
<td>C</td>
</tr>
<tr>
<td><em>H. virens virens</em></td>
<td>amakiki/-</td>
<td>+</td>
<td>-/G3</td>
<td>Humid 'ōhi'a forest, drier mamane-naio forest, subalpine scrub; at higher elevations and also in lowland mixed native-exotic forest</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td><em>Himantopus sandvicensis</em></td>
<td>'apanane/-</td>
<td>+</td>
<td>-/G4</td>
<td>Hardwood forest, native and mixed native/nonnative forests in higher elevations</td>
<td>2000</td>
<td>C</td>
</tr>
<tr>
<td><em>Loxocœides bailleui</em></td>
<td>palila/-</td>
<td>E</td>
<td>E/G1</td>
<td>Māmane and māmane-naio forests</td>
<td>2000</td>
<td>C</td>
</tr>
</tbody>
</table>
Table 8-21
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at PTA ROI (continued)

<table>
<thead>
<tr>
<th>Species (Scientific Name)</th>
<th>Hawaiian Name/ Common Name</th>
<th>Federal Status</th>
<th>State²/Global Status³</th>
<th>Habitat</th>
<th>Date Last Observed</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myadestes obscurus</td>
<td>'ōma'o/-</td>
<td>+</td>
<td>-/G4</td>
<td>Primarily inhabits mesic and wet native ʻōhiʻa and mixed ʻōhiʻa and koa forests above 1000 meters elevation; also found in mixed tree fern ʻōhiʻa habitat in Hawaiʻi Volcanoes National Park, ʻōhiʻa scrub on lava flows, kipukas, and treeless alpine scrub</td>
<td>Unknown²</td>
<td>P</td>
</tr>
<tr>
<td>Pterodroma phaeopygia sandwichensis</td>
<td>'ua'u/Hawaiian dark-rumped petrel</td>
<td>E</td>
<td>E/G1</td>
<td>Open ocean; breeds along barren mountain slopes</td>
<td>1996²</td>
<td>P</td>
</tr>
<tr>
<td>Vestiaria osaias</td>
<td>'iwi/Hawaiian honeycreeper</td>
<td>+</td>
<td>-/G4</td>
<td>Native forests especially ʻōhiʻa (Metrosideros) forest</td>
<td>1999²</td>
<td>P</td>
</tr>
<tr>
<td>Lasiurus cinereus semitus</td>
<td>-/Hawaiian hoary bat</td>
<td>E</td>
<td>E/G5T2</td>
<td>Bare rock, cliff, hardwood forest, grassland/herbaceous, hardwood woodland, and riparian habitats</td>
<td>1996</td>
<td>C</td>
</tr>
</tbody>
</table>


Notes:
*The state endangered listing refers only to the populations on Oʻahu, Lanai, and Molokaʻi.

**Federal:**
- E = Endangered
- SOC = Species of concern
- + = Birds of Conservation Concern

**Heritage Global Rank:**
- G1 = Species critically imperiled globally (typically 1-5 current occurrences)
- G3 = Species with restricted range, rare globally (typically 20-100 current occurrences)
- G4 = Species apparently globally secure
- G5 = Species demonstrably globally secure
- T1 = Subspecies critically imperiled globally (typically 1-5 current occurrences)
- T2 = Subspecies imperiled globally (typically 6-10 occurrences)

**State**
- E = Listed as endangered
- /- = No Status

**Likelihood of occurrence on the project site**
- C = Confirmed
- P = Potentially may occur
- U = Unlikely to occur
Figure 8-35
Sensitive Wildlife Species in the Pōhakuloa Training Area Terrestrial Biological Region of Influence
There is one Federally listed endangered seal, the monk seal \textit{(Monachus schauinslandi)}. The monk seal has critical habitat in the northwestern portion of the Hawaiian Island chain, outside of the PTA ROI.

There are five listed sea turtles that could occur in the Pacific tropical waters of Hawai‘i and could potentially occur in the PTA ROI. The most likely of these are the green sea turtle \textit{(Chelonia mydas)}, which is federally threatened, and the leatherback sea turtle \textit{(Dermochelys coriacea)}, which is federally endangered. The green sea turtle is the most likely to occur in the coastal portions of the PTA ROI. The leatherback turtle is expected to occur most commonly in offshore waters. Adult leatherbacks are commonly sighted in the waters off the outer Hawaiian Islands (NOAA Fisheries 2000z). The other species, i.e. the loggerhead \textit{(Caretta caretta gigas)}, hawksbill \textit{(Eretmochelys imbricata)}, and olive ridley \textit{(Lepidochelys olivacea)}, are less common but have the potential to occur. Hawksbills and green sea turtles nest annually on Hawaiian beaches (ONR 2000) though no nests for either species have been documented in the PTA ROI. The hawksbill species is considered uncommon in Hawaiian waters, but does have nesting sites on Hawai‘i and Moloka‘i (NOAA Fisheries 2000y) are distant from the ROI. Loggerheads and olive ridleys are known to occur in Hawaiian waters as they occur as bycatch in the longline fishery, but they are predominantly pelagic species. Loggerheads are known to spend 40 percent of their time at the surface, and olive ridleys are only at the surface 20 percent of the time and tend to be found in shallower waters than loggerheads (Polovina et al. 2000). Olive ridleys are the most abundant sea turtles in the world (Polovina et al. 2000) though they are less common in Hawaiian waters. Most records of olive ridley are from entanglements and strandings (NOAA Fisheries 2000aa).

The green sea turtle is expected to be the most common near the coastlines, while the other species would more likely be in the offshore waters along the transit lines for the vessels traveling between Oahu and the island of Hawaii.

Of these ESA-listed marine wildlife, the most likely occurrences in the ROI would be for the humpback whale, the sperm whale, the monk seal, and both the green and leatherback sea turtle. Table 8-19 lists the likelihood of occurrence of these species within the project area and associated habitat and regulatory information. The natural history of these species, as well as specific documented locations either in or near the PTA ROI (if known), is described in Appendix I-1.

\textbf{Humpback Whale (FE/MMPA)}

The waters off the coasts of the Hawaiian Islands are known for their seasonal population of humpback whales, which are also the most abundant marine mammal throughout the Hawaiian waters (Mobley et al. 2001). The Hawaiian Islands serve as an important breeding ground for this species (Calambokidis et al. 1998). The humpback whale is the only one of the five endangered baleen whales potentially occurring in Hawaiian waters that is known to be present in reasonably large numbers. The International Whaling Commission and NOAA Fisheries consider the Hawaiian population of humpbacks to be a separate stock (NOAA Fisheries 2000a). Humpback whales are found throughout the island chain and are most abundant in coastal waters of the main Hawaiian Islands, including Hawai‘i and O‘ahu, from November through April, with peak abundance occurring from late February through mid-
March (Baker and Herman 1981). Approximately two-thirds of the entire North Pacific humpback whale population (approximately 4,000 to 5,000 whales) migrate to Hawaiian waters to breed, calve, and nurse (NOAA Fisheries 2000a). These whales are generally found in shallow waters shoreward of the 600-foot (183-meter) depth contour (ONR 2000).

Humpback whale mothers and calves prefer the calmer shallower waters often found on the leeward sides of the islands (Smultea 1992), and they prefer very shallow water less than 60 feet (18 meters) (ONR 2000; Smultea 1992). Some results suggest that habitat use patterns of females and calves in nearshore areas may decrease as a result of increasing vessel traffic and human activities (ONR 2000). Humpback whales are vulnerable to human disturbance in Hawaiian waters and possibly to vessel strikes. Hawai‘i regulations prohibit boats from approaching within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs. Humpback whales (of varying pod sizes and types, including mother and calf pods) are commonly sighted off the O‘ahu coast and are confirmed in project area waters, though with unknown frequency, from January through April (Pickering 2003; Clark and Tyack 1998).

Monk Seal (E/MMPA,D)
The monk seal is the only pinniped (seal species) known to occur in the Hawaiian archipelago, and it is endemic. This species may occasionally occur in the waters or shore of the ROI. However, it is more common in the northwest island chain. Incidental transients are known at all of the main seven islands, and two individuals are known from the North Kohala area of the island of Hawaii. There is a small uncounted population on the island of Niihau (NOAA Fisheries 2000w). The species was designated as depleted under the MMPA in 1976, following a large decline in animal counts from the late 1950s and mid 1970s. The monk seal was also listed as endangered under the ESA in 1976. In 1988, NOAA Fisheries designated critical habitat for the Hawaiian monk seal but this area is quite distant from the ROI. It is designated in 10 areas of the northwestern Hawaiian Islands, extending from shore to a distance offshore to 20 fathoms (180 feet, or 55 meters) of depth. The species is managed as one stock, though each island may in fact have its own subpopulations (NOAA Fisheries 2000w). Virtually nothing is known about its distribution and movement patterns when it is at sea. Current estimates indicate that the monk seal population is declining and is believed to include approximately 1,000 animals. Hawaiian monk seals breed primarily at Laysan Island, Lisianski Island, and Pearl and Hermes Reefs but also are known to use the Midway Islands, among other northwest Hawaiian Islands (NOAA Fisheries 2000w).

Green sea turtle (FT)
The green sea turtle is considered the most abundant turtle in Hawaiian waters (Zug et al. 2002; ONR 2000; NOAA Fisheries 2000x-z, 2000aa, 2000bb). The Hawaiian population of nesting green sea turtle comprise a distinct genetic unit (Zug et al. 2002). Except during their post-hatching pelagic phase, this species spends the majority of time in coastal waters, shallow bays, and nearshore areas where foraging is optimal (Brill et al. 1994; Zug et al. 2002). Juveniles and subadult green turtles are especially abundant in the nearshore areas. These turtles have nested on all of the seven main islands (Dollar 1999). The most accurate abundance estimates for adult female green turtles which nest annually on Hawaiian beaches are from 450 to 475 animals, with the majority of reproduction taking place at the French
Frigate Shoals (Balazs 1980; NOAA Fisheries 2000x, 2000y). Submergence intervals vary by behavior. When the animals are resting, they have regular, long submergence intervals. When feeding, submergence intervals are short and irregular (Brill et al. 1994). In Hawaii, 40 – 60 percent of immature green sea turtles suffer from fibropapillomatosis, a disease that causes tumor growth (Work et al. 2003). Studies are currently ongoing to assess the impacts of these tumors on the animal’s behavior.

Green sea turtles are expected to occur especially in the coastal portions of the ROI or on beach habitats. This species is known to feed on marine plants that occur in the ROI and in the nearshore areas. The PTA ROI does have sea turtle foraging and resting areas. Green sea turtles have been shown from some Hawaiian areas to remain within a small portion of a habitat area if foraging and rest habitat is optimal there, and to have short submergence intervals (Brill et al. 1994). During the breeding season, adult green sea turtles undertake long-distance oceanic migrations from feeding areas throughout the Hawaiian archipelago to nesting beaches at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl Reef and Hermes Reef, Cure Atoll, and Midway Island. It is hypothesized that green turtles in the Hawaiian archipelago could be a genetically distinct subpopulation (NOAA Fisheries 2000x). The majority (90 percent) of green turtle nesting in the Hawaiian Islands occurs far distance from the ROI at the French Frigate Shoals, the portion of the islands that are 800 miles (1,482 kilometers) northwest of the main Hawaiian Islands, consisting of a string of 11 small island regions.

**Leatherback sea turtle (FE)**

Leatherbacks do not nest regularly or in great numbers in the Hawaiian Islands (NOAA Fisheries 2000x, 2000aa). Adult leatherbacks are commonly sighted in the Pacific Ocean near the Hawaiian archipelago, primarily over deep oceanic waters. Leatherbacks could occur equally as frequently off any of the main seven islands, but they are often sighted off the north shores of both O'ahu and the island of Hawai'i (NOAA Fisheries 2000z; ONR 2000). They are considered to have the potential to occur in ROI waters (NOAA Fisheries 2000z).

**Sensitive Habitats**

**Critical Habitat**

Critical habitat designation ensures that any USFWS authorized action on that land is not likely to result in destruction or adverse modification of that habitat. Critical habitat was designated for 41 plants on the Island on Hawaii in 2003.

Army lands were excluded from critical habitat based upon a rationale that recognizes and emphasizes the essential contribution that Army-led natural resource conservation actions play in the recovery of threatened and endangered species. These contributions include ongoing and proposed management actions specified in Integrated Natural Resource Management Plans (INRMPs) and other natural resource conservation programs. The INRMPs for Army installations on the islands of Oahu and Hawaii complement and support recovery goals through monitoring, invasive species control, and endangered species management, thereby providing conservation benefits to listed species.
There are presently four noncontiguous specially managed vegetation areas on PTA. These areas were designated as such because of their botanical composition or rare species potential habitat. Areas additional to these are fenced units protecting individuals or populations of rare plants. In addition, there are Botanically Significant Areas within the Region of Influence (ROI) of the proposed action outside of Army installation boundaries in the West PTA Acquisition Area (Palmer 2003).

Palila critical habitat was first designated in 1977 when the USFWS dedicated 60,187 acres (24,357 hectares) for their protection (USFWS 1977a and 1977b). There are 2,569 acres (1,040 hectares) of this habitat are in two noncontiguous areas on PTA (Figure 8-36). The vegetation of critical habitat area A, adjacent to the BAAF, is mostly Dodonaea shrubland, with Eragrostis atropoides, māmane (Sophora chrysophylla), and naio (Myoporium sandwicense). There are no firing points in this area. Critical habitat area B is mainly māmane and naio open forest, sophora myoporum shrubland with grass understory, and contains 11 firing points (USARHAW and 25th ID[L] 2001b). There is no plant critical habitat designated within the ROI.

Hawaiian Islands Humpback whale National Marine Sanctuary
The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) was designated under the National Marine Sanctuaries Act (16 U.S.C. 1431 et seq., P.L. 106-513). This act was enacted to designate and manage areas of the marine environment with special national significance as National Marine Sanctuaries. The primary objective of this law is to protect marine resources. The Act also directs the Secretary of Commerce to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection. Sanctuaries are managed according to site-specific Management Plans prepared by the NOAA Fisheries. HIHWNMS waters are composed of five separate areas abutting six of the major islands. Designated sanctuary waters encompass the entire western portion of the island of Hawai‘i and include waters just outside and surrounding Kawaihae Harbor (see Figure 3-13).

Biologically Significant Areas
The Hawai‘i Natural Heritage Program has defined three types of BSAs for managing important natural communities (Figure 8-37). Areas outside of PTA proper but within the ROI, such as PTA Trail and Kawaihae Harbor, have not been evaluated for BSA status.

BSA1 contains a high density of federally listed endangered, proposed endangered, or candidate species; approximately 11,618 acres (4,702 hectares) within PTA proper is designated as BSA1. This includes a portion of Kipuka Kalamauna endangered plants habitat and Pu‘u Kapele, which is the site of a large population of Haplostachys haplostachya (USARHAW and 25th ID[L] 2001b).
Figure 8-36
Federally Designated Palila Critical Habitat in the Pōhakuloa Training Area Terrestrial Biological Region of Influence
Figure 8-37
Biologically Significant Areas Found in the Pōhakuloa Training Area Terrestrial Region of Influence
BSA2 contains all or some of the following: lower densities of current occurrences of federally listed endangered or proposed endangered species, current occurrences of candidate species or other species of concern that are expected to be upgraded to federally protected status within the next few years, and areas judged likely to contain high densities of federally listed species based on habitat assessment, despite the lack of any record of such occurrence to date. Approximately 20,909 acres (8,462 hectares) of BSA2 are identified in PTA proper.

BSA3 is stands of intact native vegetation, with few known occurrences of rare elements. These areas are valuable for their remnant natural vegetation and the potential to support reintroduced special status species. BSA3 areas make up a large portion of PTA, including a large portion of central and southern PTA. There are 45,841 acres (18,551 hectares) of BSA3 occurring within PTA proper.

8.10.2 Environmental Consequences

In response to the agency and public comments received during the Draft EIS comment period we reevaluated our analysis of the biological resources. As a result of considering these comments and a reanalysis of the available information, we recognize that the impact to biological resources from fire could not be mitigated to the less than significant level. However, these impacts will be substantially reduced as a result of mitigation.

Summary of Impacts

Biological resources that have been considered include vegetation communities, wildlife, sensitive species, and sensitive habitats. All biological resources have been assessed for potential impacts from project activities. Significant impacts have been identified from fire and from construction and training activities, both of which would occur to sensitive species and habitat. Significant impacts mitigable to less than significant have been identified for impacts from the spread of nonnative species from construction and troop movements on sensitive species and sensitive habitat. Less than significant impacts have been identified from construction and training on general vegetation and wildlife, for migratory birds from the FTI construction, from noise and visual effects from construction and other project activities on wildlife, from vessel transport on marine wildlife and habitat, and runoff impacts on marine wildlife and coral ecosystems. For a full description of the impact methodology used to determine impact on a resource please refer to chapter 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of significant and less than significant impacts is provided in Table 8-22.

Proposed Action (Preferred Alternative)

Implementing the Proposed Action would increase the amount of land used for training ranges and maneuver lands, which would directly and indirectly impact biological resources.

Significant Impacts

Impact 1: Impacts from fire on sensitive species and sensitive habitat. Wildfire is a great threat to flora and fauna communities at PTA. An increase in construction and training at PTA would increase the likelihood of wildfires, which can spread rapidly and affect areas outside of the initial ignition area.
Table 8-22
Summary of Potential Biological Impacts at PTA

<table>
<thead>
<tr>
<th>Impact Issues</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
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<tbody>
<tr>
<td>Impacts from fire on sensitive species and sensitive habitat.</td>
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<tr>
<td>Impacts from construction and training activities on sensitive species and sensitive habitat.</td>
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<tr>
<td>Impacts from the spread of nonnative species on sensitive species and sensitive habitat.</td>
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<tr>
<td>Impacts from construction and training activities on general habitat and wildlife.</td>
<td>☒</td>
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<tr>
<td>Threat to migratory birds.</td>
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<td>Noise and visual impacts.</td>
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<td>☒</td>
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<tr>
<td>Vessel impacts on marine wildlife and habitat.</td>
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<td>☒</td>
</tr>
<tr>
<td>Runoff impacts on marine wildlife and coral ecosystems.</td>
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In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

LEGEND:

☒ = Significant
☐ = Significant but mitigable to less than significant
☐ = Less than significant
☐ = No impact

+ = Beneficial impact
N/A = Not applicable

The use of various types of ammunition, weapon systems, and pyrotechnics during military training increases the risk of wildfire ignition. Proposed actions that could ignite fires include the use of BAX and the AALFTR. Fire sources associated with the proposed SBCT actions are discussed in detail in Chapter 8, Section 8.12, under fire hazards.

Federally listed species are known to occur within the immediate areas of the proposed ranges and in various areas throughout PTA and the WPAA (see Tables 8-20 and 8-21). Vegetation communities of PTA generally consist of montane dry forest and shrubland and subalpine dry forest and shrubland, all dominated by native species, while the WPAA is dominated by nonnative grasses and shrubs. BSAs that occur within the ROI and that would be affected by fire are presented in Figure 8-37. Species that occur within the surface danger zones of the proposed ranges could be affected by munitions during the operation of the proposed ranges. In addition to vegetation loss, major adverse ecological effects of wildland fires include reduced watershed stability, soil erosion, increased risk of weed invasion, and loss of native habitat. Increased fire frequency would affect the structure, composition, and function of ecosystems. An additional detrimental effect from fire is damage of and disturbance to native seedbeds. Though some native plants do show a degree of tolerance to fire and an ability to establish seedlings in a post-fire environment, these species are still not
as vigorous as the nonnative colonizers with which they compete. The spread of nonnative species that results from wildfires is considered a significant impact because nonnative species often out-compete native species and destroy native communities, as addressed in Impact 3. Impacts from fire on sensitive species including federally listed species are expected to be significant. The mitigation measures below will substantially reduce the impacts but not to less than significant levels.

**Regulatory and Administrative Mitigation 1.** The effects of the proposed action on listed species in the ROI have been evaluated in the ESA Section 7 Consultation with USFWS. The Army will implement all the terms and conditions defined in the Biological Opinion issued by USFWS for current force and SBCT proposed actions on the island of Hawai‘i, including the PTA Implementation Plan. These measures will help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementation of the proposed action. The Biological Opinion is available upon request.

The Integrated Wildland Fire Management Plan for Pohakoloa and Oahu Training Areas was updated on October 2003. The Army will fully implement this plan for all existing and new training areas to reduce the impacts associated with wildland fires. The plan is available upon request.

Prescribed burns will require separate ESA Section 7 consultation with USFWS.

**Impact 2: Impacts from construction and training activities on sensitive species and sensitive habitat.** The Proposed Action would result in short- and long-term impacts on listed species and their designated critical habitat within the ROI as a result of construction and increases and changes to training. Listed species affected by the Proposed Action include the following species:


- **Wildlife:** *Branta sandvicensis*, *Buteo solitarius*, *Hemignathus munroi*, and the palila (*Loxoiides bailleui)*.

The latest designation for plant critical habitat on the Island of Hawaii excluded Army training lands however, federally listed plant species do occur in populations on the Army training lands. Within the ROI one wildlife species, the palila, has critical habitat. Proposed activities border on the palila designated critical habitat (Figure 8-36) in the ROI. There are 2,569 acres of palila critical habitat within the ROI. The Army is responsible for maintaining this habitat in a condition suitable for the palila and, by doing so, contribute to the recovery of the species.
Construction activity and increased training would have adverse impacts on the habitat, deterring the recovery of the species. Battle Area Complex construction, for example, will destroy the easternmost population of *Haplostachys haplostachya*, significantly reducing the distribution of this species. Populations of *Silene hawaiiensis* are known from the footprints of the BAX and AALFTR, and up to 20 percent of the total number of existing plants of this species could be adversely affected by construction. One individual representing less than one percent of the total population of *Zanthoxylum hawaiiense* occurs in the BAX project area and would likely be affected by construction. Construction activities would also increase the spread of nonnative species (Impact 3).

There would be a limited short-term impact on critical habitat from construction of the FTI, the Range Maintenance Facility, and the BAAF runway upgrade/extension. Construction-related dust, noise, the spread of nonnative species (discussed in Impact 3), and increased fire hazard would adversely impact palila federally designated critical habitat. Long-term impacts on listed species and their critical habitat include habitat degradation and reduction from increased human activity, spread of nonnative species due to habitat disturbance, and the higher risk of people bringing nonnative species to the area on their clothing, equipment, or vehicles. The habitat degradation caused by vegetation trampling, erosion, and an increase in the visual presence of Soldiers in and around the critical habitat would damage plant habitat and deter wildlife use of the area. Stryker maneuvers in these areas are likely to adversely affect populations of *Stenogyne angustifolia* and *Vigna o-waunensi*.

Changes to dismounted training would include activities in TA 23, while avoiding the 1,500 acres (607 hectares) around the MPRC. Troops would be transported to TA 23 by either Strykers or trucks using existing roads. Soldiers would begin dismounted training in tactical formations by walking in dispersed groups overland, toward a given objective. During simulated engagement some Soldiers may use ammunition consisting of blanks and laser weapons and seek concealment or cover during nonlive-fire training. Soldiers could trample listed plant species identified in the area, including *Silene hawaiiensis*, *Asplenium fragile var. insularis*, *Hydinae cordaema*, *Silene lanceolata*, *Spermolepis hawaiiensis*, and *Zanthoxylum hawaiiense* (Figure 8-34). Listed wildlife, such as the nene, have been recorded in the proximity of TA 23 (Figure 8-35) and would be disturbed by noise of approaching Strykers, nonlive fire, and the increase in human presence in the area.

A moderate to large portion of vegetation within the construction footprints (approximately 10 to 30 percent) would be affected during construction of the proposed ranges. Native mammals and birds capable of escaping the area would be expected to vacate during construction and less mobile creatures, such as small mammals (nonnative) and invertebrates, could be killed during or as a result of construction of the proposed projects. Table 8-23 indicates the area of disturbance during construction of proposed ranges. Grading during construction would involve turning up the ground, moving topsoil and vegetation, and staging the heavy machinery area, would cause intensive short-term disturbance to vegetation. This represents a significant impact on native vegetation communities. Listed plant and wildlife are known to exist in the PTA ROI and would be affected by the loss and degradation of the PTA ROI (Tables 8-20 and 8-21).
Off-road mounted maneuver would occur on approximately 31,230 acres (12,675 hectares) at PTA, primarily in the WPAA (Figure 2-6). Use of PTA Trail and the WPAA would increase the stress on the environment. The impact of all vehicle use in the PTA ROI is estimated at 92,794 MIMs as compared to the 13,659 MIMs based on all current vehicles. Long-term loss and degradation include the loss of open space areas in and around the areas proposed for project construction and in the WPAA where extensive off-road dismounted maneuver is proposed. A direct loss of habitat would be associated with the construction of PTA Trail. Sections of PTA trail would cross biologically sensitive areas with stands of intact, relatively common native vegetation types. Part of the reason that these communities still exist is their remote location. Opening this area up to the more direct effects of humans threatens these communities and their diversity. Hawaiian plant communities evolved without the environmental pressures that are prevalent on major landmasses and thus have no defense mechanisms to cope with these stresses. Fragmenting these sensitive communities interrupts corridors for species to naturally disperse, encourages the spread of nonnative plants, and limits the potential for nonnative species-dominated areas to be reclaimed to reintroduce native species.

Training restrictions on palila critical habitat, established based on ESA Section 7 consultation that occurred after the designation of critical habitat in 1977 (USARHAW and 25th ID[L] 2001b), would continue to apply to activities under the Proposed Action. Additional potential impacts such as the effects of increased noise in this area were investigated along with the effects on palila as a part of the most recent (2003) ESA Section 7 consultation. The increased likelihood of training-related fires and the increase in extent and intensity of such a fire is also a threat to this species and is discussed in detail in Impact 1. No off-road mounted maneuvers would be allowed in the critical habitat.

The Proposed Action would significantly impact sensitive species and sensitive habitat from construction and training activities. The mitigation measures below would substantially reduce the impacts but not to less than significant levels.

**Regulatory and Administrative Mitigation 2.** The Army will implement all the terms and conditions defined in the Biological Opinion issued by USFWS for current force and SBCT proposed actions on the island of Hawai‘i, including the PTA Implementation Plan. These measures will help avoid effects and compensate for impacts on listed species that would
result directly and indirectly from implementation of the proposed action. The Biological Opinion is available upon request. Some of the terms and conditions of the BO include:

- If a construction site is within 75 meters (246 feet) of a listed plant occurrence, then construction grading or earth moving operations shall be sprayed with water to reduce airborne dust.
- The Army will maintain a minimum of 12 percent ground cover in off-road maneuver areas on PTA.

The Army will implement land management practices and procedures described in the ITAM annual work plan to reduce erosion impacts (US Army Hawai‘i 2001a). Currently these measures include: implementation of a training requirement integration (TRI) program; implementation of an Integrated Training Area Management (ITAM) program; Sustainable Range Awareness (SRA) program; development and enforcement of range regulations; implementation of an Erosion and Sediment Control Management Plan; coordinating with other participants in the Koolau Mountains Watershed Partnership (KMWP); and continued implementation of land rehabilitation projects, as needed, within the Land Rehabilitation and Maintenance (LRAM) program. Examples of current LRAM activities at KTA include: revegetation projects involving site preparation, liming, fertilization, seeding or hydroseeding, planting trees, irrigation, and mulching; a combat trail maintenance program (CTP); coordination through the Troop Construction Coordination Committee (TCCC) on road maintenance projects; and development of mapping and GIS tools for identifying and tracking progress of mitigation measures.

Regulatory and Administrative mitigation measures identified in Section 8.8, Water Resources and Section 8.9, Geology, Soils, and Seismicity, would lessen this impact on sensitive species and habitat.

**Additional Mitigation 2:** The Army proposes to fence or flag where practicable any sensitive plant communities from activities that may take place in the ROI. The Biological Opinions outline fencing for the majority of the sensitive species. USARHAW will evaluate if additional fencing may be necessary.

**Significant Impacts Mitigable to Less than Significant**

**Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat.** The Proposed Action would lead to an increase in nonnative species for the short and long term in the PTA ROI. In general, nonnative species (both plant and animal) pose a threat to Hawaiian native ecosystems (Atlas 1998).

Introduction or spread of existing or new aggressive nonnative plant species can alter native plant habitat and create competition with native and sensitive plants for space, nutrients, and light (Atlas 1998). Invasive plants have an advantage in becoming established in an environment that is stressed and can often out-compete native species that are not adapted to the novel environment created through human activity (Wagner et. al. 1999). Nonnative species often benefit from fires, due to their ability to colonize areas following a burn. In
addition, nonnative plant species are frequently more flammable than native plant species, so that fires are more likely to occur and affect the populations to a larger extent. Although most plant species in and around the proposed PTA Trail and the WPAA are nonnative, there is the possibility that the area could be further disturbed, by increasing the fire hazard for surrounding sensitive areas and species. This impact would affect the sensitive plant species and sensitive wildlife species (Tables 8-20 and 8-21) that are likely to occur within the PTA ROI.

Movement of troops and equipment into Hawai‘i from continental US or foreign ports, as well as from other islands or subinstallations within Hawai‘i would increase the likelihood of nonnative plant introductions. Construction workers and equipment used to build the PTA Trail, the construction at BAAF, and range ground softening would introduce and spread nonnative species. The BAAF runway upgrade and expansion also risk introducing animal species because the airplanes are more likely to bring in nonnative species by transporting cargo, stored goods, and additional Soldiers.

Implementation of the Proposed Action would increase the number of vehicles traversing PTA Trail, including both Strykers and conventional vehicles. There would be 145 trucks and HMMWVs and 96 Strykers that would travel from Kawaihai Harbor to PTA twice a year. This would be an increase in 105 trucks per event from existing current force use patterns and a 100 percent increase in Stryker use. Ninety percent of the Strykers and sixty percent of the trucks would travel along the PTA Trail. Strykers have a more intense impact on the land than do conventional military vehicles already in use (discussed in Impact 3). The more intense impact on the land would increase the potential for the spread and establishment of nonnative and invasive plant species. Dismounted training in Training Area 23 would likely introduce and spread nonnative species in this high value habitat which supports many sensitive species. The Proposed Action would also increase the likelihood of a fire in the ROI, as detailed in Impact 1.

Nonnative wildlife species are an existing problem in the ROI that would not change as a result of implementing the Proposed Action. The prolonged prohibition of hunting in certain areas due to the presence of unexploded ordnance could be a factor in the proliferation of nonnative mammals at PTA.

**Regulatory and Administrative Mitigation 3.** As required in the terms and conditions of the Biological Opinions, the Army will:

- Educate soldiers and others potentially using the facilities and roads in the importance of cleaning vehicles, equipment and field gear.

- Educate contractors and their employees about the need to wear weed-free clothes and to maintain weed-free vehicles when coming onto the construction site and to avoid introducing nonnative species to the project site.

- Prepare a one-page insert to construction contract bids informing potential bidders of the requirement.
- Inspect and wash all military vehicles at wash rack facilities prior to leaving PTA to minimize the spread of weeds, such as fountain grass, and animal (invertebrate) relocations.

- Ungulates shall be removed from all future fence exclosures to include the western fence unit and all eastern fence exclosures. The existing fenced areas, Kipuka Kalawamauna, Kipuka Alala, and Puu Kapele shall remain basically ungulate free. In addition, the existing fence exclosures on the Keamuku Parcel around Puu Papapa and Puu Nohonaohae shall remain ungulate free and upgraded if necessary. All ungulates shall be removed from the new fence exclosures by 2010. An annual aerial survey of each fenced area shall be conducted after 2010 to ensure that ungulates have not returned to the fence units. Ground surveys will ensure the fencelines are intact. If ungulates are observed, appropriate hunts or snaring shall immediately commence to remove these animals. The objective is to keep all fence units ungulate free, however, complete removal of ungulates may be difficult to maintain at all times due to the size, topography and/or density of vegetation within the various exclosures. However, the goal is to have all fence units as ungulate free as practicable. The Implementation Team shall address the frequency and logistics associated with fence maintenance and hunting programs to accomplish the ultimate objective.

- If a new introduction of a nonnative animal is found, the source and time of the introduction will be identified, and the area will be searched and treated with an appropriate pesticide to eradicate any other individuals of the target species that may be present. In addition, an area deemed adequate to cover the potential dispersal distance of the new nonnative animal will be searched and treated as well.

USARHAW will follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines Federal Agency duties in regards to preventing and compensating for invasive species impacts. USARHAW will agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. The Implementation of an Environmental Management System will further improve the identification and reduction of environmental risks inherent in mission activities.

In accordance with USDA regulations and requirements, cargo originating outside of Hawai‘i will be inspected by USDA and certified to ensure it is not carrying the brown tree snake or other reptiles before transporting cargo for use on training ranges.

**Additional Mitigation 3:** The Army proposes to use native plants in any new landscaping or planting efforts where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.
Less than Significant Impacts

Impact 4: Impact from construction and training activities on general habitat and wildlife. The Proposed Action is expected to have a less than significant impact on general vegetation, wildlife, and habitat at PTA. Impacts from trampling and an associated reduction in vegetative groundcover would result in loss and degradation of habitat for general vegetation, wildlife, and habitat and would be similar to impacts described under Impact 2, for to sensitive species but since these activities would take place primarily in areas of nonnative vegetation less than significant impacts are expected. The Proposed Action would disturb general vegetation and wildlife by removing vegetation, deterring wildlife from foraging, and promulgating other general degradation effects that would result from elevated human activity in the PTA ROI but not to a significant level.

Nonnative vegetation communities and barren lava prevail in the areas of proposed construction. As mentioned in the affected environment section, these communities are all affected by fountain grass, which can rapidly invade a disturbed community. Impacts in these areas would include trampling and disturbance from vehicles and military personnel. Communities within the proposed range areas would be disturbed by trampling and general operation of the ranges. In addition, operation of the proposed ranges could affect biological resources within the impact area and associated surface danger zones. The use of certain types of ammunition increases the chances of starting fires in the impact area and within the surface danger zones. The potential introduction of fire resulting from the operation of the proposed ranges is discussed under Impact 1 and Impact 3.

Due to the weight of the Stryker vehicle, vegetation in areas where the Stryker performs off-road maneuvers likely would be crushed or flattened along tire paths. Stryker maneuvers would generally occur in unforested areas at PTA that contain nonnative vegetation communities. There are areas with high concentrations of native species that will be avoided as discussed under Impact 2. Stryker operations on roads and trails within the installation would not be expected to affect biological resources. Off-road maneuvers would not adversely affect general biological resources. However, the Army would implement SOPs to prevent adverse impacts on biological resources.

Vehicle movements on the ranges and through maneuver training areas would disturb soils and increase the amount of dust in the air. Additional impacts to the soils in the ROI are discussed in section 8.9. Additional impacts associated with dust and air quality are discussed in Section 8.5.

Use of the UAV would occur over much of the land area at PTA but would not be expected to affect biological resources during normal operation. Due to the nature of the UAV, accidents would be possible and could cause wildfires. The impact of potential wildfires within the ROI is discussed under Impact 1.

Lava tubes have been surveyed for arthropods. However, these surveys are incomplete and therefore inconclusive. A more detailed survey will be conducted prior to construction to determine presence and extent of the root dependent arthropods.
Operation of the ranges is likely to displace various wildlife species, such as birds and rodents. Mobile wildlife would vacate areas immediately adjacent to the ranges while the ranges were in use due to disturbance. Displacement would likely be caused by increased human presence in the area, as well as by elevated noise levels. Wildlife within the impact area and associated surface danger zones could be affected by ordnance or other munitions. The potential introduction of fire, which could affect wildlife, is discussed under Impact 1.

Increased noise levels associated with the Proposed Action would not be expected to adversely affect wildlife species at PTA or the WPAA.

Additional Mitigation 4: The Army proposes to conduct more intensive surveys of lava tubes identified as potentially supporting native root dependent arthropods. Lava tubes found to contain or support native root dependent arthropods will be avoided where practicable. All generated construction and training related drainage will be channeled away from lava tubes.

Threat to migratory birds. The presence of the FTI antennas could significantly affect migratory bird species known to occur in the PTA ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai‘i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000). A full description of the FTI is located in Appendix D, but in general, the antennas are under 100 feet (33 meters) high and will be mounted on already existing structures. They will not use guy wires or location lighting though some may have a small light on top as a signal to aircraft operators.

Some migratory bird species known to occur at PTA that could be adversely affected by the Proposed Action include the white-tailed tropicbird, black-crowned night heron, barn owl, golden plover, and northern cardinal (USARHAW and 25th ID[L] 2001a).

UAVs would be allowed in restricted airspace over the entire training area, but activity is not anticipated to threaten night-migrating birds. If night collisions with birds did occur, then UAV operations would be halted at night until the USFWS and the Army could agree on a solution.

Noise and visual impacts. The Proposed Action would have short- and long-term noise impacts on terrestrial wildlife. These impacts would be negative but less than significant. Areas surrounding the proposed PTA Trail, BAAF runway upgrade and extension, ammunition storage, and range maintenance facility projects would be exposed to greater human noise as a result of these projects. The human noise level at BAAF and the PTA cantonment area is already high. This circumstance, along with the disturbed habitat in which these facilities are located, limits the species occurring there to those that are more tolerant of human activity. Therefore, wildlife in or around these project locations would not be significantly affected by these activities. (Potential noise impacts on the palila are discussed in Impact 2.) Increased noise as a result of construction is not expected to affect terrestrial wildlife, because field
surveys have shown that it is not a significant factor in behavior and does not affect reproductive success (US Army Engineering District Honolulu 2000). Noise produced as part of proposed training activities would be mitigated by ESA Section 7 Consultation. These measures would ensure that noise impacts on sensitive species would be less than significant. No significant visual impacts are expected to terrestrial species.

Less than significant impacts on marine wildlife are expected from vessel noise. LSVs and barges do emit sounds into the marine environment, and these sounds do add a component of low frequency noise to the habitat. Any noise associated with vessels under the Proposed Action is part of existing conditions for this project. Wildlife reactions to noise depend on a variety of factors. It has been shown that marine wildlife can react adversely to the introduction of loud low frequency sounds in their habitat (Richardson et al. 1995). However, in the absence of other low frequency noise sources, some of which have historically occurred in Hawaiian waters (i.e. from other projects, like the North Pacific Acoustic Laboratory or from the Low Frequency Active Sonar project), the magnitude and intensity of noise impacts from LSV and barge vessels are not expected to be significant. Frequency of vessel use is not high, there is no meaningful change in the number of vessels from existing conditions (only six per year more than the current number 60), and animals would not be collocated with the vessels for any significant amount of time.

Less than significant impacts on marine wildlife are expected from SBCT helicopter activity between O'ahu and the island of Hawai'i. Over the ocean, the aircraft normally fly at least 1,000 feet above sea level. There is no change in helicopter activity expected from existing conditions under SBCT. The Aviation Brigade of the 25th Infantry Division has local flying rules SOPs that include a 1,000-foot (300-meter) vertical limit over whales and, more recently, over monk seals and dolphins when sighted. These procedures have already been communicated to all units flying in Hawai'i and will be formally incorporated into the local flying rules. The SOP includes a suggestion that future rules will apply to vertical as well as lateral altitude limits. They also suggest altering flight paths once wildlife is observed.

No significant noise or visual marine wildlife disturbances specific to the Proposed Action are expected from other activities at Kawaihae Harbor. This includes disturbance from harbor construction, which would be considered under separate NEPA documentation and is not being done to accommodate ships for this project. It also includes disturbance from establishing a fixed tactical tower at this site. The construction mainly involves the pouring of a small 8-foot by 8-foot concrete pad and an equipment shelter constructed on it, so related activities are minor and are not expected to result in any impacts from construction or from the minor excavation. The pad is not being constructed close to shore and there will be no related run off.

Any construction-related noise impacts are not expected to be significant because they would be short-term and would be mitigated by the reduced transmission of sound through the air-water interface. There is a possibility that a monk seal or more than one seal could haul out on this coastline but since the harbor is so highly trafficked any such individuals would be noticed, and all construction in the area would be halted until the animal left the area.
Impacts on this species from activities in the Sanctuary under the Proposed Action are not considered to be significant.

**Vessel impacts on marine wildlife.** Less than significant impacts on marine wildlife are expected from vessel transport between O'ahu and the island of Hawai'i. The increase from 60 to 66 LSV trips a year is minor and not significant. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. (Low frequency and/or mid-range sonars have been shown to cause injury and mortality in marine wildlife [Rossiter 2003], but these emissions typically occur off of vessels engaged in defense training maneuvers, not transport). Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit through Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under the Proposed Action are not considered to be significant. Theater Support Vessel (TSVs) are not in use at this time, however they may be utilized in the future. When and if that occurs, separate NEPA documentation will be done to address impacts from TSV use to marine wildlife. There is a minimal chance of ship strikes (direct hits on marine mammals) with LSVs or barges, but these are considered to be minimal due to the slow speed of the vessels.

The Army informally consulted with NOAA Fisheries on the proposed action in accordance with ESA Section 7. NOAA Fisheries concurred with the Army’s determination that the proposed action would was not likely to adversely affect federally listed species, marine mammals or essential fish habitat. (See Appendix E).

**Runoff impacts on marine wildlife and coral ecosystems.** There would less than significant impacts on marine wildlife and coral ecosystems in the PTA ROI. No significant impacts from potential runoff are expected for marine wildlife resources or coral ecosystems. The expected increase in erosion to the ocean would be within the natural range that exists due to rainfall and runoff variation. The expected increase in erosion at the harbor, described in Chapter 8, Section 8.08, would also be within the natural range that exists due to rainfall and runoff variation. There are no contaminants moving off of the range which is located quite a distance from the coastline. No contamination of surface or ground water is expected (see Section 8-06 Water Quality). There is no runoff carrying contaminants from UXOs to nearshore ocean waters and there are no UXOs in the marine ROI. No water contaminating activities are occurring in the upland portions of the marine ROI habitat and therefore no direct effects from runoff on marine wildlife or coral reefs and their associated organisms would occur.

It is known that continued development and construction along the coastline may add to the decline of this reef system via the following mechanisms: interruption of long-shore transport due to harbor development, consequent siltation of Pelekane Bay, and the close proximity to important cultural sites, causing increased recreational use and human presence (CRAMP 2003). Over time, these mechanisms would further the decline of the coral that is already a special management concern. This is further addressed in the cumulative impacts
section. The proposed construction and use of the military vehicle trail could impact protected species if activities are collocated in the nearshore environment.

However, provided best engineering practices are utilized, it is expected that these will minimize erosion and properly contain potential petroleum spills. If best engineering practices are incorporated into the project plans, vehicle trail construction is not expected to adversely impact protected species. It is also recommended that Best Management Practices (BMPs) be incorporated into the project to protect listed or otherwise protected species which may come into the nearshore project area. BMPs include ensuring that all project personnel are apprised of the status of the listed species in the area, and the protections afforded to these species under federal laws. All project personnel should become familiar with the official NOAA Fisheries brochure explaining the laws and guidelines for listed species in Hawaii. Information may also be downloaded off the NOAA web site. Also, if during project activities any listed or otherwise protected species enter the project area, activities should cease until the animal(s) voluntarily leave the area. Impacts on marine wildlife and coral ecosystems in the ROI waters under this Alternative are not considered to be significant.

The Army informally consulted with NOAA Fisheries on the proposed action in accordance with ESA Section 7. NOAA Fisheries concurred with the Army’s determination that the proposed action would was not likely to adversely affect federally listed species, marine mammals or essential fish habitat. (See Appendix E).

**Reduced Land Acquisition Alternative**

Under Reduced Land Acquisition, biological resources impacts at PTA would generally be very similar to the Proposed Action, with the following exceptions:

- QTR2 would not be built on the SRAA but rather on the Range 8 site at PTA. Construction and operation of QTR2 would occur within approximately 120 acres (48.6 hectares) in the vicinity of Range 8. Because QTR2 would be located within an existing PTA range area, collocated with the AALFTR, similar impacts and mitigation measures would occur under Reduced Land Acquisition as under the Proposed Action.

- Additional off-road mounted maneuvers would occur within the PTA ROI.

These changes would result in increases in impacts on PTA biological resources, but would not change the overall significance level of those impacts.

**Significant Impacts**

**Impact 1: Impacts from fire on sensitive species and sensitive habitat.** Impacts from fire on sensitive species would be similar to those described in Proposed Action Impact 1, but there would be an even greater probability of training induced wildfires. Construction of QTR2 on PTA Range 8 would likely increase the amount of live-fire training at PTA, thereby resulting in the potential to increase the frequency of wildfires, presenting an additional potentially significant adverse impact on sensitive species, such as *Silene hawaiiensis*, and habitat.
Regulatory and Administrative Mitigation 1. The same SOPs, BMPs, and mitigation measures described in Proposed Action Impact 1 and Section 8.12.2 would be applied under this alternative. The implementation of increased fire prevention and fire fighting measures would reduce the severity of this impact but it is still considered significant. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

Impact 2: Impact from construction and training activities on sensitive species and sensitive habitat. Under Reduced Land Acquisition, there would be additional Stryker maneuvering off-road. The 25,855 MIMs proposed for road maneuvers in the SRAA under the Proposed Action would be reallocated to PTA for primarily off-road maneuvers, for a total of 118,649 MIMs. The addition of MIMs in the PTA ROI would exacerbate an already severe impact by causing further vegetation destruction and soil erosion. Compare Figures 8-34 and 8-35 with 2-10 to see the proximity of known sensitive species and habitat to the proposed QTR2 and mounted maneuverability areas. Specifically, Range 8 contains populations of *Silene hawaiiensis*. Under Reduced Land Acquisition, additional natural vegetation communities could be adversely affected, including barren lava, *Metrosideros* treelands, *Sophora* shrublands, and *Myoporum* dominated tree and shrublands. The same SOPs, BMPs, and mitigation measures described under this impact for Proposed Action would be applied for this impact.

Regulatory and Administrative Mitigation 2. The same SOPs, BMPs, and mitigation measures described in Proposed Action Impact 2 and Section 8.12.2 would be applied under this alternative. The implementation of increased fire prevention and fire fighting measures would reduce the severity of this impact but it is still considered significant. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

Significant impacts mitigable to less than significant and less than significant biological resources impacts associated with Reduced Land Acquisition would be largely identical to biological resources impacts associated with the Proposed Action.

No Action Alternative

No Action would result in no new impacts on biological resources, but would involve a continuation of existing impacts. An in-depth analysis of current force training impacts on PTA biological resources can be found in the O'ahu Training Areas INRMP (USARHAW and 25th ID[L] 2001a) and the Endangered Species Management Plan Report (ESMPR) for Pohakuloa Training Area (R. M. Towill Corp. 1997c). All conservation measures detailed in the 2003 BO for Routine Military Training and Transformation of the 2nd Brigade 25th ID(L) at U.S. Army Installations on the island of Hawai'i (USFWS 2003e) will be enacted under this alternative as well. A synopsis of No Action Alternative impacts is given below.

Significant Impacts

Impact 1: Impacts from fire on sensitive species and sensitive habitat. Current force training threatens native habitat and sensitive species in the PTA ROI. Military activities have burned areas of native vegetation and threatened habitat for federally listed flora and fauna. The Army produced a comprehensive wildland fire management plan for PTA, to be finalized in 2004.
Additionally, the mitigation for wildland fire management listed under the Proposed Action should be implemented for current force training, including reducing the densities of fire-adapted introduced species. Mitigation for wildland fires would be the same as those under the Proposed Action. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

**Significant Impacts Mitigable to Less than Significant**

**Impact 2: Impacts from construction and training on sensitive species and sensitive habitat.** Current force activities occur near designated palila critical habitat. The BAAF and PTA cantonment area are located on or near the critical habitat (Figure 8-36). The primary threat posed to palila and palila designated critical habitat is disruption to vegetation and ecological communities caused by training activities and use of BAAF that occurs in the vicinity of valuable palila habitat. This leads to the introduction and spread of nonnative and potentially invasive species. Palila’s food source, mamane seeds and flowers, would be threatened by the introduction of nonnative vegetation (USGS 2001b). The introduction of nonnative animals could continue to lead to increased predation of native species, such as the impacts from mongoose on ground nesting bird species. Nonnative animals could also act as disease vectors and are thought to be one of the reasons for the palila’s sharp decline (USGS 2001b and 2001c). Secondarily, activities are likely to disrupt and deter use of nearby palila habitat and lower its potential value. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

**Impact 3: Impact from the spread of nonnative species on sensitive species and sensitive habitat.** Existing impacts on biological resources would continue under No Action. Nonnative plants and animals, some of which may be invasive, have likely been introduced and would continue to be introduced into natural areas at PTA. Transport of troops around the installation and between islands spreads weedy species via clothing and vehicles. In compliance with EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize risk of harm caused by invasive species. Army environmental management (Chapter 2, Section 2.2.4), including research, monitoring, and stabilization projects, would reduce these impacts to the less than significant level. All mitigation detailed under this impact for the Proposed Action as a result of ESA Section 7 consultation will be implemented for this alternative as well.

**Less than Significant Impacts**

**Threat to migratory birds.** No threats to migratory birds as a result of routine training have been identified though additional Army programs are outlined in the BO to preserve habitat and monitor species.

**Noise and visual impacts.** Noise would continue to be produced as a result of current activities. Noise would have an adverse impact on animals in the area due to disturbance but would not significantly affect their behavior and would not lead to a population level decline. Studies such as the Final Report: A Study to Determine the Effects of Noise from Military Training on the Endangered O‘ahu ‘Elepaio (HINHP 1998) show that Army-related noise on O‘ahu has not
significantly affected species, including sensitive species, such as the ‘elepaio. There are no visual impacts under this alternative.

**Vessel impacts on marine wildlife.** Less than significant impacts on marine wildlife are expected from vessel transport between O‘ahu and the island of Hawai‘i. There are 60 LSV and 4 barge trips per year. Assuming that low frequency or mid-range sonars are not used from LSVs, impacts from vessel transit is expected to be minor and not significant. Existing MMPA regulations prohibit any boats in Hawaiian waters to approach within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). LSVs and barges do transit Penguin Banks, a known high-concentration area for humpback whales. However since they travel at a maximum of 10 knots, collisions are unlikely. Impacts on marine wildlife from vessel transport in the ROI waters and/or in the Sanctuary under No Action are not considered to be significant.

**No Impact**

**Impacts from construction and training activities on general habitat and wildlife.** Training and construction would have no additional impact on general habitat and wildlife. Mounted, dismounted, and live fire activities would continue to be executed in the areas for which they are currently approved. Construction projects would be approved on a case by case basis consistent with current force needs. The ongoing Army environmental programs such as ITAM would ensure no impact to general habitat and wildlife under this alternative.

**Runoff impacts on marine wildlife and coral ecosystems.** No significant impacts from potential runoff are expected for marine wildlife resources or coral under this Alternative. Best management and best engineering practices described under the Proposed Action Alternative are expected to ensure no impacts. In addition, there are no changes from existing conditions.
CEQ regulations implementing NEPA require that the cumulative impacts of a proposed action be assessed (40 CFR Parts 1500-1508). A cumulative impact is an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over time (40 CFR § 1508.7). AR 200-2 (32 CFR 651.51) also requires that cumulative actions, when viewed with other proposed actions that have cumulatively significant impacts, should be discussed in the same impact statement.

CEQ’s guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant.” (CEQ 1997). Section 9.2 discusses other projects on the islands of O’ahu and Hawai’i that may have cumulative effects when combined with impacts from the alternatives discussed in this EIS. Cumulative projects considered below are similar to the Proposed Action, large enough to have far-reaching effects, or are in proximity to the Proposed Action with similar types of impacts.

9.1 CUMULATIVE METHODOLOGY

CEQ’s cumulative effects guidance sets out several different methods to determine the significance of cumulative effects, such as checklists, modeling, forecasting, and economic impact assessment, where changes in employment, income, and population are assessed (CEQ 1997). This EIS uses a variety of methods, depending on the resource area, to determine cumulative socioeconomic and environmental effects. Methods for gathering and assessing data on cumulative impacts include interviews, use of checklists, trends analysis, and forecasting. In general, past, present, and future foreseeable projects are assessed by resource area. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be either countervailing, where the adverse cumulative effect is less than the sum of the individual effects, or synergistic, where the net adverse cumulative effect is greater than the sum of the individual effects (CEQ 1997). Where applicable, the resource sections below include a discussion of whether project
impacts will accelerate any ongoing trends of resource degradation. The ROI for cumulative impacts is often larger than the ROI for direct and indirect impacts and the ROI for each specific resource is defined in Section 9.5. A summary of cumulative impacts in table form is provided in Section 9.5.

Based on public comments submitted on the EIS, the list of projects in Section 9.2 through 9.4 have been updated and expanded. In addition, the discussions of the cumulative impacts in Section 9.5 have been expanded and in some cases determinations have been changed to address comments raised during the EIS public review.

The projects listed under Sections 9.2 through 9.4 are anticipated to occur in the reasonably foreseeable future within the cumulative impact ROI for this project. The Army has considered the effects of these actions in combination with the impacts of the Proposed Action to determine the overall cumulative impact on the resources discussed in Section 9.5.

9.2 Projects on Both O‘ahu and Hawai‘i

Since the publication of the EIS all of these projects have been updated to their current status.

**USFWS Designated Plant Critical Habitat in O‘ahu and Hawai‘i (Project 1)**
The USFWS has designated 54,203 acres (21,935 hectares) as critical habitat on O‘ahu for 101 threatened and endangered plant species. This acreage is about 14 percent of the island, and much of it is in the Ko‘olau and Wai‘anae Mountains. Fifty-two of the plant species exist nowhere else in the world.

The USFWS has designated 208,062 acres (84,200 hectares) of land as critical habitat on the island of Hawai‘i for 46 threatened and endangered plant species. This acreage is about 8 percent of the island. Twenty-seven of the plants listed exist nowhere else in the world.

**Open Burning Permit Program (Project 2)**
Open burning is allowed in Hawai‘i, per Department of Health regulations (Hawai‘i Administrative Rules, Air Pollution Control, Title 11, Section 11-60.1-51 to -57). Most such permits are granted for agricultural burning, although open burning on Army installations is also permitted. Permits are granted year-round, except for no burn periods, which normally fall during winter trade wind season. The state does not keep records on emissions from open burns (Young 2003).

**Army Campaign Plan (Project 3)**
In late February 2004, HQDA issued a planning directive to initiate preparation of the Army Campaign Plan (ACP). The final ACP will direct the planning, preparation, and execution of Army operations and Army transformation within the context of current to future force. The planning directive initiated detailed planning and preparation for the full range of actions necessary to execute the ACP. Among the actions set forth for further planning is a proposal to transform the Army to a modular, capabilities-based configuration beginning in FY 2004.

Proposed in the main effort is the conversion of 33 current active force Brigade Combat Teams (BCT) to 43 to 48 modular BCT Units of Action (UAs) and the transition of division
base structures to modular designed Units of Employment (UEs) for command and control purposes. This conversion is independent of the proposed transformation to SBCTs in Hawaii and other locations.

The planning directive discusses the possible addition of from one to three UAs to the 25th ID(L). It is not clear where these UAs may be stationed, but Hawaii is a possibility. At this time, there is insufficient information regarding the potential structure, manning, capabilities, and equipment, of the UAs to analyze their impacts. The appropriate level of NEPA analysis and documentation would be prepared once the planning process has progressed beyond the conceptual phase and a proposed action is formulated.

**Implementation of the Army Integrated Wildland Fire Management Plan - All Army Ranges (Project 4)**

This project outlines specific guidance, procedures, and protocols in the prevention and suppression of all wildfires on all Army training lands in Hawaii. Its goal is to convey the methods and procedures necessary to minimize fire frequency, severity, size and fuels management strategies. At the same time it will allow military units a high level of combat readiness. The plan is organized around general wildfire management; installation specific information, requirements, and upgrades; and Standing Operating Procedures (SOPs) for wildfire management actions in all Fire Management Areas (FMAs) at each installation. The executive summary and chapter 1 of the IWFMP are provided in Appendix D of this FEIS.

**Range Standing Operating Procedures - All Army Ranges (Project 5)**

Fire Management Areas (FMAs) and standing operating procedures are established for training areas on Army ranges for ongoing/current force training. 25th ID(L) and USARHAW Regulation 210-6 addresses FMA procedures and is applicable to all Army ranges and training areas in Hawaii.

**9.3 PROJECTS ON O'AHU**

Ongoing and proposed projects on O'ahu that could reasonably contribute to cumulative impacts are identified in Table 9-1 and their locations are shown on Figure 9-1.

**Whole Barracks Renewal Program—O'ahu (Project 1)**

The Army proposes to upgrade unaccompanied enlisted personnel housing in Hawaii. SBMR structures have an average age of 68 years. Over 50 percent of the barracks were built prior to 1922, and over 80 percent are eligible for the NRHP. Upgrades would take place on WAAF, SBMR, and Tripler Army Medical Center grounds. The program includes new guidelines for upgrading the barracks by increasing the housing square footage for Soldiers. Closet space will replace the current wardrobe locker system, and two-person bathrooms will replace gang latrine systems. The Army intends to complete upgrades in this seven-phase plan by 2010. Based on current estimates of SBCT troop increases and associated decreases in current force troops, no additional housing upgrades will occur outside of what is already planned.
### Table 9-1
#### Cumulative Projects on O'ahu

<table>
<thead>
<tr>
<th>Project</th>
<th>Related Project Location</th>
<th>Project Sponsor</th>
<th>Project Description</th>
<th>Projected Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Whole Barracks Renewal Program</td>
<td>SBMR</td>
<td>US Army</td>
<td>Upgrade barracks facilities.</td>
<td>2010</td>
</tr>
<tr>
<td>2. Advanced Wastewater Treatment Upgrade</td>
<td>SBMR</td>
<td>US Army</td>
<td>Upgrade sewage treatment to an advanced treatment and effluent system.</td>
<td>2005</td>
</tr>
<tr>
<td>3. Fire Station SBMR</td>
<td>SBMR</td>
<td>US Army</td>
<td>Build a new fire station. Old fire station is historic and will be preserved.</td>
<td>2005</td>
</tr>
<tr>
<td>4. Soldier and Family Readiness Center</td>
<td>SBMR</td>
<td>US Army</td>
<td>Build a new facility to house several services.</td>
<td>2007</td>
</tr>
<tr>
<td>5. Information Systems Facility</td>
<td>SBMR Main Post</td>
<td>US Army</td>
<td>Construct a 38,138-square-foot (11,624-square-meter) building. Special electromagnetic field shielding precautions are compulsory.</td>
<td>2005</td>
</tr>
<tr>
<td>7. Installation Information Infrastructure Architecture</td>
<td>SBMR Main Post</td>
<td>US Army</td>
<td>Install fiber optics cabling from the cantonment area to the ranges, motor pool, and other facilities within the installation.</td>
<td>2004</td>
</tr>
<tr>
<td>9. Army Facility Strategy Program</td>
<td>SBMR/WAAF</td>
<td>US Army</td>
<td>Projects include an aviation motor pool complex at WAAF, 2 physical fitness centers (SBMR, WAAF), a general instruction building, and upgrades to SBER.</td>
<td>Unknown</td>
</tr>
<tr>
<td>10. Kamehameha Highway Bridge Replacements</td>
<td>Kawela, Kaukonahua Road (near SBMR/SBER)</td>
<td>State of Hawai'i</td>
<td>Replace bridges. Kawela Stream bridge is near Kawela Camp Road, and Upper Poamoho Stream Bridge is in the Vicinity of Helemano Plantation, near Kaukonahua Road.</td>
<td>Funded through 2004</td>
</tr>
<tr>
<td>11. Mākua Implementation Plan</td>
<td>MMR</td>
<td>US Army</td>
<td>Cooperative program with local landowners to stabilize endangered plants and animals with habitat at MMR.</td>
<td>2036</td>
</tr>
<tr>
<td>12. Live-Fire Training</td>
<td>MMR</td>
<td>US Army</td>
<td>Resume routine live fire military training at MMR.</td>
<td>2005</td>
</tr>
<tr>
<td>13. Controlled Burns at Army Installations in Hawai'i</td>
<td>MMR, SBMR (McCarthy Flats), PTA, DMR</td>
<td>US Army</td>
<td>Controlled burn of dangerous vegetation to reduce fuel load at ranges. This also facilitates UXO clearance and surveys for cultural sites.</td>
<td>Ongoing, seasonal</td>
</tr>
<tr>
<td>14. Farrington Highway Improvements</td>
<td>Makaha (near MMR)</td>
<td>State of Hawai'i</td>
<td>Construct safety and operation improvements for Farrington Highway, including sidewalks, signalized pedestrian crosswalk or bridges, and continuous left turn fences.</td>
<td>Funded through 2004</td>
</tr>
<tr>
<td>15. Farrington Highway, Replacement of Makaha Bridges 3 and 3A</td>
<td>Makaha (near MMR)</td>
<td>State of Hawai'i</td>
<td>Replace two timber bridges in the vicinity of Mākaha Beach Park.</td>
<td>Funded through 2004</td>
</tr>
<tr>
<td>16. Kahuku Windmill and Hook Parcels Land Acquisition</td>
<td>KTA</td>
<td>US Army</td>
<td>Purchase 71.5 acres at KTA.</td>
<td>Completed</td>
</tr>
<tr>
<td>17. Turtle Bay Resort Improvements</td>
<td>KTA</td>
<td>Turtle Bay Resort</td>
<td>Expand and renovate hotel.</td>
<td>2004</td>
</tr>
<tr>
<td>18. Lāʻie Wastewater Collection System Expansion Phase II – Lāʻie</td>
<td>Lāʻie (adjacent to KTA)</td>
<td>Town of Lāʻie</td>
<td>Upgrade the existing sewage collection system.</td>
<td>2004</td>
</tr>
</tbody>
</table>
### Table 9-1

**Cumulative Projects on O'ahu (continued)**

<table>
<thead>
<tr>
<th>Project</th>
<th>Related Project Location</th>
<th>Project Sponsor</th>
<th>Project Description</th>
<th>Projected Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Drum Road Upgrade</td>
<td>Helemano to Kahuku (near KTA)</td>
<td>US Army</td>
<td>Align, widen, and harden approximately 23 miles (37 kilometers) of the dirt and gravel road that runs from the end of the paved road at HMR to the end of the paved road at KTA. Road upgrade done to accommodate current force training.</td>
<td>2005/2006</td>
</tr>
<tr>
<td>20. Kamehameha Highway Traffic Improvements</td>
<td>Kahaluu to Waimea Bay (near KTA)</td>
<td>State of Hawai'i</td>
<td>Construct passing lanes, construct turning lanes at intersections, modify existing traffic signals, and install signs, flashers, and other warning devices.</td>
<td>Funded through 2004</td>
</tr>
<tr>
<td>22. Troop Rigger Facility</td>
<td>HAFB</td>
<td>US Air Force</td>
<td>Construct a 10,872-square-foot (3,314-square-meter), two-story troop rigging facility as part of the Army/Air Force Joint Mobility Complex.</td>
<td>Unknown</td>
</tr>
<tr>
<td>25. Residential Communities Initiative</td>
<td>Army Installations on O'ahu</td>
<td>US Army</td>
<td>Turn over approximately 7,700 units of housing on O'ahu to private developer or consortium of developers for renovation and operation for a 50-year period.</td>
<td>Construction starts 2004, Lease/manageme nt period 2004-2053</td>
</tr>
<tr>
<td>26. 25th ID(L) &amp; USARHAW Revitalization Program</td>
<td>O'ahu</td>
<td>US Army</td>
<td>Construct or renovate water tanks and central ID Lab.</td>
<td>2006-2008</td>
</tr>
<tr>
<td>27. Implementation of the Integrated Natural Resources Management Plan</td>
<td>O'ahu</td>
<td>US Army</td>
<td>The Hawai'i area INRMP establishes a management program to preserve, protect, and enhance natural and cultural resources while improving the Army's capability to conduct training and maintain military readiness.</td>
<td>Not all projects funded. Plan 2002-2006</td>
</tr>
<tr>
<td>28. Implementation of the Integrated Cultural Resource Management Plan</td>
<td>O'ahu</td>
<td>US Army</td>
<td>This project outlines stabilization and preservation strategies for protecting cultural and historical resources on US Army installations on O'ahu.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>29. Implementation of Proposed Range and Training Land Program Development Plan actions</td>
<td>O'ahu</td>
<td>US Army</td>
<td>A planning document for managing range facilities and training areas based on Army training doctrine and resource guidance.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>30. Implementation of the Central O'ahu Sustainable Communities Plan</td>
<td>O'ahu</td>
<td>City and County of Honolulu</td>
<td>A guideline for developing central O'ahu.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>31. Basing of eight C-17 aircraft at HAFB and the departure of four C-130 aircraft from HAFB.</td>
<td>HAFB</td>
<td>USAF</td>
<td>The USAF proposes basing eight C-17 aircraft at HAFB and four C-130 aircraft leaving HAFB. A notice of intent has been issued for the preparation of an environmental assessment.</td>
<td>Unknown</td>
</tr>
<tr>
<td>32. Land Transfer at DMR</td>
<td>O'ahu</td>
<td>US Army</td>
<td>The Army will be returning the portion of the beach land in front of DMR to the State.</td>
<td>2004 - 2005</td>
</tr>
</tbody>
</table>
Project numbers correspond to Table 9-1.

Legend

- Project Areas

26-29  All ranges on O‘ahu (Army)
25    All Bases with Housing (Army)
30    Central O‘ahu

Cumulative Projects on O‘ahu

O‘ahu, Hawai‘i

Figure 9-1
Funding and scheduling of this project are moving ahead. There is also a possibility of purchasing land currently included in the Residential Communities Initiative footprint for future barracks, headquarters, and motor pool sites (Bow 2002).

**Advanced Wastewater Treatment Upgrade—Schofield Barracks (Project 2)**
SBMR needs to upgrade its current sewage treatment to an advanced treatment and effluent system. The Army plans to comply with Clean Water Act water quality regulations and to meet Hawai‘i and federal reuse guidelines and Hawai‘i water quality standards. The necessary upgrades are expected to be completed in 2005. Privatization studies have been completed and the contract has been awarded.

**Fire Station SBMR—Schofield Barracks (Project 3)**
SBMR is planning to construct a new fire station, which will support SBMR, WAAF, Camp Stover, and HMR. The current station is considered undersized and termite damaged. The old station is a historic building and will be preserved. This project is funded through fiscal year 2005 (Shimabukuro 2002).

**Soldier and Family Readiness Center—Schofield Barracks (Project 4)**
This project would construct facilities for the following services: Red Cross, Aloha Furniture, housing referral, passport and ID, retirement services, vehicle registration, and others. This project is funded for fiscal year 2007 (Shimabukuro 2002).

**Information Systems Facility—SBMR Main Post (Project 5)**
The proposal is to construct a 38,138-square-foot (11,624-square-meter) information systems facility (ISF) with a ground floor and basement. The ISF would be constructed at the corner of Trimble and Beaver Roads on a site previously used for Army family housing. The ISF would support information data communication systems of telecommunication cables, conduit, fiber optics, relays, and junctions. Additionally, the ISF would provide connectivity to essential constructive, virtual, and real information systems now and in any future upgrades. Twenty-four hours per day, seven days a week, the ISF operations would support the tactical Internet management location, the local communications control center, secure and not secure main communications node of the network switching systems, the secure information vault, and the special compartmentalized information facility rooms. Special electromagnetic field shielding precautions are compulsory in portions of the facility. A 25-person situation readiness center, with a video teleconferencing center, would be included. Anti-terrorism/force protection measures are essential to protect this critical communication node. SBCT would use these training facilities as well. This project is required for current mission requirements of the 25th ID(L), is scheduled for completion in 2005, and would be needed regardless of SBCT implementation. An Environmental Assessment was published for the project in August 2003 and a FONSI was issued in January 2004.

**Mission Support Training Facility—SBMR Main Post (Project 6)**
The proposal is to construct an 89,803-square-foot (27,153-square-meter) state-of-the-art mission support training facility to house war-fighting and digital classroom training for medium brigade, joint, and combined arms simulation training. The facility would include the following components:
9. Cumulative Impacts

- Reconfigurable tactical operations centers;
- Simulation work cells to support the Joint Army Navy Uniform Simulation/Force XXI Battle Command Brigade and Below;
- Exercise control;
- Simulation control;
- Corps battle simulation/opposing forces;
- Digital classrooms;
- Virtual leader effects trainer;
- Fire effects training;
- Reachback sensitive compartmented information facility;
- Technical shop;
- Conference room; and
- Office support facilities.

Additional facilities include paved walks, curbs and gutters, parking, information systems, state-of-the-art intracommunications and intercommunications systems, and site improvements. This project is required to provide a consolidated training facility for the training requirements of the 25th ID(L). The proposed mission support training facility would be sited on SBMR next to the proposed ISF, on a previously disturbed area that accommodated government housing. This project is required for current mission requirements of the 25th ID(L), is scheduled for completion in 2005, and would be needed regardless of SBCT implementation. An Environmental Assessment was published for the project in August 2003 and a FONSI was issued in January 2004.

Installation Information Infrastructure Architecture (I3A)—Schofield Barracks and Wheeler Army Airfield (Project 7)

The Army proposes to install fiber optics cabling from the cantonment area to the ranges, motor pool, and other facilities within the installation. The I3A is required for current mission requirements of the 2nd Brigade, 25th ID(L) and would be needed regardless of SBCT implementation. These telecommunications requirements would furnish digital information necessary for interconnections between various ranges on SBMR, WAAF, HMR, KTA, and other locations on O'ahu. The I3A project could consist of underground and aboveground cable that would provide additional links to the facilities and to the range complexes by upgrading the e-mail system, asset visibility system, automated personnel processing system, and video teleconference capability. A draft Environmental Assessment is currently being written on the project and the project is funded through 2004.
9. Cumulative Impacts

Gate Alignments—Schofield Barracks/Wheeler Army Airfield (Project 8)

Fuote Gate, SBMR
This project will realign the road to allow “vehicle stacking” and will include a visitor center and search area with parking. The guardhouse will be updated and will include new lighting and surveillance equipment. Tentative funding is for fiscal year 2007.

Macomb Gate, SBMR
This project will realign the road to allow vehicle stacking and will include a visitor center and search area with parking. The guardhouse will be updated and will include new lighting and surveillance equipment. Tentative funding is for fiscal year 2007.

Lyman Gate, SBMR
This project will realign the road to allow vehicle stacking and will include a visitor center and search area with parking. The guardhouse will be updated and will include new lighting and surveillance equipment. Tentative funding is for fiscal year 2008.

WAFF Gate Connections with SBMR
This project will create a direct link between SBMR and WAAF. Signal lights and crosswalks should improve traffic safety for pedestrians and motorists. Tentative funding is for fiscal year 2008.

Kawamura Gate, WAAF
This project will realign the road to allow vehicle stacking and will include a visitor center and search area with parking. The guardhouse will be updated and will include new lighting and surveillance equipment. Tentative funding is for fiscal year 2007-2008. (Shimabukuro 2002).

Army Facility Strategy Program (AFS)—SBMR, Fort Shafter, WAAF (Project 9)
The AFS program provides for construction of new facilities, including construction of a consolidated motor pool at Fort Shafter, an aviation motor pool complex at WAAF, two physical fitness centers (SBMR, WAAF), a general instruction building and upgrades to the range at SBER, and a chapel at Fort Shafter.

The current fuel storage facility at SBMR has a 60,000-gallon (227,125-liter) capacity. The Army is proposing to increase this capacity to 120,000-gallons (454,249-liters). At WAAF, an increase in fuel storage capacity for petroleum, oil, and lubricants storage is needed for the Aviation Brigade Motor Pool expansion (Bow 2002).

Kamehameha Highway Bridge Replacements—Kawela, Kaukaonahua Road (Project 10)
The State of Hawai‘i is planning to replace bridges on Kamehameha Highway with new bridges that meet current design standards. Kawela Stream Bridge is near Kawela Camp Road and Upper Poamoho Stream Bridge is in the vicinity of Helemanō Plantation, near Kaukonahua Road. The projects are funded through 2004 (OMPO 2002).
9. Cumulative Impacts

Mākuʻa Implementation Plan—Mākuʻa Military Reservation (Project 11)
The US Army's Mākuʻa Implementation Plan (MIP) is a 33-year plan to work with local landowners to stabilize endangered plant and animal species on Army training land at MMR. The land needed for stabilizing these plants and animals is divided into 32 management units on Oʻahu and sites on Kauaʻi, wherever the most important wild populations occur. Under the MIP, landowners enter into an agreement to implement species stabilization actions on their property, as determined by the Mākuʻa Implementation Team of experts. Stabilization is the goal of the program, and recovery is not the responsibility of the private participants or the Army. The MIP states, “Successful implementation of the MIP assures that the Army will be in compliance with the Endangered Species Act and still accomplish its training mission.” (Mākuʻa Implementation Team et al. 2002). The MIP was finalized in fall 2003 by the USFWS and work on urgent actions has been initiated.

Live-Fire Training—Mākuʻa Military Reservation (Project 12)
Under the Proposed Action, the Army would conduct routine company-level CALFEX training for the combat units assigned to the 25th ID(L) and would allow other military units to conduct similar training. CALFEX is a combat training exercise where the Army unit deploys several forces, such as infantry, aviation, artillery, and engineers, all at once to have a greater effect on an enemy. While all maneuver training areas and impact areas are within the 457-acre (185-hectare) CCAAC, the training area used at MMR for CALFEXs totals 1,034 acres (419 hectares). MMR would also incorporate wildland fire management, endangered species and cultural resources protection measures, and the ITAM program. There would be no disposal of hazardous wastes at MMR. This project is required for current mission requirements of the 25th ID(L) and SBCT training requirements are not dependent upon its use. SBCT forces may use MMR for dismounted CALFEX training only after completion of the MMR EIS and ROD. SBCT dismounted CALFEX training would be substantially similar to CALFEXs conducted by other forces.

In compliance with the settlement agreement and stipulated order between Mālama Mākuʻa and USARHAW, the Army is preparing an EIS to evaluate conducting CALFEXs at MMR. The EIS is scheduled to be completed by February 2005. Numerous studies and surveys are associated with this project, along with general NEPA compliance.

Ongoing Prescribed Burns at Army Installations in Hawaiʻi (Project 13)
Prescribed burns have been conducted at Army installations in Hawaiʻi in the past on small areas (typically 4 to 5 acres) at SBMR and about 800 to 900 acres at MMR. Controlled burns have recently been conducted on larger areas and on a more regular basis. Approximately 1,200 to 1,500 acres (486 to 607 hectares) are burned at SBMR (Battle Area Complex and Qualification Ranges) to reduce vegetation (fuel load) and to allow the Army to conduct UXO clearance and cultural survey activities. Aerial broadcast spraying of herbicide by helicopter is applied before some burns to reduce vegetation prior to the prescribed burn. The first burn in this area was in May 2003 and would be conducted every year or two based on vegetation regrowth and fuel continuity. The Army is likely to also conduct controlled burns at DMR, MMR and PTA. At this time, it is not anticipated that burns will be needed in the SRAA or at KTA or KLOA.
Approximately 800 to 900 acres (324 to 364 hectares) at MMR were burned under the program to prevent large-scale wildfires, in compliance with the settlement agreement and stipulated order between Mālama Mākua and the US Army (USARHAW). The burn took place between the north and south firebreak roads and on small parcels outside the firebreak roads for four days between October 29 and November 1, 2002. The burn allowed for UXO cleanup and archaeological surveys. The EA was available for public and agency comment until October 8, 2002, and a FONSI was signed on October 28, 2002 (Miura 2002).

The most recent prescribed burn was conducted on July 22, 2003. Preparation and execution of the prescribed burn was performed according to the burn plan prepared by the Army (US Army, undated). The Army coordinated the prescribed burn with the USFWS, US Forest Service; State Department of Health, Clean Air Branch; State DNLR, Division of Forestry and Wildlife; Federal Fire Department; Honolulu Fire Department; Hickam Fire Department; and the National Weather Service. The prescribed burn was designed to burn between 800 and 900 acres (244 and 274 hectares) (Enriques 2003b). However, the prescribed burn area escaped the firebreak road due to a sudden 180 degree wind shift and an increase in wind speed from 9 miles per hour to 20 to 25 miles per hour within five to ten minutes. As a result, the fire burned uncontrolled for three days and burned 2,100 acres (640 hectares).

**Farrington Highway Improvements—Nānākuli to Mākaha (Project 14)**

The State of Hawai‘i is constructing safety and operation improvements to Farrington Highway, including sidewalks, signalized pedestrian crosswalk or bridges, and continuous left-turn fences. The project is funded through 2004 (OMPO 2002).

**Farrington Highway, Replacement of Makaha Bridge Numbers 3 & 3A—Makaha (Project 15)**

The State of Hawai‘i is planning to replace two timber bridges in the vicinity of Mākaha Beach Park. The project is funded through 2004 (OMPO 2002).

**Kahuku Windmill and Hook Parcels Land Acquisition—Kahuku Training Area (Project 16)**

The US Army has acquired 71.5 acres (29 hectares) of land in holdings within KTA. This property is presently owned by the James E. Campbell Estate. The purpose of the acquisition is to consolidate KTA land holdings. Originally, the windmill parcel was being used to generate electricity. An environmental assessment was prepared by the Army. (Malaspina 2004.)

**Turtle Bay Resort Improvements—Kahuku (Project 17)**

Turtle Bay resort is proposing to expand and renovate its hotel and resort in Kahuku. Construction is planned to begin in 2004 (State of Hawai‘i 2002c).

**Lā‘ie Wastewater Collection System Expansion Phase II—Lā‘ie (Project 18)**

This project will continue to upgrade the sewage collection system in Lā‘ie (the town next to Kahuku). These upgrades will improve system reliability and will eliminate the potential for leaks and spills from aging cesspools, septic systems, and sewer lines. The proposed expansion is being developed to address concerns and to accommodate anticipated growth.
envisioned in the Ko‘olauloa Sustainable Communities Plan. The resulting sewage effluent will be of reusable quality. The environmental assessment was finalized by the City and County of Honolulu, Department of Design and Construction and was received by the OEQC office on December 9, 2002. The OEQC office published the notice of availability of the City’s Final Environmental Assessment and Finding of No Significant Impact in the December 23, 2002, edition of the Environmental Notice (Segundo 2004). Construction will be finished in October 2004.

**Drum Road Upgrade— Helemanō MR to Kahuku TA (Project 19)**

The proposal is to align, widen, and harden approximately 24 miles (37 kilometers) of the dirt and gravel road that runs from the end of the paved road at HMR to the end of the paved road at KTA. Work would include widening the road to 24 feet (7 meters) and providing three-foot (one-meter) compacted gravel shoulders on both sides, realigning dangerous blind curves, regrading to correct steep slopes, providing drainage improvements, and installing guardrails at drop-offs and storm drainage structures and lines to preclude excessive amounts of stormwater runoff from sheet flowing over the road and endangering traffic. Site work includes clearing, grubbing, grading, and stockpiling material for embankments and installing telecommunications conduits alongside the upgraded roadway. The projects are funded through 2005/2006. This project is required for current mission requirements of the 25th ID(L) and would be needed regardless of SBCT implementation. A Draft EA is scheduled for publication in 2004.

**Kamehameha Highway Traffic Improvements—Kahalu‘u to Waimea Bay (Project 20)**

The State of Hawai‘i is planning to construct passing lanes, to construct turning lanes at intersections, to modify traffic signals, and to install signs, flashers, and other warning devices on Kamehameha Highway. The projects are funded through 2004. (OMPO 2002).

**Hot Cargo Pad—Hickam AFB (Project 21)**

This project involves constructing facilities to simultaneously load three C-5/C-17 aircraft. A staging area and service roads would also be required (Shimabukuro 2002). This project is required for current mission requirements of the 25th ID(L) and would be needed regardless of SBCT implementation.

**Troop Rigger Facility—Hickam AFB (Project 22)**

The proposal is to construct a 10,872-square-foot (3,314-square-meter), two-story troop rigging facility as part of the Army/Air Force Joint Mobility Complex. The proposed action would include facilities for parachute packing and repair, rig supply and equipment, a drying tower, administration, and a storage room. This proposed facility would be sited on Hickam AFB, between the taxiway and a football field along Moffet Street. This project is required for current mission requirements of the 25th ID(L) and would be needed regardless of SBCT implementation.

**Ship Operations Building—Bishop Point, Hickam AFB (Project 23)**

The US Army plans to construct a one-story ship operations building at Bishop Point near Pearl Harbor. The 545th Transportation Detachment and 548th Transportation Corps
Detachment, 9th Regional Support Command, would use this building for support vessels. Occupancy is scheduled for 2004 (Shimabukuro 2002).

**Dry-dock 2 Waterfront Support Facility—Pearl Harbor (Project 24)**
The US Navy proposes to construct 2 two-story metal buildings, to renovate a latrine, to demolish several buildings and portable structures, and to provide electrical modifications to a building. The US Naval Facilities Engineering Command has prepared an EA/FONSI for the project.

**Residential Communities Initiative (RCI) — Army Installations on O’ahu (Project 25)**
The US Army is proposing the full privatization of family housing at the following seven installations in O’ahu: SBMR, HMR, WAAF, Aliamanu Military Reservation, Fort Shafter, Tripler Army Medical Center, and the former Coast Guard housing at Red Hill. This initiative is a program for the Army to turn over approximately 8,000 units of housing on O’ahu to a private developer or consortium of developers for ownership and operation for a 50-year period. The land beneath these homes will be leased to the developer for the same term. This program is meant to eliminate inadequate housing and improve neighborhoods and communities. A developer (Actus Lend Lease) was selected in Aug 2003 to prepare the Community Development Management Plan (CDMP), which will be central to the design and implementation of the RCI Program. The Draft CDMP was submitted to HQ Army in February 2004 for review. Pursuant to the subsequent approval by Congress, projected for May 2004, the conveyance of the improvements and lease of these residential lands is scheduled for October 2004. The Final RCI EA and Draft FNSI were released in February 2004.

**25th ID(L) and USARHAW Revitalization Program (Project 26)**
This compilation of projects includes construction of 2 two-million-gallon (7,570,824-liter) water tanks to ensure continued sanitary and reliable water service. The current tanks exhibit considerable corrosion at the roof areas. The new tank project includes a booster pump station and emergency generators. Also under this project is construction of an additional facility for the Central Identification Laboratory Hawai‘i. Currently, the organization is housed in overcrowded and inadequate facilities, causing operations to be inefficient. The project will include a DNA lab and administrative space for command and support staff and search and recovery teams.

**Implementation of the Army Integrated Natural Resource Management Plan—O’ahu (Project 27)**
This project outlines mandatory and optional natural resource stabilization and recovery methods for endangered, rare, and threatened species and communities existing on Army installations on O‘ahu. Interagency consultation was initiated with USFWS, and public coordination efforts were made in compliance with the Sikes Act. The programs guaranteed funding are those that involve ESA Section 7 consultation, some watershed and pest management programs, and some conservation and community outreach programs.
Implementation of the Army Integrated Cultural Resource Management Plan—O‘ahu (Project 28)
This project outlines stabilization and preservation strategies for protecting cultural and historical resources on US Army installations on O‘ahu. Interagency consultation was initiated with the Hawai‘i State Historic Preservation Office.

Implementation of Proposed Range and Training Land Program Development Plan Actions (Project 29)
This project would involve the implementation by the US Army of a planning document for managing range facilities and training areas based on Army training doctrine and resource guidance. This program identifies potential training shortfalls and includes a development plan for ranges to meet training needs for current forces.

Central O‘ahu Sustainable Communities Plan—O‘ahu (Project 30)
This report serves as a vision for Central O‘ahu. The 25-year development plan for Central O‘ahu takes into account sustainability, open space, transit corridors, parks, and natural and cultural resources. Elements essential to the community building plan include the revitalization of Waipahu and Wahiawa town centers, economic development for these communities, the urban community boundary and open/green space network of parks and other areas.

Basing of eight C-17 Aircraft at HAFB and Departure of four C-130 Aircraft from HAFB (Project 31)
The USAF proposes to base eight C-17 aircraft at HAFB and to see the departure of four C-130 aircraft from HAFB. The proposed action would include aircraft beddown and operations at Hickam AFB, the construction of C-17 aircraft support facilities at Hickam AFB, personnel requirements to support the C-17 aircraft beddown, aircrew training requirements at existing facilities, and the possible construction of a new assault runway or use of existing runways. An EA was prepared and the FONSI was completed for the C-17 aircraft beddown on December 12, 2003. This project is scheduled to be completed in 2006.

Land Transfer—Dillingham Military Reservation (Project 32)
The Army will be returning State ceded lands consisting of 73 acres of airfield and 14 acres of beach area including portions of Kealia Beach, Mokuleia Beach Park, and Mokuleia Army Beach (adjacent to Kealia beach). The conveyance deeds will be executed at the Secretariat level. The State will then lease the land back to the Army for continued training operations. The deed transferring the property is scheduled to be signed in 2004-2005.

9.4 Projects on Hawai‘i
Concurrent ongoing and proposed projects on the island of Hawai‘i that could reasonably contribute to cumulative impacts are identified in Table 9-2, and their locations are shown on Figure 9-2.

Kawaihae Deep Draft Harbor—Kawaihae Harbor (Project 1)
The US Army Corps of Engineers and the State of Hawai‘i, Department of Transportation, Harbors Division are proposing to modify the existing Kawaihae Harbor. The Federally constructed harbor project consists of an entrance channel, the harbor basin, and a
“rubblemound” breakwater. Currently the harbor provides maritime access for commerce on the western side of the island of Hawai‘i. Growing demand for cargo to support the rapidly expanding economy and state plans to pursue a larger share of the North American passenger cruise market will also increase pressure on the current harbor. Presently there are numerous operating inefficiencies at the harbor. Wave surge enters the harbor and damages

Table 9-2
Cumulative Projects on Hawai‘i

<table>
<thead>
<tr>
<th>Project</th>
<th>Location</th>
<th>Sponsor</th>
<th>Description</th>
<th>Project Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Kawaihae Deep Draft Harbor</td>
<td>Kawaihae Harbor</td>
<td>The US Army Corps of Engineers and the State of Hawai‘i</td>
<td>Deepening and expanding the Kawaihae Harbor. The project consists of an entrance channel, the harbor basin, and a breakwater.</td>
<td>2008</td>
</tr>
<tr>
<td>2. TSV Pier Use</td>
<td>Kawaihae Harbor</td>
<td>The US Army Corps of Engineers</td>
<td>Using existing piers at Kawaihae Harbor for TSV landings.</td>
<td>Unknown</td>
</tr>
<tr>
<td>3. PTA 1010 Land Acquisition</td>
<td>PTA</td>
<td>US Army</td>
<td>The US Army is negotiating with a private landowner to acquire an area to be used for ongoing training.</td>
<td>Unknown</td>
</tr>
<tr>
<td>4. Consolidated command and range control building</td>
<td>PTA</td>
<td>US Army</td>
<td>Constructing a consolidated command center at PTA for ongoing training.</td>
<td>2004</td>
</tr>
<tr>
<td>5. Saddle Road realignment</td>
<td>Across island of Hawai‘i, near PTA</td>
<td>Federal Highways Administration (FHWA), State of Hawai‘i</td>
<td>Long-term highway construction project that includes improving and modifying Saddle Road between Hilo side and Kona side of the island of Hawai‘i.</td>
<td>Unknown</td>
</tr>
<tr>
<td>6. Kawaihae/Waimea Road</td>
<td>Waimea Park to Merriman’s (near Kawaihae Harbor)</td>
<td>State of Hawai‘i</td>
<td>State right-of-way and possible construction to replace road for the Kawaihae/Waimea Road.</td>
<td>Unknown</td>
</tr>
<tr>
<td>7. Waimea to Kawaihae Highway</td>
<td>South Kohala</td>
<td>FHWA</td>
<td>A 14-mile (23-kilometer) improved highway between Waimea town and Kawaihae Harbor in central and west Hawai‘i.</td>
<td>Unknown</td>
</tr>
<tr>
<td>8. Former Waikoloa Maneuver Area and Nansay Sites UXO Cleanup</td>
<td>Hawai‘i</td>
<td>The US Army Corps of Engineers</td>
<td>Clean up unexploded ordnance on lands used by US Navy and Marines as an artillery and naval gun firing range, troop maneuvers, and weapons practice.</td>
<td>2015</td>
</tr>
<tr>
<td>9. Theater Support Vessel (TSV)</td>
<td>O‘ahu to the island of Hawai‘i (Pearl Harbor to Kawaihae and waters in between)</td>
<td>US Army</td>
<td>High-speed transport vessel may be used between O‘ahu and Hawai‘i. Design specifics and operating characteristics are not known at this time.</td>
<td>Unknown</td>
</tr>
<tr>
<td>10. Relocation of Kilauea Fire Station to PTA</td>
<td>Hawai‘i/PTA</td>
<td>US Army</td>
<td>The Army proposes to move the fire station on the grounds of Hawai‘i Volcanoes National Park to Pōhakulā Training Area, 70 miles (113 kilometers) away by road.</td>
<td>January 2005</td>
</tr>
<tr>
<td>11. RTLP Range Development Plan</td>
<td>Hawai‘i/PTA</td>
<td>US Army</td>
<td>The Army is proposing to improve its existing firing ranges at PTA in four different components that all fall under the RTLP Range Development Plan</td>
<td>2004-2005</td>
</tr>
</tbody>
</table>

Source: Tetra Tech 2002
Cumulative Projects on Hawai‘i

Project numbers correspond to Table 9-2.

Legend
- Pōhakuloa Training Area Boundary
- P3/P4 Pōhakuloa to Kawaihae Trail
- Main Road
- Project Areas

Island of Hawai‘i, Hawai‘i

Figure 9-2
vessels and piers and causes cargo-handling delays. The current harbor basin is approximately 35 feet (11 meters) deep, and accommodating the new vessels would require a harbor basin depth of at least 40 feet (12 meters). Possible alternatives include deepening of the existing entrance channel and harbor basin, extending the existing breakwater and constructing a new breakwater. The southwest part of the harbor is the primary port for military equipment, supplies and personnel destined for PTA. The harbor was first completed in 1962 and was enlarged in 1973. Submittal of the Environmental Impact Statement is scheduled to be completed in January 2006. This project is required for current mission requirements of the 25th ID(L) and would be needed regardless of SBCT implementation.

**TSV Pier Use—Kawaihae Harbor (Project 2)**
As described in Chapter 2, the Army could replace the LSV landing craft with a TSV. The TSV would need to dock at a pier and to have cargo offloaded by either a ship-mounted or shore crane. Kawaihae Harbor is the main seaport for the Army to access PTA and would probably be the site of any TSV landings. The existing entrance channel, harbor depths and piers structures in Kawaihae Harbor could accommodate the TSV, but some modifications may need to be done to existing piers. Specific sites, plans, and specifications for pier modification are not available, so any impact analysis at this stage would be speculative. Such a project, whether within current force or SBCT operations, would be subject to later NEPA documentation.

**Land Acquisition—Pōhakulao Training Area (Project 3)**
In addition to the land that the Army is planning to acquire for SBCT, it has been leasing between 990 and 1,010 acres (401 hectares and 409 hectares) on the northwest of PTA from Parker Ranch. This lease ran out in 1998, and negotiations have been underway for the Army to acquire this land. The Army Real Estate Planning Report prepared for this acquisition states that the neighborhood of the acquisition is dominated by military training and pasture land use, though the report also says that “the land to be acquired has no significant impact on the local community.” The State of Hawai‘i DOT has proposed a new alignment of Saddle Road that would cross the boundary of the proposed acquisition and PTA. Restrictions have been placed on 70 acres (28.3 hectares) after the discovery of the endangered Hawaiian mint on the parcel. (These plants are currently fenced and restricted from training activities.) ESA Section 7 consultation is underway, and the Army is finalizing the EA for the purchase (Shimabukuro 2002; US Army Corps of Engineers 2002). This project is required for current mission requirements of the 2nd Brigade, 25th ID(L) and would be needed regardless of SBCT implementation.

**Consolidated Command and Range Control Building—Pōhakulao Training Area (Project 4)**
The US Army plans to construct a consolidated command center for the camp commander and others at PTA for ongoing training. Quonset hut buildings that would be vacated would be used for officer and NCO barracks and a task force HQ. Construction is to begin in January of 2003 for occupancy in January of 2004. An EA was completed in April 2002 (Shimabukuro 2002).
Saddle Road Realignment—Island of Hawai‘i (Project 5)
This is a long-term highway construction project that includes improvements and modifications to the Saddle Road between the Hilo side and Kona side of the island of Hawai‘i (see www.saddleroad.com for more details on the project). Approximately 50 miles (80 kilometers) of road will be modernized to meet American Association State Highway and Transportation Officials standards. Constructed in 1942, Saddle Road does not meet design standards for roadways. It is the only road serving PTA and is subject to serious traffic congestion when military convoys are transporting ammunition or troops for training. It is also the only road serving Mauna Kea astronomical observatory complex, Waikī‘i Ranch, Kīlohāna Girl Scout Camp, Mauna Kea State Recreation Area, and major hunting areas. An EIS was completed in the fall of 1999 (County of Hawai‘i 2002b). The initial segment of construction will realign the portion of the Saddle Road that passes through PTA to a location north of the base. There is an Memorandum of Understanding (MOU) among the Federal Highway Administration, the Hawai‘i Department of Transportation, and the DLNR to mitigate impacts on critical habitat of the Palila (see Appendix E) (FHWA 2003).

Kawaihae/Waimea Road—Island of Hawai‘i (Project 6)
Hawai‘i County Public Works Department is investigating traffic mitigation measures along Kawaihae Road from Waimea Park to Merriman’s. The intent is to use the existing road corridor and, after minor paving and other improvements, to re-mark the roads with through lanes and turning pockets. The county is also studying a project to provide for a state right-of-way for a road to replace the Kawaihae/Waimea Road (County of Hawai‘i 2002b). There are no other County of Hawai‘i road projects in the areas of Pōhakuloa, Kawaihae, or Waimea (Kuba 2002).

New Highway—Waimea to Kawaihae Harbor (Project 7)
The FHWA has proposed constructing an improved 14-mile (23-kilometer) stretch of upgraded highway between the central and west Hawai‘i town of Waimea to Kawaihae Harbor near the district of South Kohala. A notice of intent to prepare an EIS for the proposed project has been issued.

UXO Cleanup—Former Waikoloa Maneuver Area and Nansay Sites (Project 8)
The Department of Defense has begun investigating and cleaning up UXO on lands formerly used by the US Navy and Marines under the auspices of the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP/FUDS). Starting in 1943, the Navy and the Marines acquired State of Hawai‘i and private lands (Parker Ranch) through license agreements and used them for artillery and naval gun firing ranges, live-fire exercises, troop maneuvers, and weapons practice. Ordnance recently used or identified within the entire former maneuver area includes shells, rockets, grenades, mortars, cannons, and small arms. While use of most of the area for training and weapons practice ended in 1946 and 1953, the Pu‘u Pa‘a Maneuver Area is still used occasionally as an active US military training area. The Pu‘u Pa‘a area is leased to the Department of Defense by Parker Ranch. Current use of the former maneuver land on the Parker Ranch property is mainly cattle ranching and grazing and, in the areas near Waimea and Waiaka Village, residential, commercial, and industrial. UXO continues to be found in the former maneuver area, and preliminary investigations show that approximately 48,000 acres (19,440 hectares).
could hold ordnance and explosives waste hazards. Units from SBMR have disposed of UXO, and the Corps of Engineers prepared the "Engineering Evaluation/Cost Analysis, Phase II" (1992) document discussing possible investigation and cleanup alternatives (USACE2001d). This report utilized the Ordnance and Explosives Risk Impact Assessment (OERIA) to assess and recommend cleanup in various areas in the former Maneuver Area. The Maneuver Area includes the Ke'amuku area (the WPAA) that may be acquired under the Proposed Action. Based on the OERIA, the Engineering Evaluation/Cost Analysis Phase II found that the Ke'amuku area was of low relative risk to human health and the environment from unexploded ordnance, and that mitigation would be primarily through application of institutional controls, such as public education, signage, brochures, etc. Initial visual screening investigation in the Ke'amuku area was conducted and three areas were identified within the Ke'amuku area as needing further geophysical study (see Figure 9-3). As part of the public education module, the DERP/FUDS program has also produced a safety video outlining proper procedures and potential risk for access into the former maneuver area including access to the Ke'amuku area. Identification of unexploded ordnance within the former maneuver area has been performed by the Corps of Engineers through the FUDS project with disposal conducted by military EOD units. The Engineering Evaluation/Cost Analysis Phase II report recommended ordnance clearance in certain areas of the former maneuver area. This current ordnance clearance project administered by the Corps of Engineers includes both the identification and the disposal of unexploded ordnance. In the event of an emergency situation with imminent risk to human health and safety, military EOD units would assist in the identification and disposal of unexploded ordnance.

**Theater Support Vessel (Project 9)**

In the future, the Army is considering the use of TSVs to transport troops and supplies between O'ahu and the island of Hawai'i. TSVs would launch from Pearl Harbor with troops and equipment and would land at Kawaihae Harbor. The 25th ID(L) units would offload and transit from Kawaihae Harbor to PTA. Some of the transit areas for the vessels between the two islands are within or in close proximity to the Hawaiian Islands Humpback Whale National Marine Sanctuary waters. If and when this project would be implemented, the Army plans to comply with all appropriate environmental regulations including NEPA, the ESA and the Marine Mammal Protection Act.

**Relocation of Kilauea Fire Station to PTA (Project 10)**

The Army fire station on the grounds of Hawai'i Volcanoes National Park will be moved to Pōhakuloa Training Area, 70 miles (112 kilometers) away by road, in January 2005. The Army originally planned to close the military camp fire station in mid-2004, but Hawai'i County Fire Department officials requested a delay to provide more time for the extensive training county firefighters will need before taking over the military camp coverage. The move will provide the national park with firefighting crews skilled in forest and brush fires.

**RTLP Range Development Plan (Project 11)**

The Army is proposing to improve its firing ranges at PTA in four different components that all fall under the RTLP Range Development Plan project. Upcoming proposed projects identified so far to meet current force needs include converting the multi-purpose machine
The Department of Defense has begun investigation and cleanup of unexploded ordnance on lands formerly used by US Navy and Marines. Waikoloa Study Area is the area assessed for cleanup in a Phase II Site Assessment (USACE 2001e).

**Legend**

- **P3/P4 Pōhakuloa to Kawaihae Trail**
- **Main Road**
- **Waikoloa Study Area**
- **P7 West PTA Acquisition Area**
- **Area Recommended for Clearance of Surface and Subsurface Ordnance and Explosives**
- **1010 Land Purchase Area**
- **Pu'u Pā Maneuver Area**
- **Waikī Ranch**
- **Hawaiian Homelands**
- **Pōhakuloa Training Area Boundary**

**Waikoloa Maneuver Area and Nansay Sites**

Island of Hawai‘i, Hawai‘i

**Figure 9-3**
gun lanes on R-8 to standard 10 lanes, constructing a new 10-lane modified record fire range, expanding the existing combat pistol qualification course on R-2 for 10-lane capability, and constructing a 25-lane known distance range on R-4 or R-1. An EA is being prepared for this project, which would be implemented in 2004-2005.

**Outrigger Telescopes Project (Project 12)**

NASA proposes to fund the construction, installation, and operation of six outrigger telescopes in the W. M. Keck Observatory at the Mauna Kea summit area. Construction of four telescopes is planned for 2004 and the remaining two in 2007.

9.5 **ANALYSIS OF CUMULATIVE IMPACTS**

The cumulative impacts of these developments are discussed by resource area below. Relevant significant and not mitigable, significant and mitigable to less than significant, and less than significant cumulative impacts also are described. Table 9-3 provides an overview of cumulative impacts by resource area.

9.5.1 **Summary of Cumulative Impacts**

Cumulative impacts from the Proposed Action and the Reduced Land Acquisition Alternative, and the No Action alternative would occur in all resource areas. Significant cumulative impacts would occur in the following resource areas: Land use, biological, cultural, and human health and safety hazards.

There would be significant cumulative impacts on land use from the acquisition and conversion of agricultural land independent of the Proposed Action, Reduced Land Acquisition Alternative, and No Action Alternative. Significant impacts on biological resources would occur from a cumulative increase in the potential for fire to occur on O‘ahu and the island of Hawai‘i as a result of SBCT and the projects listed in tables 9-1 and 9-2. There would be significant cumulative impacts on cultural resources from the projects listed in Tables 9-1 and 9-2 and the construction and training associated with the Proposed Action or Reduced Land Acquisition Alternative.

The implementation of the Proposed Action or Reduced Land Acquisition Alternative would result in significant cumulative impacts on human health and safety hazards from the introduction of more ammunition and unexploded ordnance considering the existing levels of ammunition and unexploded ordnance from the projects listed in Tables 9-1 and 9-2. There would be significant but mitigable to less than significant long term cumulative impacts on surface water quality from suspended sediment resulting from training activities at SBMR and KTA, from the potential for chemical residues or spills at SBMR, and from sediment loading following wildfires at SBMR, KTA, and PTA.

There would be a significant but mitigable to less than significant long term cumulative impact on socioeconomics and environmental justice from the projects listed in Tables 9-1 and 9-2 in association with the Proposed Action and Reduced Land Acquisition Alternative for population, schools and housing. The Army proposes to mitigate these cumulative impacts through measures discussed in Section 4.13 including notification to the Hawai‘i Department of Education at the earliest point when practicable of any known increases of students to schools on or near SBMR and WAAF, supplementing the Hawai‘i Department of
Education budget through the US Department of Education Federal Impact Aid Program, and long-range procurement planning for supply and demand issues related to construction activities.

Table 9-3
Summary of Potential Cumulative Impacts

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Proposed Action</th>
<th>Reduced Land Acquisition</th>
<th>No Action</th>
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</thead>
<tbody>
<tr>
<td>Land Use/Recreation</td>
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<tr>
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<tr>
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</tbody>
</table>

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

**LEGEND:**

- ☒ = Significant
- ☒ = Significant but mitigable to less than significant
- ○ = Less than significant
- ☒ = No impact
- + = Beneficial impact
- N/A = Not applicable

9.5.2 Cumulative Impacts by Resource Category

**Land Use and Recreation**

For the evaluation of cumulative impacts relative to land use and recreation, the ROIs are as follows:

- For acquisition of land for military use and conversion from agricultural to nonagricultural use, the ROI is statewide or island-wide;
- For reduction in the amount of land available for hunting, the ROI is island-wide.

The major historic influence on land use and recreation in the ROI has been the rapid development since World War II. Initially, the largest land use changes included construction of military lands including cantonment areas and training lands. After WW II the tourism boom resulted in the development of resort and support services connected to the tourism industry. The resulting land use changes included significant conversion of agriculture land to
urban and military uses, and in the case of resort areas, loss of coastal areas and limited beach access. These land use changes significantly altered the character of the ROI, particularly on O'ahu, from rural and agricultural in nature to land dominated by urban sprawl, military facilities, and resort areas.

Future land use and recreation trends for the O'ahu sites are reflected in the sustainable community plans prepared by the City and County of Honolulu for those regions; future trends for the island of Hawai'i sites are reflected in the General Plan for Hawai'i County and the proposed draft revision to the General Plan for Hawai'i County. The above documents recognize the statewide decline in large-scale plantation agriculture for various economic reasons but express the desire to preserve existing agricultural land, particularly prime agricultural land, for current and future agricultural businesses. Residential development has also risen in recent years in coastal areas of O'ahu. Since 1978, there has been a one percent decline in total agricultural lands of importance to the state. Trends associated with recreational resources include providing continued, and where possible, increased access to recreational resources.

**Proposed Action (Preferred Alternative)**

**Cumulative impacts from converting agricultural land to training land.** The Proposed Action includes the Army’s acquisition of land on O'ahu and the island of Hawai'i. Proposed O'ahu acquisitions include 1,402 acres (567 hectares) for the SRAA, 13 acres (5 hectares) for the Helemano Trail easement, and 36 acres (14.6 hectares) for the Dillingham Trail easement. Proposed acquisitions on the island of Hawai'i include the 23,000-acre (9,308-hectare) WPAA and a 132-acre (53.4-hectare) easement for the PTA Trail. These acquisitions total 24,604 acres (9,957 hectares) statewide. When combined with the acquisition of 71.5 acres (29 hectares) for the Kahuku Windmill and Hook parcels, adjacent to KTA, and the 1,010 acres (409 hectares) northwest of PTA, the total area to be acquired by the Army statewide is 25,686 acres (10,395 hectares). These acquisitions would increase the state-wide decline in farmland since 1978 from one percent to 2.7 percent and would contribute to the diminishing amount of agricultural land in the state. From a cumulative, state-wide perspective, this is a relatively small increase, especially in the context of the proposed release of military land to civilian use. The Army is returning approximately 50 acres (20.2 hectares) of land at DMR to the State of Hawai'i. Other proposed transfers to civilian ownership include the Barbers Point and Waikele parcels as part of the Navy’s proposed Ford Island development. Individually, the proposed action would not result in significant impacts on the conversion of agricultural land. However, in the State of Hawai'i, there is an ongoing loss of agricultural land due to development. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts would be significant.

**Cumulative impacts on natural resources management and recreational land use.** Training and operation of the proposed QTR2 on the SRAA could affect land use within a portion of the Honouliuli Preserve. Approximately 100 acres (40.5 hectares) within the SRAA are part of the TNC-managed lands that are available for intensive natural resources management and hiking. In response to comments received early in the EIS process, the Army reoriented QTR2 so that the SDZ would no longer affect any lands within the Honouliuli Preserve. Army will grant TNC personnel and TNC-sponsored personnel daily controlled access to the TNC-managed
lands along a route to be determined by the Army in consultation with the TNC. Access controls will be developed and implemented to ensure the safety of all personnel. Signs will posted at the boundary to prevent unauthorized use/trespass. As discussed in Section 5.2, there would not be a significant cumulative impact with the reorientation of QTR2 because there would be minimal changes recreational and land use management at the Honouliuli Preserve, which is 0.06 percent of the Conservation District land on O'ahu and is a fraction of a percent of the total Conservation District land in the state.

Operation of the CACTF at KTA would prohibit any traffic (on foot or in unprotected vehicles) within the SDZ. Presently, traffic – such as unauthorized public access - is not strictly controlled at KTA. The addition of fencing and signs restricting unauthorized access when the range is in use would be a less than significant cumulative impact because it would affect existing military training land within an installation. Existing public recreation areas would not be affected. Recreation opportunities at Army installations on O'ahu have declined in the past few years due to increased security and decreased personnel available to manage check-in stations. The land use in some coastal areas has also changed due to residential development. Because the Proposed Action does not include new development of coastal areas, it would not combine with residential development to cumulatively affect land use.

Under the Proposed Action, recreational land use would be increased because approximately 23,000 acres (9,308 hectares) of private hunting land would be opened to the public for hunting game birds and game mammals when the land is not used for training. Trends associated with recreational resources should not be affected by the cumulative impacts of these projects. Individually, the proposed action would not result in significant impacts on natural resources management and recreational lands. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts on recreational land use and natural resource management would not be significant.

### Reduced Land Acquisition Alternative

**Cumulative impacts from converting agricultural land to training land.** Land acquisitions associated with the Reduced Land Acquisition Alternative are similar to the Proposed Action, except that the SRAA would be reduced to 100 acres (40.5 hectares). The statewide land acquisitions would total approximately 24,281 acres (9,826 hectares). These acquisitions would increase the state-wide decline in farmland since 1978 from one percent to 2.6 percent and would contribute to the diminishing amount of agricultural land in the state. The acquisitions would also increase the state-wide amount of land owned or leased by the military from 10.8 percent to 11.4 percent.

The cumulative impacts of land acquisition and conversion to nonagricultural use on O'ahu would not be significant. In addition, on the island of Hawai'i the Army is considering establishing a cooperative relationship to allow continued grazing at the WPAA in conjunction with training. Individually, the proposed action would not result in significant impacts on the conversion of agricultural land. However, in the State of Hawai'i, there is an ongoing loss of agricultural land due to development. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts would be significant.
**Impacts on natural resources management and recreational land use.** Under the Reduced Land Acquisition, the cumulative impacts on the access to natural resources management and recreation resources would not change from the current conditions. Under Reduced Land Acquisition, cumulative impacts on the island of Hawai‘i relative to hunting would be the same as those for the Proposed Action. Individually, the proposed action would not result in significant impacts on natural resources management and recreational lands. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts on recreational land use and natural resource management would not be significant.

**No Action Alternative**
Under No Action, there would be no cumulative impacts on land use and recreation because the land acquisitions and the proposed construction and training described in Chapter 2 would not occur. The acquisition of 72 acres (29 hectares) for the Kahuku Windmill and Hook parcels, adjacent to KTA, and the 1,010 acres (409 hectares) northwest of PTA would be addressed under their respective NEPA documents. Access to natural resources management areas and recreational land use would not change.

**Visual Resources**
Historically, there has been a steady change in the visual character in the ROI due largely to the land use changes identified above. The development of resort areas adversely affected large portions of the near shore areas in the ROI. There has been a steady loss of unobstructed views of the shore as resort and urban development encroached in the viewshed. Along with this development came the necessary infrastructure such as roads and power/telephone poles and lines that also intrude on views of the mountains and open areas. Historic conversion of open lands to agricultural uses changed the character of much of the land in the ROI particularly in the flatter areas suitable for large scale farming of pineapples and sugarcane. With this development came a steady increase in light pollution. The large urban and downtown areas create large concentrated sources of light pollution affecting night time viewing of the skies and in some cases affecting birds migrating along the shores at night.

Increasing activities and building new structures on O‘ahu and Hawai‘i will continue to reduce the quantity and quality of visual resources over time. This is because the developments would be on islands with finite land resources that are incapable of supporting increasing population. These impacts on visual resources become more significant as the extent of developed land increases. Most of the cumulative projects listed above for O‘ahu and Hawai‘i would occur in previously disturbed areas, thereby limiting the level of disturbance to natural areas and views.

The ROI for cumulative visual impacts is the ROI for the Proposed Action and the regions affected by the cumulative projects listed above for O‘ahu and Hawai‘i. These regions include areas such as travel corridors or coastline areas where projects may occur that, although not within a single viewshed, may be viewed in succession or proximity and result in a cumulative visual impact.
Overall, cumulative impacts would be less than significant because the proposed project and the cumulative projects listed above would be spread out over a large area and would not be confined to one region in particular. Consequently, any impacts on visual resources are more likely to be localized. Also, the Proposed Action and the cumulative projects listed above would occur at different times, and some of the projects would replace existing infrastructure instead of constructing new infrastructure that would affect visual resources.

**Proposed Action**

*Modification of existing view.* Many of the other projects proposed within the ROI that may have cumulative effects would occur in areas of similar development and would be visually consistent with the existing facilities and SBCT-related projects. The assumption is that these other projects that may have cumulative effects would be developed in a manner that is consistent with installation master plans to ensure compatibility with surrounding uses, which could be negatively affected by visually incompatible development.

Other cumulative actions would occur in the vicinity of SBCT installations but would be sufficiently removed from SBCT-related actions that there would be no visual relationship between the actions. SBCT-related construction and training activities at KTA, in combination with other projects, would not result in cumulative impacts because many of these actions are of limited duration, the actions are dissimilar and unlikely to be visually perceived in combination, and the actions have negligible visual relationship because of separation.

Other projects that may have cumulative effects would occur in the same location but at different times, and potential visual impacts would be such that they would not result in a sequential cumulative impact. For example, SBCT-related training and prescribed burning at MMR and other ranges may have similar visual impacts as a result of smoke; however, these impacts would be of limited duration and are expected to be substantially separated in time, such that there would not be a reasonable cumulative link between the visual impacts of the two actions. As a result, the Proposed Action, in combination with other projects that may have cumulative effects, would not result in any cumulatively significant impacts on existing views.

Finally, the Army believes the fugitive dust and soil mitigation identified in Section 4.5 Air Quality and Section 4.9 Geology, Soils, and Seismicity would be implemented to keep soil erosion and compaction to a minimum, thereby minimizing visible fugitive dust. It is reasonable to predict that other construction and operation projects listed above would implement similar soil control practices, resulting in less than significant cumulative impacts to visual resources.

Individually, the proposed action would not result in significant impacts on existing views and viewsheds. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts to the modification of existing views would not be significant.

*Impairment of view during the construction phase.* No significant cumulative impacts as a result of visual impairment during construction are expected. Construction in the SRAA would result
in a significant but mitigable impact on visual resources; however, other projects that may have cumulative effects in the SBMR viewshed would occur in developed areas and at different times from the South Range construction and are not expected to cumulatively add to this impact.

Construction of the Helemano Trail, which is expected to occur between August 2005 and August 2006, could occur simultaneously with the Kamehameha Highway bridge replacement near the Helemano Plantation, which is expected to occur at the end of 2004. It is unlikely that construction would result in a cumulatively significant impact on visual resources because of the limited nature of construction involved for each project, the transient nature of construction activities, and the active agricultural use of the area that is similar in kind to the anticipated construction activities. The Kamehameha Highway traffic and drainage improvements, in conjunction with construction of the Helemano Trail, are not likely to result in a cumulatively significant impact because these actions would also be transient and would have a negligible visual relationship because of separation.

Similarly, construction of PTA Trail, which is expected to occur between March 2008 and March 2009, may occur simultaneously with other construction activities on Saddle Road and Kawaihau/Waimea Road, which are not currently scheduled. It is unlikely that construction activities would result in a cumulatively significant impact on visual resources because of the limited nature of construction involved for each project, the transient nature of construction, and the fact that most of these activities would have negligible visual relationship because of separation.

Individually, the construction activities would have no impacts on existing views and viewsheds. In light of historic, ongoing, and reasonably foreseeable future actions and the transient nature of construction projects the Army concludes that the cumulative impacts on impairment of views during construction would not be significant.

Alteration of landscape character. Projects listed in Tables 9-1 and 9-2 may result in alteration of the landscape character. However, these projects occur in areas of similar development or at different times than the Proposed Action or Reduced Land Acquisition Alternative such that there would be no visual link between them. As discussed in Section 4.3, the Army will implement mitigation measures to reduce the impacts on visual resources from the construction of the Proposed Action on a project-wide basis to less than significant. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts on the alteration of landscape character would not be significant.

Consistency with visual resource policies. As discussed in Section 4.3, the Proposed Action and Reduced Land Acquisition Alternative would not be substantially inconsistent with any visual resource policies. The Army has not been informed of any projects listed in Tables 9-1 and 9-2 that have not considered visual resource policies in their design and implementation. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts on consistency with visual resource policies would not be significant.
Alter nighttime light and glare. Under the Proposed Action, the use of nighttime lighting devices, such as flares, during training might increase slightly. The use of these devices is not expected to increase dramatically because training with night vision goggles would be conducted. There would be nighttime use of the cantonment areas and there would be lights which could contribute to light pollution, however these lights would be shielded.

Cumulative projects listed above that could contribute to cumulative nighttime light and glare impacts include construction and renovation of buildings and facilities at SBMR, which is already relatively developed. The Army assumes that excessive lighting would not be installed at new buildings and facilities, and renovation would only replace existing lighting with lighting of similar intensity and not increase lighting. These facilities are expected to properly orient and shield light fixtures.

Cumulative projects listed above that could contribute to cumulative nighttime light and glare impacts at PTA include the consolidated command and range control building, the relocation of Kilauea Fire Station to PTA, and the RTLP Range Development Plan Projects. Similar to SBCT PTA facilities, these facilities are expected to use low sodium vapor lighting. Also, these facilities are expected to properly orient and shield light fixtures. Cumulative visual impacts with respect to nighttime light and glare would be less than significant.

Individually, the impacts from light and light glare would have less than significant impacts on natural existing views and viewsheds. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts that would alter nighttime light and glare would be less than significant.

Reduced Land Acquisition
The potential for cumulative impacts on visual resources would be similar to that described above for the Proposed Action.

No Action
No cumulative impacts on visual resources are expected under No Action.

Airspace
Initially the development of military lands just prior to and after World War II had the biggest impact on airspace in the ROI. The expansion of military airfields continued as larger and more military aircraft were stationed in Hawai‘i. Following World War II the increase in tourism resulted in an expansion of civilian airfields and airports. As with the military, the civilian aircraft increased in numbers and size requiring expansion of the existing airports. This historic development resulted in close monitoring of airspace as the land area is small in Hawai‘i with limited airspace.

Proposed Action
Because the Proposed Action, with the possible exception of a shift in the instrument approach path to BAAF on PTA, would have no impact on airspace use in the ROI, there is no potential for incremental additive impact on airspace use. No other projects in the various airspace use ROIs have been identified that would have the potential for incremental, additive cumulative impacts on controlled or uncontrolled airspace, special use airspace,
military training routes, en route airways and jet routes, airports/airfields, or air traffic control in the ROI. The less than significant impacts from extending and reorienting the runway at BAAF would not lead to any airspace use cumulative impact.

Similarly, while the airspace over SBMR and WAAF is considered congested for general aviation aircraft and is likely to become more congested over time, procedures are in place that, although not mandatory, allow general aviation to function satisfactorily. Moreover, the WAAF tower provides traffic advisories to general aviation pilots when it is open. On weekends, when the tower is closed, pilots tune in to the common advisory frequency to monitor other traffic and to broadcast their position, thus minimizing the likelihood of adverse cumulative impacts on airspace.

The required consultation and review process with the FAA on all matters affecting airspace use would eliminate the possibility of direct adverse impacts on airspace use in the various ROIs. All aircraft operations at WAAF and BAAF and Hickam AFB are subject to air traffic control clearances and instructions. For example, the maximum height of each individual FTI antenna will be 100 feet or the FAA-approved height, whichever is lower. Prior to final design, the Army will coordinate with the FAA to ensure that each antenna does not obstruct air navigation, including approach and departure clearance near any runway or airfield. In addition, for those UAV flights that could not be contained wholly within restricted areas or warning areas, operations would be conducted in accordance with well-defined FAA procedures for remotely operated aircraft. The required scheduling process for the special use airspace by the military would eliminate the potential for adverse cumulative impacts. Military pilots operating outside special use airspace would still follow FAA regulations, thus minimizing the potential for adverse cumulative airspace use impacts. Individually, the proposed action would have no impact on airspace. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts on airspace would not be significant.

Reduced Land Acquisition
For the same reasons described for the Proposed Action, there would be no cumulative impacts on airspace under the RLA Alternative.

No Action
There would be no cumulative impacts on airspace under No Action.

Air Quality
As noted in Section 3.5, air pollution levels in Hawai‘i generally are low due to the small size and isolation of the state. Historic air quality monitoring data do not show any recent upward or downward trends in average air quality conditions on O‘ahu or Hawai‘i. The only identifiable trend has been an apparent increase in the peak 24-hour average PM$_{10}$ concentrations on O‘ahu attributed to fireworks use during New Year’s celebrations (Hawai‘i Department of Health 2000, 2001a, 2002). As discussed in Section 3.5, the state 1-hour ozone standard was rescinded in September 2001 and replaced with an 8-hour ozone standard. Data for maximum 8-hour average ozone levels have not been published, but maximum 1-hour ozone level data show that the 8-hour standard has not been exceeded.
Maximum 8-hour ozone concentrations probably have been about 55 to 60 percent of the 8-hour standard in recent years.

As noted in Section 3.5, the ROI for air quality issues depends on the pollutant and emission sources that are under consideration. The ROI for a regional secondary pollutant, such as ozone (which is not emitted directly but is formed by chemical reactions among precursor compounds), generally will be island-wide. The ROI for directly emitted primary pollutants is much more localized because dispersion processes reduce pollutant concentrations as emissions are transported away from the point of emission. Cumulative air quality impacts would occur when multiple emission sources affect the same geographic areas simultaneously or when sequential projects extend the duration of air quality impacts on a given area over a longer period of time.

Because the geographic scale of the ROI differs for regional secondary pollutants and directly emitted primary pollutants, it is convenient to separate the discussion of cumulative air quality impacts by type of pollutant. The major emissions associated with the Proposed Action and the RLA Alternative include ozone precursors (reactive organic compounds and nitrogen oxides) and directly emitted PM$_{10}$. Emission quantities of other pollutants are too low to pose air quality concerns.

**Proposed Action**

**Ozone precursor emissions.** Combustion processes are the dominant source of ozone precursor emissions. Construction equipment, motor vehicle traffic, and aircraft flight activity are important sources of ozone precursor emissions. Tables 9-1 and 9-2 include several construction projects that would at least partially overlap the time frame of construction projects identified for the Proposed Action. In a cumulative perspective, the Proposed Action would do little to alter overall vehicle traffic or air traffic activity on O'ahu or Hawai‘i. Federal ozone standards have not been exceeded in Hawai‘i during the past decade, despite the cumulative emissions from highway traffic, commercial and military aircraft operations, commercial and industrial facility operations, agricultural operations, and construction projects in both urban and rural areas. Given historical air quality conditions, the cumulative impact of emissions associated with the Proposed Action in combination with other construction projects and the continuing emissions from highway traffic and other sources is not expected to violate any state or federal ozone standards. Consequently, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative air quality impacts on ozone or other secondary pollutants would be less than significant under the Proposed Action.

**PM$_{10}$ emissions.** Fugitive dust sources and wildfires are the major contributors to PM$_{10}$ emissions. Fugitive dust sources include construction activity, vehicle traffic on unpaved roads or off-road areas, and wind erosion from areas with exposed soils. Tables 9-1 and 9-2 include several construction projects that would at least partially overlap the time frame of construction projects identified for the Proposed Action. However, spatial separation among these various construction projects would minimize or eliminate cumulative PM$_{10}$ impacts from those projects with overlapping construction time frames. Very few of the projects identified in the tables are in close proximity to training areas that would be affected by military vehicle traffic or wind erosion from military vehicle maneuver areas. While
agricultural burning, wildfires, and controlled burns could create temporary localized areas of high PM$_{10}$ concentrations, such events in the past have not violated federal PM$_{10}$ standards. As discussed in Chapters 4 through 8, there may be localized, direct significant impacts from PM$_{10}$ emissions. However, given historical air quality conditions, the cumulative impact of emissions associated with the Proposed Action, in combination with other construction projects and the continuing emissions from other emission sources, is not expected to violate state or federal ozone standards. Consequently, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative air quality impacts from primary air pollutants, such as PM$_{10}$, would be less than significant under the Proposed Action.

**Reduced Land Acquisition**

The cumulative impact issues discussed above for the Proposed Action also would apply to the RLA Alternative; consequently, cumulative air quality impacts under the RLA Alternative would be less than significant.

**No Action**

Under No Action, there would be no cumulative impacts involving air quality.

**Noise**

Historic trends that have affected noise in the ROI has been the steady development in the state. Urban and military development produced significant noise generators from vehicles, aircraft, military training, and construction activities. There has been no routine monitoring of ambient noise conditions, so data are not directly available for evaluating specific trends, but in general, noise conditions in the vicinity of USARHAW installations are not likely to have significantly changed in recent years because activity levels for major noise sources have not grown or declined significantly.

Noise impacts are inherently localized because sound levels decrease relatively quickly with increasing distance from the source. Cumulative noise impacts would occur when multiple projects affect the same geographic areas simultaneously or when sequential projects extend the duration of noise impacts on a given area over a longer period of time.

**Proposed Action**

Cumulative noise impacts under the Proposed Action would stem primarily from temporary construction activities and military training. Land acquisition or transfer projects and resource management plan activities listed in tables 9-1 and 9-2 would have no meaningful noise impacts and thus no potential for cumulative noise impacts under the Proposed Action. Private development construction projects, highway improvement projects, and military construction projects at sites other than USARHAW installations would not produce cumulative noise impacts under the Proposed Action, due to distance or differences in construction timing.

Tables 9-1 and 9-2 include several construction projects at SBMR or PTA that would partially overlap the time frame of construction projects identified for the Proposed Action. Uncertainty in the timing of some highway construction projects near PTA precludes any meaningful evaluation of cumulative noise impacts related to those projects. However,
spatial separation among these various construction projects would minimize or eliminate cumulative noise impacts or noise-sensitive land uses. Consequently, no cumulatively significant noise impacts would occur from planned construction projects at or adjacent to Army installations.

Military training projects at MMR are too far removed from SBMR, SBER, KTA, KLOA, or DMR to have any cumulative noise impacts under the Proposed Action. Although noise impacts on a project level are significant, due to the type and location of projects identified in tables 9-1 and 9-2, cumulative noise impacts affecting the same geographic areas or extending the duration of noise impacts on a given area over a longer period of time would be unlikely to occur. Consequently, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative noise impacts under the Proposed Action would be less than significant.

Reduced Land Acquisition
The cumulative impact issues discussed above for the Proposed Action also would apply to the RLA Alternative. Consequently, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative noise impacts under the RLA Alternative would be less than significant.

No Action
Under No Action, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be no cumulative impacts involving noise.

Traffic
There has been a steady increase in traffic in Hawai’i over the last 50 years. Much of the increase in traffic on O’ahu is due to urban sprawl. Historically people tended to live close to where they worked and local road networks were adequate to handle local and weekend traffic. However, as areas such as Ewa Beach, windward O’ahu, and Hawai’i-Kai developed and people moved to these developing communities, commute traffic began to overload major roadways into Waikiki and Honolulu. In general, highway development in these areas has barely stayed ahead of these traffic increases. On other parts of the island and on the island of Hawai’i, tourist traffic created problems in the more popular destinations, overloading local roads mainly on weekends. Military traffic has remained relatively stable over the years with the exception of travel to and from SBMR and Ewa Beach, a popular location for off-base housing. Recent trends have noted a decrease in military personnel in Hawai’i, as the military has downsized and closed some facilities.

Proposed Action
Traffic trends differ by region. Peak-hour traffic along the major roadways on O’ahu is expected to increase at an average growth rate of 1.6 percent per year until 2020 (Kaku Associates 1995). For the same period, peak-hour traffic along residential streets is expected to increase 0.4 percent per year. Comparable data for the roadway network on the island of Hawai’i is not provided in either the current or previous transportation plans. Comparing historical traffic counts along Mamalahoa Highway and Kawaihae Road provides an indication of past growth. Between 1996 and 2000, daily traffic increased approximately 0.1 percent per year, which implies minimal growth along this roadway. For the same period,
traffic along Kawaihae Road, between Mamalahoa Highway and Queen Kaahumanu Highway, has increased an average of 4.5 percent per year. This growth is considered robust and is comparable to calculated growth rates for traffic in the Kailua-Kona area, which is on the same side of the island as the project.

The Proposed Action has several traffic-related impacts. The first relates to the construction of the military vehicle trails and the second to the individual projects at SBMR.

The Proposed Action separates military traffic from civilian traffic as much as possible, so there would be a beneficial impact on traffic because the volume of military traffic on the state and county road system would not be greater than current hourly volumes. The hourly volume of convoy traffic is limited by operational considerations (no more than 24 vehicles per convoy and a minimum interval of 15 minutes between convoys). Unless this operational procedure is changed, the maximum hourly volumes of convoy traffic would remain the same. The threshold of 100 peak-hour trips in the peak direction would not be reached for existing or cumulative conditions, so the impact from Army use of military vehicle trails would be less than significant.

The second aspect of traffic impacts of the military vehicle trails relates to the trail crossings of public roadways. The traffic impact of these crossings was analyzed using the methodology for intersections without signals, with the convoy traffic yielding to public traffic along the highway. Thus, the operation of traffic along the military vehicle trail would have minimal or no impact on traffic operations along the public roadways as long as they are two lane and two way. Any future improvement of the highways may result in the trail crossing a four-lane highway. In other areas where trails (or plantation roads) have crossed highways greater than two lanes wide, either traffic signals have been installed or a grade crossing has been constructed. Because there are several highway improvement projects on the list of cumulative impacts, the resulting cumulative impacts of the widening plus military vehicle trail crossing would have to be assessed on a case-by-case basis. This would have to be performed as part of the environmental assessment of the highway project. Design year traffic volumes are typically not available until the EA is performed for the highway improvement project. At this time, cumulative traffic impacts are predicted to be less than significant.

The individual projects on SBMR either have separate NEPA documents prepared or do not generate sufficient traffic to warrant a traffic impact analysis. With few exceptions, the projects have minimal traffic impacts in the immediate vicinity of the project because traffic is being redistributed within a confined area.

Potential traffic impacts could occur due to increased use of PTA, along with the increased traffic and development caused by the Saddle Road realignment. Increased traffic, as described in the Saddle Road EIS, could have indirect impacts on cultural, socioeconomic, and biological resources. Further, expanded use of PTA could combine with other local land acquisition and development projects to conflict with right-of-way acquisition needs for Saddle Road.
The proposed alignment for Saddle Road through WPAA is currently not funded. If the Army decides to implement the proposed action, the Army will coordinate with DOT to minimize impacts on traffic crossings on the new Saddle Road from the PTA military vehicle trail. The Saddle Road project could have two impacts on the Proposed Action. The first is that traffic operating conditions, and therefore the level of service, will improve because the deficiencies will be corrected by the improved alignment and higher (and newer) design standards. These higher standards include improved sight distances, sufficient lane widths, and adequate shoulders. The higher design standards will also result in higher operating speeds. As stated in the EIS for the Saddle Road project, the projected 2014 ADT is 14,000 vehicles per day. The incremental impact of the Proposed Action on future traffic conditions with the Saddle Road project completed would be negligible because traffic volumes along Saddle Road would increase insignificantly as a result of increased use of PTA.

The second impact of the Saddle Road project relates to the impact of right-of-way acquisition on the expansion of PTA. While the road project may affect PTA expansion, SBCT project actions at PTA would not contribute to right-of-way impacts on Saddle Road.

On O'ahu, the traffic growth rates discussed above consider growth in the population, employment, and housing, including those related to increased military activity. The estimated projections are based on historical growth and specific projects that were known at the time the study was prepared. Therefore, it is reasonable to assume that a modest increase in military activity is included in the traffic forecasts. This also implies that the Proposed Action would not lead to a significant cumulative impact as long as the number of new personnel is consistent with past trends. Lastly, it should also be noted that traffic will be separated from the public when using the military vehicle trails. On the island of Hawai'i, traffic along the roadways within the study area should increase within the growth rates noted above. In light of past, present, and reasonably foreseeable future actions, the Army determined that the Proposed Action will not result in significant cumulative impacts on traffic.

**Reduced Land Acquisition**

No significantly cumulative impacts are expected for this alternative for the same reasons described in the Proposed Action. Other impacts of a cumulative nature are the same as those under the Proposed Action.

**No Action**

Under No Action, there would be no cumulative impacts involving traffic in light of past, present, and reasonably foreseeable future actions.

**Water Resources**

Cumulative impacts on water resources may occur in four categories: water supply, surface water quality, groundwater quality, and flooding. The ROI for the cumulative effects on water resources is the sum of the regions of influence of the combined projects. For the Proposed Action, the ROI is the same as that described in each of the preceding chapters and includes the region within the installation boundaries or easements where the Proposed Action will be implemented, the watershed downstream of the installation boundaries (for surface water impacts), or the aquifer(s) downgradient of the installation boundaries (for...
groundwater impacts). The ROI of the projects outside the Proposed Action vary in size and may not be well defined. In general, the cumulative impact assessment is intended to be descriptive rather than quantitative.

Among the trends that should be considered in the analysis of cumulative impacts on water resources in Hawai‘i are increases in demand for potable water, due to an increasing population and expansion of urban areas, and an accompanying increase in sources of pollution. In the past, demand for water for agriculture spurred the development of a network of tunnels, pipelines, and canals to transfer water from areas of abundance (usually in mountainous areas with high level water) to the major agricultural areas. This did not come without consequences in the form of lowered water levels in the high level aquifers. Potable water was also supplied through drilling wells to tap abundant groundwater resources. But drilling and pumping are expensive, and over pumping can lower groundwater levels, and cause salt water intrusion in coastal areas. To prevent overdraining groundwater resources, the State of Hawai‘i has attempted to estimate the long-term sustainable yield of the major aquifers and to issue permits for groundwater extraction so as to not exceed the sustainable yield. Groundwater quality has been affected by industrial chemical releases and by septic systems, as well as by pollutants infiltrating urban runoff. These pollutants can threaten the available water supplies and may require expensive treatment to make the water usable. Similarly, urban expansion and industrial and agricultural development have all had an effect on surface water quality. Nutrients, sediment, toxic chemicals, and debris from disbursed nonpoint sources are collected by runoff in streams and eventually discharge to lakes, estuaries, or the ocean. These pollutants can adversely affect aquatic species or they can affect the aesthetic qualities that make Hawai‘i a desirable place to live. The State of Hawai‘i has increasingly addressed efforts at reducing and preventing this type of pollution, through monitoring, setting water quality goals, and permitting and through public education and information campaigns. These trends are expected to continue.

**Proposed Action**

*Water supply.* The demand for freshwater on O‘ahu is increasing, and in parts of O‘ahu is nearing the available supply. For example, the Honolulu Board of Water Supply estimates that permits have been issued for over 95 percent of the estimated sustainable yield of the Central and Pearl Harbor aquifers. The board is considering plans to build new conveyances to link areas with surplus water (windward side of the island) to areas with inadequate supplies and plans for future growth in demand (for example, the Ewa area). The Proposed Action would increase the number of Army personnel and their families compared to No Action, and this would increase water demand. In addition, operating certain proposed new facilities, such as the vehicle wash facilities, would increase water use compared to No Action. These increases are not expected to be significant with respect to the overall demand for water in the hydrologic units in which the Proposed Action would occur. The greatest future growth in demand for water is likely to occur in the Pearl Harbor hydrologic unit due to urban development and expansion. A relatively minor increase in demand for groundwater from the Central Plateau aquifer at SBMR, which spills over to the Pearl Harbor aquifer, is not likely to significantly reduce available water supplies in the Pearl Harbor aquifer. Demand for water at PTA to support the tactical vehicle wash would require a large percentage increase in water deliveries to PTA, but the water would be supplied from areas with abundant freshwater, so in light of historic, ongoing, and reasonably foreseeable
future actions the Army concludes that the cumulative impact on water supply would be negligible and therefore less than significant.

Surface water quality impacts from nonpoint source pollution. Nonpoint source pollution is recognized as one of the principal causes of surface water quality degradation. The State of Hawai‘i is developing TMDLs for its impaired surface waters in response to requirements of the Clean Water Act. Enforcing stormwater management regulations will help reduce pollutant loadings to surface waters by requiring industrial facilities, municipalities, and military and other facilities to implement stormwater management practices to reduce their individual nonpoint source contributions of pollutants. Until TMDLs are developed for receiving waters, loadings from individual sources identified, and maximum loads allocated to these sources, it will be difficult to quantify the relative contribution of Army training activities compared to other sources. Qualitatively, any contribution to pollutant loading from a source in the watershed of an impaired water body, if it is greater than natural background levels, can be regarded as significant. With the implementation of required Regulatory and Administrative mitigation measures for the Proposed Action under the Clean Water Act as discussed in Section 5.8 and in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impacts on surface water quality from nonpoint source pollutants would significant but mitigable to less than significant.

Surface water quality impacts from contaminated suspended sediment. There would be significant but mitigable to less than significant long term cumulative impacts on surface water quality from suspended sediment resulting from training activities at SBMR and KTA, and from sediment loading following wildfires at SBMR, KTA, and PTA. These water quality impacts would affect streams that have been identified by the State of Hawai‘i as “impaired water bodies.” Impairment is a cumulative effect resulting from contaminant contributions from multiple sources in a watershed. Therefore, the direct surface water impacts described in sections 5.8, 7.8 and 8.8, related to parameters on which the impairment is based (sediment, pathogens, nutrients, etc.), are also considered to be cumulative impacts.

Trace levels of explosives residues could be transported by runoff from training ranges to streams. The chemical constituents of explosives have various degrees of toxicity and represent different health risks. Most break down rapidly in the environment, but some are more resistant to degradation. Their ultimate chemical degradation products include nitrogen compounds, which stimulate plant or algal growth if present in sufficiently high concentrations. The trace concentrations that have been found to be present in soils and that may be transported by runoff into stream waters are not expected to be significant relative to background concentrations of natural organic compounds.

Based on the analysis in Section 5.9, explosive chemical concentrations present in soils on training ranges at SBMR are unlikely to be transported to receiving waters at concentrations high enough to degrade surface water quality. The concentrations would be considered to contribute to a cumulative impact on surface water quality, which would be significant if the concentrations were subject to regulation under the State’s antidegradation policy, or contributed to an impairment of surface water quality under Section 303(d) of the Clean Water Act. While there is a potential for this to be a significant cumulative impact, there are insufficient data to accurately predict whether the impact would occur.
With the implementation of required Regulatory and Administrative mitigation measures for the Proposed Action under the Clean Water Act as discussed in Section 5.8 and in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impacts on surface water quality from contaminated sediment suspension would significant but mitigable to less than significant.

Surface water quality impacts from soil loss and suspended sediments. Anecdotal evidence suggests that sediment from upslope human activities may be affecting coral offshore in the vicinity of Kawaihae Harbor. Sediment deposition and decreased water clarity, which affects photosynthesis, can affect coral colonies. In general, urban runoff is considered one of the principal threats to coastal water quality. As discussed in Section 5.8 Water Resources and Section 5.9 Geology, Soils and Seismicity, our analysis demonstrates that the soil loss from the Proposed Action will not add substantially to the overall trend of sedimentation.

Preliminary results of ATTACC modeling indicate that the Proposed Action will increase soil erosion in the training ranges. This impact probably cannot be fully mitigated through improved land management practices because of the limited land area available. Increased erosion will result in larger volumes of sediment being transported to streams by runoff. This erosion could adversely affect stream water quality by making the water more turbid.

Construction projects also generally result in soil disturbance and expose soils to erosion. Construction projects under the Proposed Action that involve disturbance of more than one acre (0.4 hectare) of land will be required to comply with stringent stormwater pollution prevention requirements, including use of best management practices identified prior to construction in stormwater pollution prevention plans, to minimize soil erosion. Other construction projects besides those identified under the Proposed Action could also contribute to sediment erosion and could have impacts on surface water quality. These projects would also be subject to the same stringent nonpoint source permitting requirements, requiring the use of BMPs to prevent water quality impacts. The cumulative effects of sediment loading from many sources would include an increase in the total load of sediment discharged into a stream, and either an increase in the amount of sediment transported to downstream waters (lakes, estuaries, or the ocean), or an accumulation of sediment deposits in the stream channel (if the sediment loading were greater than can be transported by the stream).

As with the impacts of sediment loading, the effects of chemical contaminant loading could also contribute to cumulative impacts on stream water quality. However, implementing construction BMPs for stormwater would also address the potential for contaminant transport. Complying with the regulatory requirements that would apply to construction projects and to federal facilities under the Phase 2 stormwater management regulations to be implemented would ensure that the contributions of sediments and pollutants from the Proposed Action would be kept at a minimum. In most cases, complying with these regulations is expected to improve surface water quality compared to current conditions and to keep potential cumulative impacts from exceeding significant levels. Monitoring and the requirement to define and document progress toward meeting pollutant reduction goals would help to ensure that water quality is not degraded further.
With the implementation of required Regulatory and Administrative mitigation measures for the Proposed Action under the Clean Water Act as discussed in Section 5.8 and in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impacts on surface water quality from soil loss and suspended sediment would significant but mitigable to less than significant.

Surface water quality impacts from watershed impairments. Studies in some urban coastal areas have shown that the cumulative contribution of contaminants from many dispersed sources, rather than from any single point, is one of the major factors affecting coastal water quality. Among the causes of these impacts are increased loading of nutrients, toxic chemicals, and suspended sediments, but another important contributing factor is alteration of stream channels. Natural channels tend to widen out or meander on the coastal plain, and may contain abundant vegetation. This slows stream flows and traps sediments and nutrients before they enter the ocean. Unfortunately, these characteristics also can lead to the coastal plain flooding in high flow conditions. To prevent flooding and to increase the habitable land area, stream channels have been straightened, narrowed, and confined to permanent concrete channels or pipes and vegetation has been removed, preventing the streams from functioning to remove sediment and nutrients.

Each watershed differs in its size, shape, amount of runoff, nature and degree of development, and in the types of problems and solutions appropriate to address those problems. Increasingly, watershed managers recognize that an integrated approach is needed to address problems in watersheds, not only to eliminate sources but to restore watershed functions. In addition to reducing sources of surface water pollutants on lands managed by the Army, the Army would continue to cooperate with other entities, including state and local agencies, local land owners, scientists, and local organizations, to plan and implement new approaches to improve watersheds and coastal water quality. One such cooperative effort is the Ko'olau Mountains Watershed Partnership, sponsored by the Hawai'i Department of Land and Natural Resources and involving numerous stakeholders. There are no proposed significant impacts on watershed impairments or stream crossings from the Proposed Action. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impacts on surface water quality from watershed impairments would be less than significant.

Groundwater quality. The Army continues to address potential groundwater contaminants resulting from past practices through its Installation Restoration Program, which is discussed in more detail in the hazardous materials sections of this document. Infiltrating surface water containing nonpoint source pollutants is not likely to have a significant impact on groundwater quality because the pollutants are typically highly dilute and tend to be adsorbed or biodegraded during infiltration through soils.

Spills and other accidental releases may occur from time to time and could have more significant local impacts on groundwater quality. Their occurrence cannot be predicted, but standard operating procedures are in place to reduce the potential and impacts of accidental spills and releases. These include training spill response personnel and those who handle or manage hazardous materials or wastes, provide spill response equipment and supplies, reduce the use of hazardous chemicals and other waste minimization procedures, and use
engineering controls (such as secondary containment) to reduce the potential for releases. If spills occur, the extent of the spill is expected to be fully investigated and characterized and then remediated, in compliance with regulatory requirements. The Proposed Action is not expected to significantly increase the cumulative potential for spills that could affect groundwater quality, relative to No Action, and if spills were to occur, they would be remediated immediately, as described under No Action. Because implementation of SOPs will address containment and remediation of spills, nonpoint source pollutants are not likely to interact with or accelerate any decreases in groundwater quality due to septic tank or industrial releases; therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact on groundwater quality would be less than significant.

Increased Flood Potential. Construction projects involving paving, new structures, and other impermeable surfaces can increase flooding potential by reducing the retention time of runoff and concentrating runoff at selected discharge points, rather than dispersing it over a wide area. The Proposed Action is not expected to contribute significantly to an increase in the potential for flooding, relative to No Action. Impacts from construction projects under the Proposed Action are not expected to significantly decrease the amount of stormwater runoff retained by soils in the high-intensity short-duration storms that cause most flooding in Hawaiian watersheds. Each construction project would be designed to accommodate the additional runoff. Phase 2 stormwater management regulations would require MS4s, including federal facilities, to control runoff in new developments and prevent impacts such as flooding or high stream flows that increase erosion. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact on increased flood potential would be less than significant.

Reduced Land Acquisition
Water supply. The impacts of Reduced Land Acquisition on the water supply would be equivalent to the impacts from the Proposed Action and would be less than significant.

Surface water quality. Reduced Land Acquisition would result in minor differences in water quality impacts compared to the Proposed Action. Therefore, cumulative impacts would be approximately the same as those described for the Proposed Action and would be less than significant.

Groundwater quality. The cumulative impacts would not differ substantially from those for the Proposed Action and are not expected to be significant.

Increased Flood Potential. The cumulative impacts on flooding of Reduced Land Acquisition would be approximately equivalent to those under the Proposed Action. This project would have less than significant cumulative impacts on flooding.

No Action
Water supply. Under No Action, Army demand for water is expected to remain approximately at current levels, but with cyclical or periodic fluctuations. In times of shortage, if significant additional growth in water demand occurs on the island, water shortages could occur. However, because Army demand is expected to remain at approximately current levels, its
water use is not considered to contribute to this potential future impact. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impact of No Action on regional water supply is expected to be less than significant.

Surface water quality. Continued activities under the No Action Alternative would contribute minor quantities of sediment and explosives residues to surface waters, via stormwater runoff that drains from ranges or future construction sites. Currently, the magnitude of the contribution of nonpoint source pollutants from the project Army installations on O'ahu is suspected to be small, compared to contributions from urban areas and from agricultural sources, although data are insufficient to fully quantify or confirm this conclusion. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the impact of No Action on surface water quality is expected to be less than significant.

Groundwater quality. Activities under No Action would continue to contribute small quantities of chemical pollutants, including explosives residues, solvents, and petroleum hydrocarbons, to groundwater through the infiltration of surface water, accidental spills or releases of chemicals, or leaching of hazardous wastes resulting from past disposal practices. Because spill control and response programs address the potential for future releases, and compliance with regulatory requirements addresses past releases, the No Action Alternative is not expected to result in any additional significant impacts on groundwater quality. Continued implementation of these measures is expected to reduce the potential for impacts on groundwater quality in the future. in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that when combined with other contributions to groundwater pollutants in the recharge areas of the aquifers in which the installations are located, the long-term cumulative impacts of No Action are not expected to be significant.

Increased Flood Potential. New construction projects could increase the impermeable areas covered by pavement, structures, or other surfaces that are less permeable than the existing land surface. The projects could change the drainage pattern at a site, causing stormwater to run off more quickly than under current conditions or to direct larger volumes to a channel or conveyance than it has capacity to retain. Flows in excess of conveyance capacity can lead to flooding or erosion. Each of the construction projects listed in tables 9-1 and 9-2 would take drainage capacity into consideration in the design of the project. It is standard engineering practice to design for excess drainage capacity and to take into account existing and proposed drainage capacity requirements when designing new facilities. Standard engineering practice also requires that drainage system design be reviewed before building permits are approved. Similarly, regional projects may increase stormwater runoff volumes, and may route to stream channels more quickly, as an area becomes more developed. In the past, urban development projects have modified stream channels to accommodate flood flows. While more rapid routing of storm drainage from areas of construction at Army installations such as SBMR could contribute to increased downstream flood flows, the increases are not likely to be significant relative to the effects of increased urban development overall.

If necessary, various engineering approaches are available to slow or retain runoff to reduce the potential for flooding. Also, in large intense storms of short-duration, which cause most flooding in Hawai‘i, soil infiltration capacity has relatively little effect on flood magnitude.
because there is too little time for infiltration to occur, and the bulk of the water runs off quickly regardless of ground cover.

One of the best strategies for avoiding the effects of flooding under these circumstances is to avoid building in flood-prone areas. Army projects that would be constructed under No Action would be unlikely to contribute significantly to increased flood potential because of the relatively small amount of increased impermeable surface area and the relatively small effect of this increase on runoff volumes under peak runoff conditions. Several of the anticipated future civilian projects under No Action (bridge replacement and drainage improvement projects by the State of Hawai‘i) are likely to reduce the potential adverse effects of flooding by increasing channel capacity and efficiency. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the No Action is expected to result in less than significant cumulative impacts on increased flood potential.

**Geology and Soils**

The project is likely to contribute to cumulative impacts from soil erosion. The major historic influence on soil erosion in the ROI is the disturbance of soils, modification of slopes and drainage features, and loss or disturbance of vegetation due to agricultural conversion, military activities, fires, roads, and development. Soil disturbance alters the soil profile, exposes soils directly to rain and runoff, and in other ways increases the potential for erosion. Without vegetated cover, soils are more subject to the erosive forces of wind and water as well as general down slope movement of unstable soils. Although it is difficult to quantify historic soil loss, many of the lower slopes of the islands of O‘ahu and Hawai‘i have been subject to vegetation removal and subsequent increased soil erosion rates. Modification of slopes and drainage features It is important to note that soil erosion and deposition is a naturally occurring phenomena in any landscape. However, adverse impacts may occur when erosion rates are accelerated by human or natural disturbances. Impacts associated with this include loss of productive topsoil, loss of fragile soils supporting unique plant species, loss of unique and/or endangered habitats, water quality impacts, and down slope movement of soils.

The historic trend of soil erosion and/or loss has been modified in recent years by better management of agricultural lands, better stormwater controls on urbanized lands, a trend towards revegetation of disturbed lands, and a better understanding of the importance of vegetative cover within the landscape. However, activities that disturb or remove vegetative cover are presently occurring or will occur in the reasonably foreseeable future, which will continue to result in greater soil erosion and loss than without these activities. Areas with well developed (deep) soils have the potential to be revegetated and stabilized, however, areas with newly formed soils or shallow soil profiles may not be able to recover from soil erosion or soil loss impacts.

Large construction projects, including road construction projects listed in Table 9-1, are examples of potential soil-disturbing projects that in the past might have contributed significantly to soil erosion. In addition, many smaller projects and activities not listed in Table 9-1 also contribute to the cumulative loss of soils. Today, there are increasingly strict regulations at the federal and state level that require implementation of management
practices to reduce erosion from construction sites to protect water resources. Increasingly widespread application of these practices has the indirect effect of reducing soil erosion at the source. Similar practices can be applied, and are increasingly applied, to all ground-disturbing activities, as awareness of the effects of erosion on downslope and downstream resources increases, and the forward trend in soil erosion is expected to be a continued decrease in erosion from human activities.

Introducing either different land use activities or increasing the level of disturbance activities at the proposed project sites will increase the potential for erosion and soil loss within the ROI. In areas of the PTA where soils can be thin and fragile, the effects of soil loss may be irreversible. Impacts on water quality from this project and other reasonably foreseeable projects can be mitigated with stormwater management and runoff controls. However, maintaining a persistent vegetative cover in areas of intensive use or development will not be possible because of the nature of the proposed use. In light of historic, on-going, and reasonably foreseeable actions, the cumulative impacts associated with the proposed project are significant.

**Proposed Action**

Use of the training ranges is likely to result in continued enhanced soil wind erosion in some areas; these effects are expected to be locally significant. However, at the regional level, the effects are not expected to be significant, compared to natural rates of erosion. The contribution of soil wind erosion from training ranges at SBMR to cumulative soil loss or sedimentation in the Pearl Harbor or Kaukonahua watersheds, for example, is expected to be minor relative to the contributions from agricultural and urban lands. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the short-term erosion from construction at other project sites would be reduced at each construction site through implementation of best management practices, as required under federal and state regulations, and the effects would not be significant, either alone or in combination with other projects.

Seismic or volcanic eruption hazards could result in cumulative effects if, for example, evacuation of personnel or treatment of casualties were to overwhelm the capacity of the available infrastructure. The most likely site for severe seismic or volcanic impacts to occur is at PTA, where the seismic and volcanic hazards are greatest. However, the Army is expected to have internal capacity to evacuate its personnel and to support civilian emergency response efforts in a seismic or volcanic emergency. The presence of trained personnel and equipment resources at PTA would reduce the potential impacts of a natural disaster in the region and therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the proposed action would not cause significant cumulative impacts regarding seismic and volcanic hazards.

No other cumulative geologic impacts are expected from the Proposed Action.

**Reduced Land Acquisition**

Impacts from the RLA Alternative would resemble impacts from the Proposed Action.
9. Cumulative Impacts

No Action
Existing erosion conditions would remain, and no significant cumulative impact is anticipated from projects across O‘ahu and Hawai‘i.

Biological Resources
During the last century the introduction of nonnative species has increased exponentially as a result of intentional and incidental introductions. Nonnative introductions are estimated to occur now at a million times the natural rate (Juvik 1998). Nonnative species disrupt ecosystems by consuming or destroying native species and habitats, spreading diseases, and outcompeting native species for local resources. There have been human-induced flora and fauna extinctions dating back thousands of years ago to the beginning of human use of the Hawaiian Islands, but the extinction rate on O‘ahu and the island of Hawai‘i has accelerated over the past century. The hardest hit terrestrial species are birds, snails, and plants. Of the known Hawaiian species, approximately 70 percent of the land snails are extinct, 40 percent of the birds are extinct, with another 45 percent federally listed as endangered, and roughly 10 percent of the vascular plants are extinct, with an additional 20 percent considered at risk of becoming extinct in the near future (USGS 1999c). Marine species and habitats have also been degraded by human activity over the last century. Several factors contribute to stress in the marine environment in Hawaiian waters, including acoustic pressures and increasing interference with marine wildlife from tourism and recreation. Hawaiian waters have been identified as “acoustic hot spots” (NRDC 1999), i.e., ecologically significant and exposed to high levels of human-made noise. At various times, there may be military projects that emit low frequency sounds in Hawaiian waters (such as those from the North Pacific Acoustic Laboratory).

Proposed Action
The ROI for cumulative impacts on biological resources corresponds with the SBCT ROI, Figure 3-12. The following describes impacts on biological resources that would result from SBCT actions in conjunction with those projects described in tables 9-1 and 9-2. The extensive disturbance and reduction of native habitats, as discussed above and in Section 3.10, has caused the extinction of many native Hawaiian species and has placed in peril most of those that remain. Development, heightened human activities, fire, and the introduction of nonnative species have been the main causes of habitat degradation and loss and the subsequent loss and endangerment of native species.

Impacts from fire on sensitive species and sensitive habitat. There would be a cumulative increase in the potential for fire on O‘ahu and the island of Hawai‘i as a result of SBCT and the projects listed in tables 9-1 and 9-2. Human-induced fires would increase through live-fire activities proposed at MMR, part of the reinstatement of current force activities, and the spread of nonnatives, such as the highly flammable fountain grass and molasses grass. The increased use of improved roads would lead to a higher probability of fire starting from a catalytic converter or discarded cigarette. The Army has developed an IWFP for all installations on the islands of O‘ahu and Hawai‘i to prevent and control fires. These plans would greatly reduce fire damage but are unlikely to fully prevent and contain fires in and immediately around Army training ranges. The USFWS would be notified if a fire were to occur outside of the firebreak roads. The potential loss to listed species, species of concern, and sensitive habitat would be substantially mitigated by the Mākua Implementation Plan, Pōhakuloa.
Implementation Plan, and the O'ahu Implementation Plan. The Mākua Implementation Plan was completed in the Fall 2003 and will be in effect as long as routine training is resumed at MMR. The Mākua Implementation Plan identifies listed species and important habitat in need of stabilization and identifies specific measures needed to recover these species, such as replanting, invasive plant eradication and predator removal. Both the Pohakuloa and O'ahu Implementation Plans will be modeled on the Makua document.

The Army has completed ESA Section 7 consultation with the USFWS for both current force and SBCT training on the islands of O'ahu and Hawai‘i. In compliance with the Biological Opinion of "no jeopardy" issued by the USFWS for O'ahu, the Army will develop implementation plans for the island of O'ahu (not including Mākua), as well as PTA no later than October 2006. The Army will abide by all terms and conditions outlined in the biological opinion of "no jeopardy" issued by USFWS for current force and SBCT training on the island of Hawai‘i.

The Army believes it is highly likely that the project-wide impacts on biological resources over time would be mitigated to a less than significant level with the full implementation of the terms and conditions of the Biological Opinions for SBCT and current force activities on the islands of O'ahu and Hawai‘i (dated October 2003 and December 2003, respectively), and with the full implementation of the Wildland Fire Management Plan (dated October 2003). The Army has three years to develop and execute the O'ahu Implementation Plan as directed by USFWS in the Biological Opinion. The Army has two years to execute the terms and conditions defined in the Biological Opinion for PTA. However, the Army has made a conservative determination that although the mitigation will considerably reduce the impacts on biological resources, the impacts may not be reduced to a less than significant level. Non-Army projects with potential fire producing activities (such as road construction and development) are numerous and outside the control of the Army. These projects increase the potential for fires to impact sensitive species and habitat by reducing the amount of native and nonnative vegetation in areas and increasing access to areas previously undeveloped. The Army cannot mitigate for all potential scenarios. Thus, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts from fire on sensitive vegetation and habitat are considered to be significant.

**Impact on sensitive species resulting from the spread of nonnative species.** There would be a cumulative increase in the number of nonnative species as a result of the SBCT Proposed Action or RLA and the projects shown on tables 9-1 and 9-2. Construction and increased use of roads would introduce additional nonnative species and further spread those that already occur on O'ahu and the island of Hawai‘i. The disturbance caused by construction and demolition and the increased use of improved roads would leave the surrounding habitats vulnerable to nonnative species that can thrive in conditions where native species cannot. Further stress on the land would be caused by the displacement of land and removal of vegetation that would occur as a result of I3A construction at SBMR and PTA and CAACTF construction at KTA. Mitigation and conservation measures associated with SBCT, the Saddle Road Realignment, and O'ahu and PTA IRMPs would limit the spread of nonnative species by washing construction and military vehicles, and incoming equipment into O'ahu and the island of Hawai‘i. Nonnative wildlife, such as ungulates, monegese, snakes, ants, and rodents, which cause problems to native plants and animals, are being monitored, restricted, and eradicated.
when possible, as part of O‘ahu and PTA INRMPs and yearly inventory of O‘ahu and the island of Hawai‘i training installations. ESA Section 7 consultation is being conducted in order to identify ways to minimize impacts on ongoing Army training at PTA and O‘ahu installations, and mitigation measures would be added into current force actions in order to avoid jeopardizing any listed species. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that while on a project-wide basis the Proposed Action’s impact on the spread of non-native species would be significant and mitigable to less than significant, the overall cumulative impact from the spread of non-native species from projects listed in Tables 9-1 and 9-2 in association with the Proposed Action would be significant.

*Impacts on marine wildlife and habitat* The use of TSVs could have a potential impact on marine wildlife and habitat. This impact is predominantly due to the potential for collisions between high speed vessels and marine wildlife, contaminants and their effect on the overall marine ecosystem, and wave impacts on coral. As TSVs may be routed near some of the Hawaiian Islands Humpback Whale National Marine Sanctuary waters, potential impacts are expected during the humpback whale calving and mating season (January 1 to April 30). As described in Chapter 8, impacts on marine mammals from use of LSVs under the Proposed Action are less than significant due to the low speed and infrequent use of the LSVs. The Army conducted informal consultation with NOAA Fisheries in accordance with Section 7 of ESA. NOAA Fisheries concurred with the Army’s determination that the Proposed Action is not likely to adversely affect federally listed species, marine mammals or designated essential fish habitat (See Appendix E).

A temporal cumulative impact could occur, where combined traffic from LSVs and TSVs could, over time, cause harm to marine wildlife. However, it is too speculative to determine the extent of this potential impact because the Army has no plans or proposals for purchasing TSVs and therefore the number and timing of phase-in of TSVs is extremely uncertain. Cumulative impacts could be reduced with the implementation of specific standard operating procedures designed to reduce impacts from vessel operations on marine species. There are some measures in place that address fuel spills and ballast discharge. The US Coast Guard requires SOPs to address these impacts. In addition, regulations exist in Hawai‘i to prohibit any boats from approaching within 100 yards (91 meters) of adult whales and within 300 yards (274 meters) of mother/calf pairs (NOAA 1997). A no-wake zone already exists within the harbor entrance area, which would reduce impacts from TSV wakes in that area. Because of the speculative nature of TSV implementation and the potential to implement existing regulations or SOPs to reduce impacts, and in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact on marine wildlife and habitat is less than significant.

*Impacts on federally listed species and their federally designated or proposed critical habitat* Projects listed in tables 9-1 and 9-2 would result in direct and indirect negative impacts on listed species and their federally designated or proposed critical habitat. The projects would involve construction, demolition, and associated increased use of roads and areas around listed plant species or where listed wildlife nest or forage. The increase in training, especially live-fire training at SBMR and PTA, could threaten designated and proposed critical habitat and result in the direct loss or take of species through fire. Other factors that would further
decrease the success of listed species are the cumulative loss of suitable habitat, the production of fugitive dust or other such habitat degradation, the introduction and spread of nonnative species that compete for prey and that prey on listed species and that are possible disease and parasite vectors. The Army has developed an IWFMP for all installations on the islands of O'ahu and Hawai'i to prevent and control fires. The O'ahu INRMP, the Endangered Species Stabilization Plan, and the Makua Implementation Plan identify conservation measures that USARHAW would implement to help the recovery of some listed species in the ROI. ESA Section 7 consultation over USARHAW’s routine training and SBCT actions on O'ahu and the island of Hawai'i would further protect and benefit listed species and habitat. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the net cumulative effects of the projects on listed species and critical habitat is t considered significant but mitigable to less than significant.

Loss and degradation of sensitive species and habitat. The cumulative impact on sensitive species that would result from project-related habitat loss and degradation would be significant. Development of land throughout the state has led to a degradation of biological resources, but habitats throughout the state continue to support common and sensitive species of plants and wildlife. A spread of invasive plants could cause landscape changes and thereby modify habitats important to sensitive species, such as the O'ahu tree snails. Elevated activity levels in and around wildlife areas provide conduits for alien species movement. The Kawaihae Harbor deepening project would temporarily degrade the quality of the water in the harbor and diminish its value to aquatic species, including protected marine mammals.

Proposed and recent projects on O'ahu and the island of Hawai'i would involve development in areas that are extremely valuable to sensitive species. Wind and soil erosion would result from increased and more extensive Army activities, and road projects such as the Saddle Road Realignment. Soil erosion results in water runoff and sedimentation. Training-related fires, described earlier, would also lead to an increase in soil erosion. Dismounted maneuvers, part of ongoing current force actions, as well as the proposed SBCT action would result in elevated soil erosion, lowered water quality, continued habitat fragmentation, and lowered habitat value. Mounted training or military vehicle use, part of SBCT and current force actions, and the expansion of training by the Army would disturb soils. The destruction of plants by foot or vehicle travel exacerbates the problem of eroding and windblown soils. Additional road construction projects on the highly erodible soils of the island of Hawai'i (Saddle Road and Kawaihae/Waimea Road) could create dust that would settle on sensitive plant species and may inhibit photosynthesis, though further study is required to determine how the rate of photosynthesis is altered. The increase in dust would degrade the water and generally lower value of habitat to sensitive species, such as the nene, Hawaiian hoary bat, and native snails. Increased use of vessels, helicopters, and general transportation would result from the Proposed Action, the continuation of current force actions on O'ahu and the island of Hawai'i, and the potential increase in vehicles that would occur with the availability of better, less clogged roads. This would lead to the increased emission of contaminants, which could pollute the air and water and diminish the prevalence of natural resources. There also would be a loss of natural habitat through projects such as the Turtle Bay Resort expansion.
These impacts would be mitigated on a project-wide basis, as described in the Army’s PTA and O’ahu INRMPs, the implementation of terms and conditions in the USFWS Biological Opinions issued in accordance with Section 7 of ESA for current force and proposed SBCT training on the island of O’ahu and Hawai’i, the Mākua Endangered Species Stabilization Plan, the Mākua Implementation Plan, and other project-specific measures. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that while on a project-wide basis the Proposed Action’s impact on the loss and degradation of sensitive species and habitat would be significant and mitigable to less than significant, the overall cumulative impact from the loss and degradation of sensitive species and habitat from projects listed in Tables 9-1 and 9-2 in association with the Proposed Action would be significant.

**Threat to migratory birds.** The towers that have been developed and that are projected to be developed in the near future as part of the project listed in tables 9-1 and 9-2 would be a significant impact on birds. Towers pose a threat to birds that inadvertently collide with them. The death of migratory bird species as a result of collision is considered a violation of the MBTA, which prohibits the taking or killing of migratory birds. The construction of large towers or any tower in important breeding or flying corridors would obstruct the flying patterns of migratory birds. Presently antenna construction is not restricted or strictly regulated, although there are suggested guidelines that have been designed by the USFWS to help avoid many of these impacts (Appendix I-3). Limiting the height of these towers, eliminating guy wires, and reducing the amount of lighting, particularly red lights (USFWS 2002), would greatly minimize the severity of these impacts on migratory birds. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the extent of this cumulative impact is considered less than significant.

**Noise and visual impacts on marine wildlife.** The cumulative noise and visual impacts on marine wildlife would be less than significant. The US Army Corps of Engineers and the State of Hawai’i are proposing to deepen and expand the Kawaihae Harbor in the PTA ROI. This project would have some noise and construction-related impacts on marine wildlife that could pass through the waters. The relatively sparse distribution of marine mammals in the portion of the ROI that abuts the coastline and the seasonality of many species in the project area combine to make the probability of significant impacts on marine mammals extremely low and not adverse. Additionally, any spills would be mitigated by spill control procedures already in place. The Army initiated informal consultation with NOAA Fisheries in accordance with Section 7 of ESA and NOAA Fisheries issued a letter of concurrence that SBCT activities were not likely to adversely affect listed species (Appendix E). Because SBCT project activities on PTA have a less than significant impact on marine wildlife, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the addition of this project is not expected to result in significant cumulative impacts on marine wildlife.

**Impacts on general vegetation, habitat and wildlife.** The cumulative noise and visual impacts on general vegetation, habitat and wildlife would be less than significant. Noise levels are not expected to increase to such a degree that it would be harmful to terrestrial wildlife. General vegetation and wildlife would be disturbed by vegetation removal. This would deter wildlife...
from foraging and would combine with other adverse effects from the projects listed in tables 9-1 and 9-2, such as live-fire training and building and highway construction projects.

Habitat within the ROI is for the most part disturbed natural and introduced landscapes. Activities limited to this area would mostly affect nonnative species adapted to stressed or nonnative environments. However, the further degradation of land and the loss of even small portions of land is problematic for native species, because of the great extent of habitat loss and disturbance that has altered native habitats. Projects such as the Turtle Bay Resort expansion, the construction of new roads, and the increase in use at MMR would have detrimental affects on habitat in their vicinity, and consequently on the species that have been supported by these habitats. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of this project is not expected to result in significant cumulative impacts on general vegetation, habitat or wildlife.

*Increased energy use and pollution and their impact on biological resources.* The construction activities and the use of additional facilities and their upkeep would lead to increased consumption of natural resources that would negatively affect wildlife and vegetation. The amount of natural resources is an important factor that shapes the carrying capacity and amount of vegetation and wildlife on a piece of land or water. More nonrenewable fossil fuels would be used to power construction and to maintain new facilities as directed in EO 13123, *Greening the Government Through Efficient Energy Management* (June 4, 1999). Increased contamination would occur through the burning of fossil fuels and could lead to the need for further energy generation facilities.

Increased usage of large fuel inefficient vehicles such as the Stryker would lead to an increase in fuel usage. Road construction projects could encourage further use of vehicles but could result in better gas efficiency by alleviating traffic and improving road conditions. Although SBCT and the projects in tables 9-1 and 9-2 would not cause significant impacts on biological resources by themselves, in that no sensitive species or habitat would be directly threatened, there would be negative impacts that, when combined, would be significant. The cumulative impacts of increased energy use and energy related pollution would be the depletion and degradation of natural resources, which would result in the loss of sensitive species and habitats. Solar and passive solar construction would help avoid the drain on natural resources that these projects might otherwise have. It is not possible to determine whether energy saving devices and strategies would be used, but there are many options of mitigating and minimizing these impacts, such as the use of renewable sources of energy to power these facilities. Attaching solar panels or wind turbines would allow units to generate their own energy, without creating toxic emissions or draining natural resources that are shared with vegetation and wildlife. The design and materials used in the facilities would also reduce the amount of energy needed to build and maintain the proposed facilities. Passive solar design techniques can significantly reduce the amount of energy necessary to light and regulate the temperature in buildings. This would help minimize nonrenewable energy consumption and the air and water pollution that results in burning or producing these resources. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of this project is not expected to result in significant cumulative impacts on increased energy use and pollution and their impact on biological resources.
Runoff impacts on marine wildlife and coral ecosystems. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact of runoff on marine and coral ecosystems is not significant. Road construction and increased use that could result from cumulative projects would contribute to runoff but are not likely to exceed the fluctuations in erosion and sedimentation that results from wind, rain and natural drainage. The Army initiated informal consultation with NOAA Fisheries in accordance with Section 7 of ESA, and NOAA Fisheries issued a letter of concurrence that SBCT activities were not likely to adversely affect listed species (Appendix E).

Summary. Given the cumulative impacts described above, the Proposed Action, along with the projects listed in tables 9-1 and 9-2, would exacerbate the trend of habitat loss, habitat degradation, likelihood of fire, introduction of nonnative species and the subsequent endangerment and loss of endemic and native species. The conservation and recovery actions of federal and state agencies, such as those outlined in the MIP, would significantly reduce the impacts on native biological resources and would help to minimize or reverse the trend toward native habitat and species extinctions. Military projects add low frequency sounds in Hawaiian waters. The Proposed Action is not expected to add to noise pollution in the marine environment and impacts from TSVs are too speculative to ascertain long-term effects for marine wildlife. The overall cumulative impact on biological resources would be significant, particularly on sensitive species and sensitive habitats. The proposed development and heightened human activities in O'ahu and the island of Hawai'i would reduce viable habitat and would reduce the population of sensitive species, as designated by federal and state agencies, or of a species with regional and local significance. It would alter or destroy high to moderate value habitat, which would prevent native biological communities from reestablishing, and would introduce or increase the prevalence of undesirable nonnative species. Although the Proposed Action will not jeopardize the continued existence of threatened or endangered species, Army training and construction activities are likely to cause the “take” of a highly sensitive resource, such as a threatened and endangered species. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of this project would result in a significant cumulative impact on biological resources.

Reduced Land Acquisition
Cumulative impacts would resemble impacts from the Proposed Action. The RLA Alternative would involve siting QTR2 at PTA and limiting the amount of land acquired as part of the SRLA. This would reduce the impacts on sensitive species and habitat on O'ahu, but it could slightly increase the impacts on these same resources on the island of Hawai'i. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of this project would result in a significant cumulative impact on biological resources.

As described under the Proposed Action, less than significant cumulative impacts on marine wildlife are expected.

No Action
Impacts from No Action would combine with impacts from the projects in tables 9-1 and 9-2 to continue habitat degradation and loss of habitat due to development and human
activities. This would add to the decline of native species abundance and diversity. The impact on sensitive species and habitat would be significantly affected by No Action activities. The impact on general species and habitat would be less than significant. As described under the Proposed Action, less than significant cumulative impacts on marine wildlife are expected. Term and conditions described in the in the 2003 BOs for Routine Military Training and Transformation of the 2nd Brigade 25th ID(L) at US Army Installations on the island of O'ahu (USFWS 2003d) and on the island of Hawai'i (USFWS 2003e) will be implemented under this alternative as well. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the No Action would result in significant cumulative impacts on biological resources.

Cultural Resources

Many factors were considered for this analysis, including public comments for this project and from projects listed above. Most of the public comments related to access to traditional areas and the potential destruction of cultural sites and landscapes from training. For cumulative impacts on cultural resources, the ROI includes the islands of O'ahu and Hawai'i. Since contact times, residential, commercial, and military development throughout the state has destroyed or damaged many cultural resource sites, but Hawai'i's rich history produced a dense collection of historic properties, many of which are as yet undiscovered. Today we know more about cultural resources, their importance and how to minimize impacts on them. However, based on historic trends and losses any project of this size will have a noticeable adverse affect on the remaining resources. In light of on past, present or reasonably foreseeable future actions, the Army determines that the cumulative impact on cultural resources is significant.

Proposed Action

Military construction projects at MMR, SBMR, WAAF, and HAFB could result in a significant cumulative impact on cultural resources, including significant historic buildings, on military installations in O'ahu. Barracks upgrades, the fire station, water tank, and laboratory construction, gate alignments, and construction of the MSTF/ISF, and Drum Road could damage archaeological resources. Navy construction projects at Pearl Harbor and the RCI could affect archaeological resources and historic buildings. I3A construction at SBMR could have an adverse effect on a historic landscape as well, and local highway projects and bridge replacements could damage archaeological resources along the road alignments. RCI involves the transfer of historic family housing to private ownership, and this is considered an impact on historic properties. The proposed resumption of military training at MMR could result in significant cumulative impacts on cultural and historic sites in the valley, which is rich with archaeological sites and considered of vital significance to Native Hawaiians.

Construction projects on the island of Hawai'i could result in significant cumulative impacts on cultural resources. Public comments indicate that there are significant Native Hawaiian resources in the area around Kawaihae Harbor, including an underwater heiau; the harbor deepening and the new highway from Waimea to Kawaihae Harbor could significantly affect these resources. Construction of the new range control building at PTA could have significant impacts on cultural resources, depending on its location.
The Army intends to implement an ICRMP for all its installations in the state. This plan would provide an inventory of cultural resources on Army properties and would provide management protocols for Army activities in order to protect and preserve cultural resources and comply with federal laws and regulations regarding cultural resources.

Although each of these civilian or military projects would be accompanied by an MOA or PA, in compliance with Section 106 of the NHPA, or documented and mitigated in compliance with state requirements, the cumulative impact on cultural resources on both O’ahu and Hawai‘i could be significant because archaeological sites, TCPs, and historic buildings would be damaged or destroyed by these projects. These impacts could be limited to a greater or lesser extent, depending on the ability of project proponents to avoid or mitigate the damage.

Mitigation for these cumulative impacts would be to avoid archaeological sites and other cultural resources, to prohibit demolition of significant historic buildings and structures, to reuse these properties following the Secretary of the Interior’s Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, and to treat historic and prehistoric archaeological resources appropriately, should such resources be uncovered. In addition, Historic properties should be documented before being destroyed, in accordance with Department of Interior standards and Section 106 of the NHPA.

Given the damage or destruction of cultural resources from the cumulative impact of the Proposed Action and the other projects listed in this chapter, the Proposed Action would accelerate the trend of damage to cultural resources in Hawai‘i. Cumulative impacts on ATIs and archaeological sites under all of the alternatives, combined with the projects listed above, would result in significant cumulative impacts on cultural resources. Although specific actions proposed under SBCT can be mitigated on a case-by-case basis, the overall effect of increased training, reduced access, and continued development throughout O‘ahu and Hawai‘i will result in substantial alteration and restriction of native use of traditional areas and the potential destruction of numerous archaeological sites. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of the Proposed Action would result in a significant cumulative impact on cultural resources.

**Reduced Land Acquisition**
The RLA Alternative would result in roughly the same cumulative impacts on cultural resources as the Proposed Action. The total impacts are likely to be fewer because the project-specific impacts under the RLA Alternative are fewer, but this would have a positive effect on O‘ahu, and the change is not expected to greatly reduce the cumulative impact of the project. In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of the Reduced Land Acquisition Alternative would result in a significant cumulative impact on cultural resources.

**No Action**
No Action will have less than significant cumulative impacts on cultural resources.
Human Health and Safety Hazards

Hazardous material and waste data are reported to the state and federal environmental entities on an annual basis allowing these agencies to track trends of material use, waste generation, and release occurrences. Historically, these levels have fluctuated giving little insight to specific trends, however these reports show movements in the industrial and commercial community highlighting new large and small quantity generators, as well as changes in management techniques allowing for ongoing analysis and amendments to environmental laws and reporting requirements. The results of the ongoing analyses give the agencies a continual current status of the state of the environment, such as quality of domestic water used by the public, the quality of air within the state or specific ROIs, and the potential resource or management areas needing improvement. These conclusions are developed and published in an Environmental Report Card by the State of Hawai’i Office of Environmental Quality Control on an annual basis. These results can be compared to previous years or to other states or regions that have similar rating systems. In general, Hawai’i has excellent air and water quality and very good terrestrial quality. These levels have remained consistent over the years.

Cumulative impacts on human health and safety hazards may occur for various environmental issues. For the Proposed Action, the ROI is defined as the boundary of the installations, the military vehicle trail areas, and the lands immediately adjacent to the installations and military vehicle trail areas. The ROI for the cumulative effects on human health and safety hazards is the sum of the regions of influence of the Proposed Action and the areas affected by the cumulative projects listed above, with the exception of ammunition, UXO, and general training; the ROI for these military-specific impact issues would be the sum of the regions of influence of the Proposed Action and the areas affected by the cumulative projects listed above that would occur on military installations. The regions of influence for the cumulative projects listed above outside the Proposed Action vary in size and may not be well defined. In general, the cumulative impact assessment is intended to be descriptive rather than quantitative.

Proposed Action

Data from 1996 to 2000 show an overall declining trend in toxic releases to air, water, and land in Hawai’i. This declining trend is positive because air, water, and land are all environmentally connected (HDOH 2003). Specific trend information is provided under each subsection, as available.

Hazardous materials management. Chemical release data is reported yearly to the HDOH. No clear trend exists in the number of chemical releases from 1997 to 2001. Data from 1997 to 2001 shows that chemical releases on Hawai’i increased from 205 to 271. However, an increase in the number of releases does not necessarily correlate with an increase in damage to the environment because reporting does not include release volumes (HDOH 2003).

The Proposed Action and most of the projects identified in tables 9-1 and 9-2 (the only exceptions being the land acquisitions, training, and planning documents) would involve the transport, storage, and use of hazardous construction materials, such as diesel fuel or solvents. Because the transport, storage, and use of these hazardous construction materials would increase, cumulative impacts would include increasing the potential for these materials
to be involved in an accidental release or an exposure. These projects would be required to transport, store, and use hazardous construction material according to material safety data sheet and label instructions, as well as applicable state and federal regulations. These impacts exist and are handled using best management practices and state and federal regulations, such as US DOT regulation 49 CFR 100-109, which ensures proper handling by shipping personnel and identification by emergency personnel if an accident involving hazardous materials should occur. No new regulations would need to be established to support the elevated level of hazardous material management from these cumulative projects. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative hazardous material impacts would be less than significant. Based on limited historical chemical and hazardous material release data for the Hawaiian Islands, it is not possible to predict future hazardous material release trends.

**Hazardous waste management.** Hazardous waste generation is reported to the EPA by “large quantity generators” biennially in odd years. Overall, the quantity of hazardous waste generated in Hawai‘i from 1991 to 1999 varied from 1,300 to 3,000 tons. From 1991 to 1999 the trend in hazardous waste generation has generally decreased after a slight increase between 1993 and 1997. Waste generation data from small quantity generators were included in the survey in 1995 and could be responsible for the increased amount (HDOH 2003).

The Proposed Action and the projects identified in tables 9-1 and 9-2 (with the exception of the land acquisition, training, and planning document projects) would result in hazardous wastes from construction and renovation. All of the projects would be required to comply with state and federal hazardous waste disposal regulations, such as disposing of hazardous waste in an appropriate landfill. Therefore, as no new regulations would need to be implemented and waste management would continue to follow existing protocol, cumulative impacts on hazardous waste management would be less than significant during construction and renovation.

In addition, the upgrade to the advanced wastewater treatment facility would provide a beneficial impact in supporting the growth in personnel and preventing waste backup or system malfunction.

In light of historic, ongoing, and reasonably foreseeable future actions and based on limited historical hazardous waste accumulation data for the installations and the Hawaiian islands the Army concludes that it is likely that waste generation would decrease and the Proposed Action would therefore have no significant cumulative impacts.

**Ammunition.** MMR training would include the continued or increased use of ammunition. There would be a significant increase in cumulative ammunition storage, use, transportation, and disposal among these projects because of the Proposed Action. An EIS is being prepared for training at MMR. Since the publication of the DEIS, the US Marines canceled plans for proposed training at Waikane Valley. The EIS for MMR addresses activities involving ammunition storage, use, and transportation and would recommend appropriate mitigation measures. In addition, the 120mm mortar would likely be used by future current forces not associated with the Proposed Action. For any project using ammunition, the storage, use, or transport of ammunition requires strict adherence to established regulations.
In light of historic, ongoing, and reasonably foreseeable future actions and although no new regulations or policies would need to be established, and the Army concludes that the cumulative impact is considered significant due to the 25 percent increase in ammunition included in the Proposed Action.

Because future ammunition needs, such as those for wartime, or technology are unknown, it is not possible to predict future ammunition trends.

**Unexploded ordnance.** The presence of UXO could affect the Proposed Action projects and some projects listed on tables 9-1 and 9-2, such as the Kahuku Windmill and Hook Parcel and PTA 1010 Land Acquisitions, the Saddle Road Realignment Project, and the controlled burn projects at Army ranges. Construction or other activities could take place in areas that contain UXO, which could lead to a significant, short-term adverse safety impact. Training could contaminate ranges with UXO, creating a safety risk to personnel. In addition, the 120mm mortar, which could produce UXO, would likely be used by future current forces not associated with the Proposed Action. Although UXO presents a significant impact, proper abatement and removal techniques under EPA and USARHAW guidelines would mitigate the impact. With regard to the former Waikoloa Maneuver Area and Nansay Sites UXO Cleanup, the Saddle Road corridor was categorized as a medium risk, based on an engineering evaluation/cost analysis conducted for the area, which includes a risk-based analysis for human and environmental health. A UXO clearance would be needed prior to Army maneuvers and trail alignment under the Proposed Action in order to avoid remnants of past live-fire training. Officials should check with Navy training schedules and the training area layout on the Pu‘u Pa Maneuver Area to avoid affecting or being affected by ongoing training. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be a significant cumulative impact regarding UXOs.

Beneficially, the controlled burn projects, listed on Table 9-1, specifically at MMR, identifies and removes UXO from the land. Plans to make the burn an annual event are under discussion. Based on historical data and increased technology, it is possible to predict a decrease in UXO casualties.

**General training.** Most of the projects identified in tables 9-1 and 9-2 do not involve training; for these projects, there would be no cumulative training impacts. However, a few of the projects occur on or near installation training areas, and, for them, both training and construction would be coordinated to prevent conflicts between the Proposed Action and the other projects identified in tables 9-1 and 9-2.

The land acquisition area proposed for KTA, listed on Table 9-1, would introduce elevated levels of training on this land. SRTA is the only live-fire ammunition that will be used at KTA. The PTA 1010 land acquisition area, listed on Table 9-2, has supported training in the past under a lease agreement with the land owner and would likely continue at the same level, so no new impacts would be introduced to this area. Each of these parcels would be used for training regardless of the approval of the Proposed Action. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts with respect to general training is considered less than significant because
adverse impacts would be minimal. Because future training needs are unknown, it is not possible to predict future training trends.

**Installation Restoration Program (IRP) sites.** Although some of the cumulative projects listed on tables 9-1 and 9-2 are near IRP sites, no projects are known to overlay these sites and therefore are not expected to disrupt restoration progress of the sites. With implementation of mitigation the impact from this IRP site can be reduced to less than significant, therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be no significant cumulative impact on IRP sites.

Based on increased technology and government regulation it is possible to predict an increase in IRP site cleanup.

**Lead.** The Proposed Action and most projects identified in tables 9-1 and 9-2, with the exception of land acquisitions, training and planning document projects, could expose workers to lead at project sites. This impact would be relevant at any installation where structures would be renovated or demolished. The impact is considered significant but mitigable because lead surveys of facilities and structures included in the impact area would be updated before construction began, and best management practices are expected to be implemented to protect workers, as per USARHAW and OSHA guidelines. Beneficially, the new structures would not contain lead-based paint or construction materials, thus eliminating potential future exposure to the public or the environment. Based on increased technology and government regulation and because the use of lead-based paint has been discontinued, it is possible to predict a decrease in lead-based paint contamination on a cumulative level.

**Asbestos.** The Proposed Action and most projects identified in tables 9-1 and 9-2, with the exception of land acquisitions, training, and planning document projects, could expose workers to asbestos at project sites. This impact would be relevant at any installation where renovation, demolition, or grading takes place. The impact is considered significant but mitigable because asbestos surveys of facilities and structures included in the impact area would be updated before construction began, and BMPs are expected to be implemented to protect workers, as per USARHAW and OSHA guidelines. Asbestos-containing construction materials would be avoided where possible to reduce future exposure to asbestos. Based on increased technology and government regulations and because the use of ACM in construction materials has decreased, it is possible to predict a decrease in ACM contamination on a cumulative level.

**Polychlorinated biphenyls (PCBs).** All projects listed on tables 9-1 and 9-2 are not suspected to be affected by PCB-containing devices or PCB-contaminated soils because the Army has been dedicated to retrofilling and upgrading all equipment suspected to contain PCBs. Cumulative project sites would be surveyed for PCB contamination and managed according to EPA and USARHAW guidelines to reduce the impact. As discussed in Section 4.12, the Proposed Action would have a less than significant impact on exposure to PCB contamination. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that the there would not be a significant cumulative impact as this isolated potential PCB exposure source would not affect the sum of the areas of influence of all the above projects. Based on
increased technology and government regulations and because the use of PCBs has decreased, it is possible to predict a decrease in PCB contamination.

*Electromagnetic fields (EMF).* The ROI for cumulative EMF impacts is the ROI for the Proposed Action and the regions affected by the cumulative projects listed on tables 9-1 and 9-2. Because electricity and communications equipment would be used in some projects described above, such as the Information System Facility, the Mission Support Training Facility, or Installation Information Infrastructure Architecture, EMF would be produced. Assuming the public is not allowed unsupervised access to areas where these structures and equipment would be located, there would be less than significant impacts from exposure of EMF to the public. Signs would be posted around the perimeter of potentially harmful EMF sources, and the Army would continue to follow guidelines and regulations pertaining to EMF exposure. There would be no significant impact expected from EMF. The cumulative projects listed on tables 9-1 and 9-2 do not indicate the presence of equipment capable of significantly increasing EMF exposure trends on the islands. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would not be a significant cumulative impact from increased exposure to electromagnetic fields.

*Petroleum, oils, and lubricants (POLs).* Oil release data is reported yearly to the HDOH. No clear trend exists in the number of oil releases from 1997 to 2001, the data from which shows that oil releases on Hawai‘i decreased from 295 to 171. However, a decrease in the number of releases does not necessarily correlate with a decrease in damage to the environment because reporting does not include volumes (HDOH 2003).

The EPA certified that there were 1,702 confirmed releases from USTs from 1987 to 2002. By 2002, 77 percent of the UST releases had been completely cleaned up, 17 percent had been partially cleaned up, and 6 percent had yet to be addressed. The overall trend shows that cleanups of LUSTs have increased, while the number of new releases has decreased (HDOH 2003).

The Proposed Action and the other projects identified in tables 9-1 and 9-2 could expose workers to POLs during construction and operation. Best management practices and EPA and USARHAW protocols are expected to be followed during the use and handling of POLs under each cumulative project. Two roadways, Saddle Road and Drum Road, included on tables 9-1 and 9-2 would be traveled by military vehicles. The Proposed Action would increase the use of these highways, thus increasing the potential for accidental spill or vehicle breakdown. BMPs would be used to prevent accidents during transportation activities. Beneficially, these roadways would reduce military traffic on public highways, thus minimizing these potential releases to the public environment.

Each installation maintains strict standard operating procedures and spill contingency plans for hazardous materials and waste identifying specific operating responsibilities and procedures. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact from increased exposure to POLs would be less than significant. Based on historical data, increased technology, and increased environmental regulation, it is possible to predict a decrease in POL releases and an increase in POL cleanups.
**Pesticides/Herbicides.** Pesticides, fertilizers, herbicides, and other chemicals that are applied to the ground eventually seep into the drinking water aquifers. Analysis of safe drinking water data gives an indicator of clean water management. Data from 1994 to 2001 show that the percentage of the Hawaiian population served water below maximum contaminant levels increased from 95 to 100 percent.

There would be an increased use of pesticides/herbicides by the Army for pest management on the land acquisition areas identified in the Proposed Action, the Kahuku Windmill Hook Parcel, and the PTA 1010 Land Purchase parcel adjacent to PTA. This application would be a less than significant impact because pesticides/herbicides would be used for their intended purpose of pest management, and their usage would follow the strictly enforced federal, state, and Army regulations mandated in the USAG-HI IPMP. In addition, in conjunction with the prescribed burn of training ranges in Hawai‘i (Project 13) to control vegetative fuel load, pesticides would be applied by aerial broadcast spray prior to the burning activities to reduce live vegetation. This practice could present a significant but mitigable impact by following proper abatement procedures and Army protocol. The burn management plan is being finalized and highlights specific BMPs (such as postponing sprays during periods of high wind) and designates required spray safety distances from developed areas, in accordance with Army Regulation 200-5, Pesticide Management. The relevant installation-specific pest management plans would be updated following the proposed land acquisition activities to include these areas. Pesticides would continue to be stored in designated storage sites. Based on increased technology and stricter environmental regulations, it is possible to predict a decrease in pesticide/ herbicide releases and an increase in pesticide/herbicide contamination remediation. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impact from pesticides/herbicides would be significant but mitigable to less than significant.

**Biomedical waste.** The Proposed Action presents an increase of 810 Soldiers, 502 spouses, and 1,053 children to be stationed at SBMR, which could increase demand for medical care. The impact is considered less than significant, however, because the method of management and disposal would not change. In addition, most projects identified in tables 9-1 and 9-2 would involve upgrading and maintaining Army facilities and procedures and would not significantly increase the need for medical care. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be no significant cumulative impacts regarding medical waste.

**Radon.** Radon occurs in low concentration in the Hawaiian Islands below EPA’s recommended action levels. Radon has not been identified at any of the Proposed Action sites and surrounding areas. The Proposed Action and projects listed in tables 9-1 and 9-2 are not expected to be affected by radon. Therefore, in light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be no significant cumulative impacts from exposure to radon. Based on historical radon data for the installations and the islands within the state of Hawai‘i, it is possible to predict that future radon levels will not be an issue.

**Wildfires.** Based on available data, approximately 90, 110, and 130 fires were identified at SBMR in 1998, 1999, and 2000, respectively. A small number of large fires are responsible
for most of the acreage burned at PTA; eight individual fires of 100 acres (40.5 hectares) or more burned over 97 percent of the acres damaged by fire from 1987 to 1999. No wildfire trend data is available for DMR, KTA, and KLOA. Between fiscal years 1997 and 2002, between seven and 20 fires yearly on O'ahu and between 42 and 80 fires yearly on Hawai'i were reported to the Division of Forestry and Wildlife’s Fire Management Program. The number of fires per year for both islands fluctuated. The mission of the Division of Forestry and Wildlife’s Fire Management Program is to provide fire protection to forest reserves, natural area reserves, wildlife and plant sanctuaries, and public hunting areas. Combined with cooperative zones that are also protected by other fire management service providers, the Division of Forestry and Wildlife is involved with approximately 81 percent of the state’s land area (DLNR 2003e). Based on limited historical wildfire data for the installations and the fluctuating numbers of fires reported to the Division of Forestry and Wildlife, it is not possible to predict future wildfire trends.

The ROI for cumulative wildfire impacts is the ROI for the Proposed Action and the regions affected by the cumulative projects listed on tables 9-1 and 9-2. With respect to specified cumulative projects listed on the tables, some of the other projects would occur in or adjacent to areas where wildland fires could occur. As with the Proposed Action, the cumulative projects are expected to contain mitigation measures and SOPs to minimize potential environmental impacts involving wildfires. The EIS being prepared for MMR would address activities that could ignite wildfires and would include recommendations for mitigation measures. Roadway improvement projects could involve activities and materials capable of starting a wildfire and would be required to adhere to Hawai'i Department of Transportation safety requirements to protect the public and environment. Similar to the roadway construction projects, construction projects on the installations could involve activities and materials capable of starting a wildfire and therefore Army BMPs and SOPs would be required to reduce the potential for starting a wildfire. The Army has developed an IWFMP for all installations on the islands of O'ahu and Hawai'i to prevent and control fires. The standard operating procedures within the IWFMP will reduce the potential impacts involving wildfires. Upgrading the SBMR fire station would also have a beneficial impact on wildfires at the installation. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts involving wildfires are expected to be less than significant because of the steps all project owners are expected to take to prevent and control wildfires from threatening to public safety.

Emergency Evacuations. None of the construction projects or proposed training should affect any emergency evacuation plans in place. However, the construction of Drum Road and Dillingham Trail will allow for improved emergency evacuations from the north shore in the event the public highways are closed as a result of a natural disaster. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the proposed project would contribute positively to the cumulative impacts on emergency evacuations. The State will consult with property owners in the same manner as they do currently.

Summary. The only significant unmitigable cumulative impacts to arise from the Proposed Action would be those from ammunition and unexploded ordnance. Due to construction activities, significant impacts may arise from existing IRP sites, or pesticides during the aerial broadcast spraying of range areas. With proper abatement procedures following existing
regulations, these impacts are mitigable resulting in less than significant effects. All other issues are considered less than significant as either no impacts would be encountered or the resulting impacts would be handled or addressed in accordance with existing BMPs and SOPs, thus introducing no new impacts on the public or environment. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that the overall cumulative impact on human health and safety hazards would be significant.

**Reduced Land Acquisition**
All of the cumulative impacts identified above for the Proposed Action would be the same for Reduced Land Acquisition, which still involves the same overall impact issues as the Proposed Action. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the significant cumulative impacts from the Reduced Land Acquisition Alternative would involve ammunition and UXO, while IRP sites and pesticides would be significant yet mitigable to less than significant.

**No Action**
Under No Action impacts involving human health and safety hazards would still be possible under the identified development, planning, and training projects. All of the cumulative impacts identified in tables 9-1 and 9-2 for the Proposed Action would be the same for the No Action, with the exception of impacts resulting from implementing the Proposed Action, which includes ammunition, UXO, and IRPs. These impact issues would present less than significant cumulative impacts under No Action. Otherwise, No Action still involves the same overall impact issues as the Proposed Action. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that there would be no significant cumulative impacts involving human health and safety hazards, with the exception of lead, asbestos, and pesticides, which are significant yet mitigable.

**Socioeconomics**
Historically Hawai‘i’s economy has been dependent on the dominant industry at the time. Early dependence on whaling gave way to sugar cane and pineapple cultivation. Military development that began in the early 1940’s and later tourism boosted Hawai‘i’s economy by providing a fairly stable job market. In more recent years, because of the reduction in the sugarcane and pineapple industries and in military activities, Hawai‘i’s economy has become more dependent on tourism.

The population of Hawai‘i has grown fairly steadily since the late 1800’s to it’s present population of a little over a million. Approximately 75 percent of the population live on O‘ahu while over 95 percent of those people live in the greater Honolulu area. Approximately 120,000 people live on the island of Hawai‘i, most living in Hilo or Kailua-Kona.

There has always been a gap between the cost of living and average family income in Hawai‘i that persists today with nearly 15 percent living in poverty. However, despite this, Hawai‘i continually ranks high in quality of life studies.

**Proposed Action**
Long-term direct and indirect beneficial cumulative effects are expected as a result of the Proposed Action, which is expected to increase employment and sales volume in the ROI (the ROI includes Hawai‘i and Honolulu Counties; see Section 4.13.1). Additional increases in employment, income, and sales could also occur from other actions, which include the Whole Barracks Renewal Program at SBMR, the RCI Program, construction of a new Soldier and family readiness center at SBMR, the Kamehameha Highway bridge replacement, the Farrington Highway improvements, and the Turtle Bay Resort improvements. The beneficial economic effects (i.e., increased employment, income, and spending) of these actions are expected to last for the duration of the projects, but they could extend beyond that.

The increase in population from the SBCT Proposed Action would increase ROI population by less than one percent. This increase in population and the subsequent spending would be within historical limits and would not adversely affect the ROI economy (see Table 4-18 and Appendix L, EIFS Model). Other known actions are not expected to increase ROI population. Furthermore, population projections through 2020 generated by the State of Hawai‘i indicate continued slow growth in Honolulu and Hawai‘i Counties, as well as in the State of Hawai‘i (DBEDT 2000, 2003). Projections for residential population growth, including and excluding armed forces, indicate a decrease in growth rates throughout the forecast period. For example, the projections indicate the annual population growth decreases from a rate of one percent from 2000 to 2005 to 0.9 percent from 2005 to 2020.

Long-term minor adverse cumulative effects on schools could occur, but this cannot be definitively determined at this time. The proposed SBCT action addressed in this EIS would increase the primary and secondary school population by approximately 760 children. A separate proposed action, the RCI, could also affect school enrollments. RCI could result in more military families living at SBMR, which would increase the enrollment of Solomon and Hale-Kula Elementary Schools and the off-post schools serving SBMR, Wheeler Intermediate School and Leilehua High School. However, at this time it is not known how the number of on-post housing units would change under RCI. The proposed quantity and type of family housing on SBMR will not be determined until a private developer is selected, so the number of school children affected by RCI is also not known. One can assume that if RCI would increase the number of families living on SBMR, the number of school-age children would increase as well, resulting in cumulative adverse effects on schools serving SBMR. However, this is speculative at this time. As part of the RCI program, however, RCI will notify the Hawai‘i Department of Education at the earliest point when practicable of any known increases of students to schools on or near SBMR and WAAF.

As noted above, the State of Hawai‘i projects slowing population growth until 2020. This projection more specifically indicates a decrease in some school-age population during this period. For example, the population of school-age children 5 to 11 is projected to decrease at an annual rate of 1.2 percent from 2000 to 2005 (DBEDT 2000). The population of school-age children 12 to 13 is projected to decrease at an average annual rate of 2.6 percent from 2005 to 2010. While local school districts or individual schools may experience population pressures at variance from these averages, the overall demographic trends for Hawai‘i indicate that the state’s educational system will not face significant increases in student enrollment during the period of project implementation and may in fact experience declining enrollments in some schools.
ROI housing could be affected by several actions. The SBCT action is expected to increase demand for on- and off-post housing. However, the whole barracks renewal program and RCI would improve the quality of housing available to Soldiers and their families, which could encourage families to relocate to base housing and reduce the demand for off-post housing in the ROI. It is not yet known what the exact net number of housing units on SBMR would be after the whole barracks renewal program and RCI are completed, but there would still not be enough housing units for every Soldier stationed at SBMR and there still would be a demand for off-post housing. As noted above, because residential population growth for Hawai‘i is projected to be slow from 2000 to 2020, overall population pressures on the housing market should have little or no cumulative effect.

No adverse cumulative effects on the protection of children would be expected. Noise sources associated with Proposed Action construction projects, or construction projects from other actions occurring in the ROI would not result in a significant change from No Action. Increases in traffic would result in a minor increase in the risk of adverse health affects on children. To minimize effects, strict adherence to applicable safety regulations and procedures would continue. Construction and training activities under the Proposed Action would, for the most part, take place in areas that are off-limits to the general public. Restricted areas would continue to be posted with signs, enclosed by a fence, or stationed with guards.

In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that given the cumulative impacts described above for population, schools, and housing, the Proposed Action would not substantially alter the current and projected trends for these socioeconomic indicators and would be significant but mitigable to less than significant.

Reduced Land Acquisition
Reduced Land Acquisition would result in similar impacts on socioeconomic resources as those described under the Proposed Action.

No Action
No Action would not contribute incremental impacts on the cumulative socioeconomic effects of ongoing and proposed projects on O‘ahu and Hawai‘i. This is because implementing No Action would not change the local economy, population, or housing, and it would not alter the existing health and safety, housing, or economic conditions of children, minority, or low-income populations in Hawai‘i or Honolulu Counties.

Utilities and Public Services
The demand for utilities and public services has grown along with the general population in Hawai‘i. In addition to population increases, per capita use has increased for utilities such as water, electricity and fuel. Public services have seen a similar linear increase which follows the population trends. Keeping up for demands for fuel, for vehicles and to generate electricity, have been a challenge since all fuels have to be brought to the islands by ship. Other services such as waste disposal are limited by availability of land. These demands have increased to such levels that providers are barely able to keep up. Public and private sectors in Hawai‘i have reduced energy demand in recent decades. Between 1980 and 1995, growth in energy use lagged far behind population growth. Due to alternative energy sources and
increased conservation, per capita energy demand is decreasing. Demand for water has been growing in the Ewa area of O‘ahu, but the windward side of the island currently has sufficient supplies. Wastewater in Hawai‘i is treated by wastewater treatment plants and by underground injection control (Juvik 1998, 2002). Also, as discussed in Chapter 3 and in this chapter under Socioeconomics, projections for residential population growth including and excluding armed forces indicate a decrease in growth rates throughout the forecast period. Trends regarding demand for utilities and public services normally reflect population growth, which is minimal.

**Proposed Action**

In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the Proposed Action could contribute cumulative effects on public services and utilities. The ROI for the cumulative effects would include the islands of O‘ahu and Hawai‘i, since these would be the regions influenced by the Proposed Action in combination with the cumulative projects listed above. The additional population and the building space and facilities to be constructed at SBMR and PTA under the Proposed Action, as well as any increases in training at new and existing facilities, would increase demand on utilities and services. These demands would be in addition to the demands that ongoing and proposed construction and training would place on these services and systems.

**Police, fire, and emergency medical services.** The potentially increased demand placed on fire protection services at SBMR under the Proposed Action could be somewhat offset by the upgrade of the SBMR fire station and the development of fire management areas and SOPs. The Army will have the military police appropriately staffed for any increases in soldiers to address crime issues on base. In addition, counseling services are on base through Army Community Services for domestic abuse victims or to assist soldiers and their families struggling with illegal drug or alcohol abuse. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts on police, fire and emergency medical services.

**Water distribution.** The Proposed Action would increase the number of Army personnel and their families, and this would increase the demand for potable water at SBMR and on O‘ahu, where the demand for potable water is increasing in some areas almost to the capacity of the available supply. In addition, operation of the vehicle wash facilities would increase water use compared to No Action. These increases are not expected to be significant with respect to the overall demand for water. Increases in the overall demand for water on O‘ahu could be offset if the Honolulu Board of Water Supply undertakes plans that are now under consideration to link areas of surplus water to those with inadequate supplies. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts on water distribution.

**Wastewater and stormwater.** Implementation of the advanced wastewater treatment upgrade at SBMR could offset the (less than significant) impacts caused by the increased Army personnel and their families at SBMR. Since wastewater is treated internally at SBMR, it would not contribute to any island or state-wide trends regarding any increased demand for treatment facilities. General development around the state, as well as specific projects increasing paved surfaces, would contribute to cumulative impacts on stormwater. As
discussed under Water Resources, the Army would implement best management techniques to limit these effects, but statewide increases in polluted stormwater runoff are likely. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts on wastewater and stormwater.

**Solid waste management.** Cumulative construction activities from the Proposed Action and regional construction projects, such as highway construction, would place an increased demand on the solid waste disposal system from construction/demolition debris. This increase would be temporary and would be minimized to a less than significant level through recycling and converting waste to energy. SBCT activities would also contribute incrementally to the total area of impervious surfaces created by cumulative construction activities. The contribution of the Proposed Action to stormwater runoff impacts would be minimized to less than significant levels by implementing such standard construction practices as grading and installing curbs, drains, and gutters. Construction of new facilities at SBMR and PTA in combination with other construction projects, such as the fire station, Soldier and family readiness center, mission support training facility, and physical fitness facility at SBMR, Farrington Highway improvements, Turtle Bay Resort improvements, Drum Road Upgrade, Kamehameha Highway improvements, troop rigger facility, the Saddle Road realignment, the Kawaihae/Waimea Road, and the Waimea to Kawaihae Highway, would increase impervious surfaces, would contribute incrementally to increased impervious surfaces and increased runoff. However, each construction project would be designed to accommodate additional runoff and facilities on SBMR and PTA would be designed to comply with Phase 2 stormwater management regulations (described in the Water Resources Sections) to control runoff. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts on solid waste management.

**Communications.** Proposed Action requirements for additional computer and server equipment, combined with information system and support training projects identified in Tables 9-1 and 9-2, could increase demand for fiber optic lines. However, this increase in demand is not significant, and increases in capacity of fiber optic lines on Army installations and in the Hawai’i area are expected to accommodate new demand. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts on communications.

**Electricity and natural gas.** Electricity demand is expected to increase as a result of cumulative construction projects and would place an additional demand on these utility systems. While the Proposed Action and other proposed Army projects include construction of new buildings, much of this construction, such as that for RCI Housing, would result in more energy-efficient buildings. Construction for the Proposed Action would use modern, energy-efficient materials and would comply with EO 13123. Therefore, new delivery lines would have to be installed to supply new facilities with electricity.

The Proposed Action, in combination with ongoing and proposed projects, would have beneficial cumulative effects on public services and utilities. New utility infrastructure constructed in support of the Proposed Action, in addition to the cumulative infrastructure and fire service improvement projects, would improve public services and utilities in the
region. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that given the cumulative impacts described above, the Proposed Action would result in no significant impacts to energy use in Hawai’i.

Reduced Land Acquisition
Reduced Land Acquisition would result in similar cumulative impacts on public services and utilities as those described in greater detail under the Proposed Action. In light of historic, ongoing, and reasonably foreseeable future, the Army concludes that there would be no significant cumulative impacts from the Reduced Land Acquisition Alternative to public utilities and services.

No Action
In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the No Action alternative would not contribute significant impacts on the cumulative effects on public services and utilities of ongoing and proposed projects on O‘ahu and the island of Hawai’i because implementing No Action would not change the provision of public services or utilities.
Mr. Paul Henson
Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 5008
Honolulu, Hawaii 96850

Dear Mr. Henson:

The U.S. Army is intending to coordinate with the U.S. Fish and Wildlife Service (Service) in accordance with the Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401], as amended, for a proposal to transform the 2nd Brigade of the 25th Infantry Division to a Stryker Brigade Combat Team (SBCT). The transformation of the Army's 2nd Brigade to a SBCT is a major undertaking entailing a series of changes in equipment, force structure, training practices, and new facilities. The proposed action would require construction of two military vehicle trails on Oahu and one military vehicle trail on the Island of Hawaii. The military vehicle trails would have stream crossings that may affect aquatic resources. The coordination is necessary to determine if the action or the resources are significant enough to warrant Service input into the planning and design of the project to minimize impacts to stream wildlife. We have been coordinating with Mr. Gordon Smith of your office and are arranging for field trips to view stream crossings. If you have any questions please contact Mr. Steve Kim at telephone number (808) 438-3072.

Sincerely,

[Signature]

James L. Bersson, P.E.
Chief, Engineering and Construction Division
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July 1, 2002

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2570 Dole Street
Honolulu, Hawaii 96822-2396

Subject: Interim Brigade Combat Team (IBCT) EIS

Dear Mr. Laurs,

Tetra Tech is preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential effects associated with the proposed action of the Army IBCT project, in which the Army proposes to transform the 2nd Brigade into an IBCT, and to enhance training capabilities in Hawaii.

The proposed action results from the need of the US Army to become more strategically responsive in the spectrum of military operations. This goal will be obtained by adjusting aspects of doctrine, training, leadership, organizations, material, and soldiers within the 2nd Brigade. The changes extend to doctrinal and involve force structure, or how many soldiers are in each type of unit. They extend also to equipment, whether new or modernized.

Pursuant to NEPA, the potential environmental and socioeconomic effects associated with the transformation of the 2nd Brigade will be evaluated. This EIS focuses on site-specific issues. Of the many sites affected, three are thought to potentially involve marine life. These sites are Pohakuloa Training Area (PTA) on the big island of Hawaii, Dillingham and Makua Military Reservation (MMR), both on Oahu. Proposed changes to PTA include improving an existing tank trail to an all weather road, and the use of Kawaihae Harbor as a disembarkation point for training at PTA. Kawaihae Harbor is currently used in this capacity. Project actions would be limited to the harbor and inland activities. Activities at Dillingham and MMR would be limited to an increase of training at the sites. The transformation would result in an increase in soldiers and vehicles over the existing brigade.

The purpose of this letter is to obtain your input in identifying marine species and communities within the project region that are recognized as significant or are of special concern to your agency. These species and communities may consist of:

- Rare, threatened, or endangered species;
- Species protected by statute;
- Commercial fish or shellfish species;
- Recreationally important fish or invertebrate species; and
- Marine communities (vertebrate, invertebrate, or plant) that are considered sensitive or are of limited distribution.

To facilitate the EIS schedule, we would appreciate receiving your comments and materials within 30 days. If you foresee a delay in responding to this request, or if you have any questions, please contact me at (415) 974-1221, or George Redpath, the project manager, in Hawaii at (808) 441-5830.

Respectfully,

Tetra Tech

Ann Zoidis
Biologist
David L. Anderson, Colonel  
Office of the Garrison Commander  
Department of the Army  
Headquarters, United States Army Garrison, Hawaii  
Schofield Barracks, Hawaii 96857-5000  

RE: Stryker Brigade Combat Team  
Consultation number I-PI-02-234:MMD  

Colonel Anderson:  

We have reviewed the letter received July 1, 2003, regarding the transformation of one of the two Legacy brigades of the 25th Infantry Division (Light) to a Stryker Brigade Combat Team (SBCT). This transformation entails a series of changes in equipment, force structure, training practices and new facilities. The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) provides the following comments and information under our statutory authorities under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq. (ESA), and the Marine Mammal Protection Act of 1972, as amended 16 U.S.C. 1361 et seq. (MMPA).

Proposed actions that may affect marine protected species include the ocean transport of equipment. NOAA Fisheries concurs that the slow speeds (less than 11 knots) of the logistic support vessels (LSVs) make collisions with protected species unlikely and, therefore, not likely to adversely impact protected species. [There have been no reports of an LSV striking a protected species during the past 10 years of LSV operations in Hawaiian waters.] As a precautionary measure, vessel operators will be made aware of the regulations regarding protected species in Hawaii and instructed not to approach within 100 yards of any adult humpback whale or 300 yards of humpback whale mother/calf pairs.

The proposed construction and use of the military vehicle trail could impact protected species in the nearshore marine environment. However, provided best engineering practices to minimize erosion and properly contain potential petroleum spills are incorporated into the project plans, NOAA Fisheries concurs that vehicle trail construction is not likely to adversely impact protected species. NOAA Fisheries recommends also incorporating the following Best Management Practices (BMPs) to protect listed or otherwise protected species which may come into the nearshore project area.
1.) All project personnel should be apprised of the status of the listed species and the protections afforded to the species under federal laws. A brochure explaining the laws and guidelines for listed species in Hawaii may be downloaded from http://www.mnfs.noaa.gov/prot_res/MMWatch/hawaii.htm

2.) If during project activities, protected species enter the project area; activities should cease until the animal(s) voluntarily leaves the area.

Helicopter flights over the marine and nearshore environments could also potentially impact protected species in the area. Local Flying Rules have been changed to prohibit flight within 1000 feet of any marine mammal. Provided these flight procedures are formally incorporated into the Local Flying Rules, NOAA Fisheries concurs that this activity is not likely to adversely affect marine mammals.

Provided the above conditions are met, NOAA Fisheries concurs with the determination of the Army that the transformation of a Legacy Brigade to a SBCT is not likely to adversely affect federally listed species under our jurisdiction. However, should any activity associated with the proposed action result in the taking of any protected species the Pacific Islands Regional Office should be promptly notified at (808) 973-2937. Should you have any questions regarding these comments or the consultation process please contact David Nichols or Margaret Akamine at the above contact number.

Sincerely,

[Signature]

Samuel Pooley
Acting Regional Administrator
The National Marine Fisheries Service (NMFS), Pacific Islands Area Office (PIAO), has received your letter announcing the preparation of an EIS on the transfer of the 2nd Brigade into an Interim Brigade Combat Team (ICBT). The letter, dated 1 July 2002, was addressed to NMFS Honolulu Laboratory Director Michael Laurs. PIAO did not receive a copy until 25 November 2002.

The letter contains a summary of proposed activities at several sites which will occur because of this action. These sites include Dillingham and Makua Military Reservations on Oahu, and Pohakuloa Training Area and Kawaihae Harbor on the island of Hawaii. Based on the summary information in the letter, NMFS believes the proposed action will have a minimal impact on those marine species and habitats for which we have a responsibility. However, we request a copy of the full Draft EIS in order to insure that any potential impact from the proposed action will be minimal.

Sincerely,

John Naughton
Pacific Islands Environmental Coordinator
PIAO, NMFS, NOAA
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
In Reply, Refer To:
1-2-2003-F-02

Colonel David L. Anderson
U.S. Army Commander
Department of the Army
Headquarters, United States Army Garrison, Hawaii
Schofield Barracks, Hawaii 96857-5000

Re: Biological Opinion on Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations on the Island of Hawaii (1-2-2003-F-02)

Dear Colonel Anderson:

This biological opinion responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated April 25, 2003, and was received April 28, 2003. The statutory deadline for completing this consultation, September 10, 2003, was extended by mutual agreement to December 23, 2003, due to the complexities of this consultation. At issue are the impacts that proposed actions may have on threatened and endangered species and their habitats on the U.S. Army Garrison Hawaii (Army) installation called Pohakuloa Training Area (PTA) on the island of Hawaii (Figure 1). Species included in this consultation include 15 plants: *Asplenium fragile var. insulare*, *Haplostachys haplostachya*, *Hedyotis coriacea*, *Isodendrion hosakae*, *Lipochaeta venosa*, *Neraudia ovata*, *Portulaca sclerocarpa*, *Silene hawaiiensis*, *Silene lanceolata*, *Solanum incompletum*, *Spermoepis hawaiiensis*, *Stenogyne angustifolia*, *Tetramolopium arenarium*, *Vigna o-wahuensis*, *Zanthoxylum hawaiiense*; one mammal, the Hawaiian hoary bat (*Lasius cinereus semotus*); and designated critical habitat for one avian species, palila (*Loxioides bailleui*). Since palila and akiapolaau (*Hemignathus munroi*) have not been observed within the action area for almost 20 years, these species will not be addressed further in this biological opinion. Biological surveys to determine the status and abundance of nene (*Branta sandvicensis*), Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) and io or Hawaiian hawk (*Buteo solitarius*) will be conducted as part of your Project Description. This additional information will assist us in determining if these three species may be affected by Legacy and/or Stryker Brigade Combat Team Transformation (SBCT) training actions. If you determine and we concur there is a may affect to any or all of these avian species, then the Army will reinitiate this consultation to address potential effects to these species.
BIOLOGICAL OPINION
of the
U.S. FISH AND WILDLIFE SERVICE
for
ROUTINE MILITARY TRAINING AND TRANSFORMATION
of the
2ND BRIGADE 25TH INFANTRY DIVISION (Light)
U.S. ARMY INSTALLATIONS
ISLAND OF HAWAII

Haplostachys haplostachys

December 23, 2003
(1-2-2003-F-02)

FULL TEXT AVAILABLE UPON REQUEST
In Reply, Refer To:
1-2-2003-F-04

OCT 23 2003

Colonel David L. Anderson
U.S. Army Commander
Department of the Army
Headquarters, United States Army Garrison, Hawaii
Schofield Barracks, Hawaii 96857-5000

Re: Biological Opinion on Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army Installations on the Island of Oahu (1-2-2003-F-04)

Dear Colonel Anderson:

This biological opinion responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated April 25, 2003, and was received April 28, 2003. The statutory deadline for completing this consultation, September 10, 2003, was extended by mutual agreement until October 24, 2003, due to the complexities associated with finalizing a biological opinion of this magnitude. At issue are the impacts that the proposed actions may have on threatened and endangered species and their habitats on six Army installations on Oahu to include: 37 plants, 11 snails, 1 mammal, and 2 avian species, and designated critical habitat for the Oahu elepaio (Chasiempis sandwichensis spp. ibidis) (Appendix 1). Based on the information provided in the Programmatic Biological Assessment for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light), U.S. Army, Oahu, Hawaii (Biological Assessment) we concur with the determination that the Oahu creeper (Paroreomyza maculata) and the Hawaiian hoary bat (Lasiurus cinereus semotus) will not be adversely affected by the actions, and therefore, these species will not be addressed further in this biological opinion.

The biological opinion was prepared using the following information: 1) Biological Assessment; 2) Preliminary Draft Wildland Fire Management Plan Pohakuloa and Oahu Training Areas (WFMP), March 2002; 3) information from our files; and, 4) informal consultation between the Army and the Service.

Six Army installations are considered in this consultation to include: 1) Dillingham Military Reservation (DMR); 2) Kahuku Training Area (KTA); 3) Kawaiola Training Area (KLOA); 4)
BIOLOGICAL OPINION
of the
U.S. FISH AND WILDLIFE SERVICE
for
ROUTINE MILITARY TRAINING and TRANSFORMATION
of the
2nd BRIGADE 25th INFANTRY DIVISION (Light)
U.S. ARMY INSTALLATIONS
ISLAND of OAHU

October 23, 2003
(1-2-2003-F-04)

FULL TEXT AVAILABLE UPON REQUEST
Office of the Commander

Dr. Paul Henson
Field Supervisor
U.S. Fish and Wildlife Service
300 Ala Moana Blvd. Room 3-122
Honolulu, Hawaii 96850

Dear Dr. Henson:

I am pleased to provide you with copies of the final Biological Assessments (BA) for Programmatic Section 7 Consultation on Routine Military Training and SBCT Transformation for the Islands of Oahu and Hawaii. The purpose of this action is to initiate Section 7 consultation in accordance with the Endangered Species Act. I look forward to working with you to identify specific conservation measures to offset likely adverse impacts on listed and proposed threatened and endangered species during the formal Section 7 process.

Point of contact for this action is Joel Godfrey, Directorate of Public Works, Environmental Division, 656-2878 x1050.

Sincerely,

David L. Anderson
Colonel, US Army
Commanding

Enclosures
Programmatic Biological Assessment
for
Routine Military Training
and
Transformation of the 2\textsuperscript{nd} Brigade
25\textsuperscript{th} Infantry Division (Light), U.S. Army

Oahu, Hawaii

April 2003

Prepared by:

\begin{center}
\textbf{DAVID C. PRESS}\hspace{1cm}21\text{APR} 03
\end{center}

Lieutenant Colonel, EN
Commander
U. S. Army Corps of Engineers
Honolulu District

Reviewed by:

\begin{center}
\textbf{FLOYD A. QUINTANA}\hspace{1cm}22\text{APR} 03
\end{center}

Colonel, U. S. Army
Director of Public Works
U. S. Army Garrison, Hawaii

Reviewed by:

\begin{center}
\textbf{RONALD L. BORNE}\hspace{1cm}23\text{APR} 03
\end{center}

Director, Transformation
U. S. Army Garrison, Hawaii

Approved by the Proponent:

\begin{center}
\textbf{DAVID L. ANDERSON}\hspace{1cm}25\text{APR} 03
\end{center}

Colonel, U. S. Army
Commander
U. S. Army Garrison, Hawaii
Programmatic Biological Assessment
for
Transformation of the 2nd Brigade
25th Infantry Division (Light), U.S. Army
Island of Hawaii
April 2003

Prepared by:

DAVID C. PRESS
Lieutenant Colonel, EN
District Engineer
U.S. Army Corps of Engineers
Honolulu Engineer District

Reviewed by:

FLOYD A. QUINTANA
Colonel, U.S. Army
Director of Public Works
U.S. Army Garrison, Hawaii

Reviewed by:

RONALD L. BORNE
Director, Transformation
U.S. Army Garrison, Hawaii

Approved by the Proponent:

DAVID L. ANDERSON
Colonel, U.S. Army
Commander
U.S. Army Garrison, Hawaii
MAY 16 2003

In Reply Refer To:
PI-03-18

Lieutenant Colonel David C. Press
Honolulu District Engineer
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96858-5440


Dear Lieutenant Colonel Press:

The Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401], as amended (FWCA), was established to provide a framework to fully consider fish and wildlife conservation measures as a component of Federal projects that may significantly impact important water resources. The U.S. Fish and Wildlife Service (Service) is providing this Planning Aid Letter (PAL) for three proposed road projects: the Schofield Barracks–Helemano Military Reservation (HMR), Schofield Barracks–Dillingham Military Reservation (DMR), and Pohakuloa Training Area (PTA)–Kawaihao Harbor Road. This letter has been prepared under the authority of and in accordance with provisions of FWCA; the Federal Clean Water Act of 1977 [33 U.S.C. 1251 et seq.; 62 Stat. 1155], as amended (CWA); and the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat. 884], as amended (ESA). These comments are also consistent with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.; 83 Stat. 852], as amended (NEPA), and other authorities mandating Service concern for environmental values.

The Department of Defense is preparing an Environmental Impact Statement for programmatic changes related to Army Force Transformation in Hawaii. The proposed changes are associated with the conversion of the 2nd Brigade, 25th Infantry Division (Light) to an Stryker Brigade Combat Team (SBCT). This proposed transformation will require changes in military land use,
training patterns, and military infrastructure including training and maneuver areas for 400 Stryker armed vehicles. It is anticipated that this will result in a greater need for roadways dedicated to military use. Three road construction projects are proposed: (1) Schofield Barracks–HMR Road, which would involve acquiring access, paving, and installing electrical and telecommunications conduit primarily on existing private unpaved agricultural roads that extend from Schofield Barracks to HMR (approximately six miles), (2) Schofield Barracks–DMR Road (Dillingham Trail), which would involve acquiring access and paving existing private agricultural roads that extend from Schofield Barracks to DMR (approximately 15 miles); and (3) Kawaihae Harbor–PTA (Pohakuloa Military Trail) which would involve acquiring access, paving, and installing electrical and telecommunications conduits primarily on an abandoned military trail that once extended from Kawaihae Harbor to PTA (approximately 27 miles).

Note that the improvements to Drum Road Project, which involves widening, paving, and installing electrical and telecommunications conduits on the existing unpaved road that extends from Helemano Military Reservation (HMR) to the Kahuku Training Area (KTA) and passes through the Kawaiola Training Area (KLOA), is a closely related project that is progressing on a separate planning and review schedule. The Service previously provided a PAL regarding the Drum Road project to your office (November 2002), and have prepared a Draft FCWA report on that project (May 2003). Importantly, if the improvements to Drum Road project proceeds as proposed, and if the Army transformation takes place, use of the newly paved Drum road will be a significant component of SBCT training.

Under NEPA and other relevant authorities, all components of the Army Transformation are considered a single Federal action for which cumulative environmental impacts, including potential impacts to fish and wildlife resources, are required to be addressed as a whole. For example, if constructed, the Drum Road, Schofield–HMR, and Dillingham Trail projects together would transect every watershed on the entire north shore of Oahu from Kahuku Point almost to Kaena Point. This is the least developed region on heavily urbanized Oahu, and represents almost one quarter of the circumference of the island. The area is recognized to contain significant marine and freshwater resources. Combined, the geographical extent of these roads is one of the largest transportation infrastructure development projects to be proposed in the State of Hawaii in the last several decades. Because planning for the Army Transformation projects are underway in a phased approach, with projects being designed and reviewed “separately,” the Service reminds the Corps that, to comply with NEPA guidelines, the impacts of the various projects must be considered cumulatively, both in the context of programmatic analysis as well as project-specific and site-specific analyses.

A Federal project of this magnitude triggers multiple aspects of review by local, State, and Federal agencies, and by different functional programs within a single agency. In addition to the FWCA investigations and NEPA reviews by the Service for this project, the Service is also consulting under section 7 of the ESA, and will participate in the review of permitting under CWA sections 404 and 401. Please be advised that Service recommendations for conservation
measures regarding terrestrial resources potentially impacted by the road projects will be formulated through the section 7 process. Service recommendations regarding protection of Federal trust resources in the aquatic environment will be developed through FWCA and CWA-related reviews.

The following information was developed from information including project descriptions and maps provided to the Service by the Corps, a review of information contained in Service files, results of a site visit to the Oahu proposed road alignments, and a general knowledge of the areas under consideration. In addition, we consulted with the State of Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, particularly the Hawaii Island district staff regarding the potential effects of the Kawaihae Harbor–PTA road.

Schofield Barracks–HMR Road
This road project would be constructed on existing unpaved agricultural roads that cross lands currently under pineapple cultivation at elevations of 850 to 1,100 feet (ft) above mean sea level (msl). Kaukonahua and Poamoho streams form deep forested gullies along this alignment. These two perennial streams would be crossed with new stream crossing structures at elevations of approximately 700 to 800 ft msl.

Schofield Barracks–DMR Road (Dillingham Trail)
This project would also be located on existing agricultural roads. The alignment would descend from Schofield Barracks through approximately three miles of land that is under pineapple cultivation, and the remaining distance would traverse lands that were previously under sugarcane cultivation but now are in various diversified crops including seed corn, orchard crops, banana and coffee. As currently proposed, this road would depart from the Schofield–HMR Road in the upland area between Kaukonahua and Poamoho streams. The road would then cross Kaukonahua Stream again in its lower reaches (20 ft msl) near the Waialua neighborhood known as Ranch Camp where there is currently a bridge that was put in place by the sugar plantation. Subsequently, the road would cross several intermittent streams and drainageways, the largest of which is Makalapa Stream near Dillingham Ranch.

Kawaihae Harbor–PTA (Pohakuloa Military Trail)
This project would cross a variety of leeward Big Island terrestrial habitat types from an elevation of 6,500 ft msl at PTA down to sea level at Kawaihae Harbor. In the immediate vicinity of PTA there is a mosaic of native forest and shrubland interspersed with barren lava flows. The proposed alignment descends towards pasture lands dominated by kikuyu grass that is broken by occasional gullies, cinder cones and low hills (e.g., Waikii Ranch area, Pupoo Gulch). The lower section of the proposed road alignment passes through arid kiawe scrub and lava fields. A number of threatened and endangered terrestrial plant and animal species are found in this vicinity. Please refer to documents associated with the ESA section 7 consultation for the Service position on conservation measures to address concerns regarding listed species. The proposed road would cross
Waiulaulu Gulch, which is formed by the confluence of Waikolu and Keaunuomano streams. This stream system is perennial in its upper reaches and intermittent in its middle and lower reaches.

Aquatic Resources

The proposed Schofield–HMR and Schofield–DMR roads cross Kaukonahua and Poamoho streams, which flow from the crest of the Ko'olaus in an east-to-west direction. The Schofield–DMR road also crosses Makalaha Stream, which flows down the north-facing slopes of Mt. Kaala and the Waimanalo Range. The PTA–Kawaihae road crosses Waiulaulu Gulch.

Kaukonahua and Poamoho streams are considered perennial throughout their courses; Waiulaulu stream is considered an “interrupted stream” because it is perennial in its upper reaches but flows intermittently in its middle and lower reaches; and Makalaha Stream is intermittent throughout. Numerous smaller un-named drainages are also crossed by the proposed road alignments.

Streams throughout Hawaii, including the north shore Oahu streams and Waiulaulu Stream and its tributaries, have been altered for over a century by agricultural diversions. These human-caused modifications to surface and ground water systems have profoundly altered natural hydrologic regimes. These dams usually divert all flowing water out of the stream channel, leaving the reach below the dam completely dry for extended periods of time. For example, Kaukonahua Stream is one of the most significant freshwater features in the entire state. It is the longest watershed in Hawaii, extending over thirty miles from its headwaters to its confluence with the sea. Kaukonahua Stream is dammed and now forms the largest impoundment in the state, Waipali Reservoir. This impoundment was created to store water for sugar cane cultivation. Several miles of stream channel below the dam are now dry most of the time, and the aquatic habitats that once existed in the lower stream channel are now almost entirely eliminated. No structural modifications were incorporated into the design of dams built in the early days of the plantation era to facilitate passage of aquatic organisms within natural stream channels, nor have current environmental considerations led to water resource management for the maintenance of stream flows in the reaches below the dams. To the contrary, these diversion structures were specifically designed to be highly efficient in capturing and diverting as much of the stream flow as possible, particularly during periods of moderate and low flow, when agricultural demand for water resources is high, and coincidentally when the need for water to support aquatic life is most acute.

The dewatering of streams in the project areas is significant because the native freshwater fish and larger freshwater invertebrates of Hawaii’s streams (Table 1) are migratory and are, therefore, dependent upon adequate instream flows to complete their life cycle. These species exhibit a diadromous life cycle known as amphidromy in which adults live and spawn in the stream environment, newly hatched larvae are dispersed downstream to the ocean where the larvae persist in the marine environment until they undertake a remarkable upstream migration. Several species are capable of ascending vertical or overhanging waterfalls, and some species are found in high elevation perennial sections of intermittent or interrupted (diverted) streams, above reaches that do not contain perennially flowing water.
Table 1. Migratory native freshwater organisms of Hawaii.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Hawaiian name</th>
<th>Biogeographic status</th>
<th>Type of organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awaous guamensis</td>
<td>O'opu nakea</td>
<td>indigenous</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Lentipes concolor</td>
<td>O'opu anamo'o</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Sterogobius hawaiiensis</td>
<td>O'opu maniba</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Sicyopterus stimpsoni</td>
<td>O'opu nopili</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Eleotris sandwicensis</td>
<td>O'opu akupa</td>
<td>endemic</td>
<td>Freshwater fish (family Eleotridae)</td>
</tr>
<tr>
<td>Atysoida bisulcata</td>
<td>Opae kala'ole</td>
<td>endemic</td>
<td>Freshwater shrimp Crustacean</td>
</tr>
<tr>
<td>Macrobrachium grandimanus</td>
<td>Opae 'oea'a</td>
<td>endemic</td>
<td>Freshwater prawn Crustacean</td>
</tr>
<tr>
<td>Neritina granosa</td>
<td>Hiihiwai</td>
<td>endemic</td>
<td>Freshwater snail Mollusk</td>
</tr>
</tbody>
</table>

Moderate numbers of most, if not all, of these species have been reported from lower and mid elevation areas of Kaukonahua Stream and Pa'urau Stream, both of which may be affected by the proposed road projects (refer to the Hawaii Stream Assessment, the Hawaii Natural Heritage Program database, and the Oahu Training Areas Integrated Natural Resources Management Plan). At least two native fish species (Awaous guamensis and Lentipes concolor) are known to occur in moderate to low numbers in Waialua Stream (Bob Nishimoto, DLNR, pers. com; Pete Hendicks, DLNR, pers. com). No larger aquatic species are expected to be found in Makaleha Stream because it is dry most of the time. In addition to these native species, a considerable number of introduced aquatic species are known to occur in these streams and associated waterbodies (ditches and reservoirs).

Wildlife Resources
Hunting of feral pigs, goats and sheep in the lands adjacent to the road projects is fairly common, particularly the higher elevation areas near PTA. In addition, some upland game bird hunting is undertaken in these areas. The Service supports managed hunting of feral ungulates as a means to reduce their numbers for the purpose of watershed preservation and to reduce threats to rare, threatened and endangered animals and plants. Conservation management of State lands that are
designated as public hunting areas is strongly encouraged by the Service. Support of State hunting programs on these lands through the Service's Division of Federal Aid amounts to several hundred thousand dollars a year. In addition, adjacent landowners are generally in support of limiting feral ungulate populations because of the need to conserve watershed resources and to limit crop damage. Therefore, continued access to these lands during and after construction of the proposed road projects is necessary for the ongoing wildlife management task of controlling feral ungulates.

Planning Recommendations

The Service recommends that planning for the road projects incorporate stream protection measures both for the permanent installation and maintenance of the larger, more heavily used roadways, as well as for temporary construction related impacts. These goals should be accomplished by considering the following objectives in the design, engineering, and construction phases of the project:

1. Minimize concentration of runoff water volume and velocity, and reduce soil and sediment movement to maintain adequate water quality.
   
   • This objective should be accomplished by appropriate placement of surface cross drains to avoid discharges of runoff and roadway contaminants directly into stream channels or onto erodible slopes, and by providing buffers, grass swales, or sediment basins between cross drain outlets and stream channels.

2. Prevent stream crossings from being a direct source of sediment to streams and from degrading water quality by providing for unobstructed migratory passage for native aquatic migratory organisms.
   
   • This objective should be accomplished by the use of bottomless arch culverts and bridges that span the stream channel and adjacent stream banks where feasible. (Site specific information on stream flow characteristics may dictate special engineering considerations necessary to ensure uninterrupted fish passage.) At a minimum, bridges should be installed where ever stream flow is perennial (e.g., Kaukonahua and Poamoho streams) or where migration of native fauna is dependent upon intermittent flow (e.g., Waialua Stream). Culvert designs that retain natural bottom substrate and are large enough in diameter to allow adequate illumination by natural light should be used at all other stream crossings that exhibit characteristics of supporting intermittent flow. A plan that outlines removal of existing bridges and culverts should be developed, and demolition activities should be conducted in a manner that minimizes input of material into the aquatic environment.

3. Stringent application of effective best management practices (BMPs) throughout project construction. These BMPs should be tailored to specifically recognize the challenges posed
by the location and climatic conditions found along the proposed road alignments. A variety
of sources should be consulted regarding BMP development and standard operating
procedures for the construction phase of these projects, particularly the Corps Regulatory
Branch and the Hawaii Department of Health, Clean Water Branch. BMPs should
incorporate specific guidance on the following:

- in-stream construction should be scheduled to occur during low-flow time periods;
- at the onset of periods of persistent or torrential rain in any season, construction
  should be halted, and exposed erodible areas should be secured;
- project-related materials (fill, revetment rock, pipe etc.) should not be stockpiled in a
  stream channel or adjacent riparian zone;
- all project-related materials and equipment (backhoes, trucks, etc.) placed in the water
  should be free of pollutants;
- contamination (including alien species introductions or disposal of trash or debris) in
  stream channels, riparian areas, or adjacent marine environments should not result
  from project-related activities;
- fueling of project-related vehicles and equipment should take place away from the
  water and a contingency plan to control petroleum products accidentally spilled
during the project should be developed. Absorbent pads and containment booms
  should be stored on-site to facilitate the clean-up of petroleum spills; and
- turbidity and siltation from project-related work should be minimized and contained
to within the vicinity of the site through the appropriate use of effective silt
  containment devices and the curtailment of work during adverse weather conditions.

4. Maintenance of access to lands used by hunters, wildlife managers, and natural resource
personnel should continue during construction and operation of the military roads.
Placement of gates, security checkpoints and other infrastructure should not impede hunter
access to State lands or access to private lands by those who have permission to enter from
the landowner.

As stated above, aquatic resources of concern are found in moderate to low numbers in the
proposed project area. If the Army follows the above recommendations to avoid and minimize
potential impacts to these resources, overall project impacts to fish and wildlife are not
anticipated to be significant as defined by the FWCA. The Service will continue to track the
development of these projects, and in particular the implementation of the conservation efforts
suggested above, throughout the environmental review process. This will include reviews of
Environmental Assessments and Environmental Impact Statements under NEPA, and reviews of
permit actions under Section 404 of the CWA. Unless the nature of the project changes or the Service is made aware of new information regarding fish and wildlife resources that may be potentially affected by the road projects, no field investigation and report under Section 2(b) of the FWCA anticipated to be necessary.

The Service appreciates the opportunity to provide this Planning Aid Letter for the Army transformation road projects. If you have questions regarding this letter, please contact Fish and Wildlife Biologist Gordon Smith at 808/541-3441.

Sincerely,

[Signature]

Paul Henson, Ph.D.
Field Supervisor

cc:
EPA Region IX, Honolulu
ACOE, Engineering and Construction, Honolulu
NMFS – PIAO, Honolulu
DAR – Hawaii
DOFAW – Hawaii
CZM – Hawaii
CWB – Hawaii
In Reply Refer To:
PN-03-01

Lieutenant Colonel David C. Press
Honolulu District Engineer
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96858-5440

Subject: Fish and Wildlife Coordination Act Planning Aid Letter for the proposal to construct a Battle Area Complex (BAX) at Schofield Barracks, Oahu, Hawaii

Dear Lieutenant Colonel Press:

The Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401], as amended (FWCA), was established to provide a framework to fully consider fish and wildlife conservation measures as a component of Federal projects that may significantly impact important water resources. The U.S. Fish and Wildlife Service (Service) is providing this Planning Aid Letter (PAL) for the Schofield Barracks Battle Area Complex (BAX). This letter has been prepared under the authority of and in accordance with provisions of FWCA; the Federal Clean Water Act of 1977 [33 U.S.C. 1251 et seq.; 62 stat. 1155], as amended (CWA); and the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat. 884], as amended (ESA). These comments are also consistent with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.; 83 Stat. 852], as amended (NEPA), and other authorities mandating Service concern for environmental values.

The proposed project is associated with the conversion of the 2nd Brigade, 25th Infantry Division (Light) to a Stryker Brigade Combat Team (SBCT). This proposed transformation will require changes in military land use, training patterns, and military infrastructure including training and maneuver areas for 400 Stryker armed vehicles. It is anticipated that this will result in a greater need for roadways dedicated to military use. The proposed BAX would be constructed at McCarthy Flats on the west side of Beaver Road and north of Trimble Road, on the existing range complex and range impact area. The construction of the BAX would occupy approximately 600 acres of previously altered land for military use. This range will support mounted and dismounted infantry platoon tactical and live-fire operations either independently of, or simultaneously with, supporting tactical vehicles.
Lt. Colonel David C. Press

In addition to the FWCA Planning Aid Letter and NEPA review by the Service for this project, the Service is also consulting under section 7 of the ESA, and will participate in the review of the U.S. Army Corps of Engineers (Corps) permitting under CWA sections 404 and 401 if required. Please be advised that Service recommendations for conservation measures regarding terrestrial resources potentially impacted by transformation projects will be formulated through the section 7 process. Service recommendations regarding protection of Federal trust resources in the aquatic environment will be primarily developed through FWCA and CWA-related reviews.

The following information was developed from project descriptions and maps provided to the Service by the Corps, a review of information contained in Service files, results of a site visit to the proposed BAX site, and a general knowledge of the areas under consideration.

Schofield Barracks Vehicle Crossings

A total of five stream crossings sites were surveyed at Schofield Barracks Range on August 29, 2003. All stream sites were dry and had no aquatic resources present. Streams surrounding the Schofield Barracks Range are known to be intermittent throughout the year, and on occasion have pulse flows during heavy rain events. Each stream site surveyed on the Schofield Barracks Range had little potential for fish and wildlife habitat due to the absence of flowing water and absence of quality in-stream substrate (e.g., gravel, cobbles). Three of the five sites visited contained grasses and shrubs growing directly in the stream channel and the other two sites contained dried mud and fine sediments in the channel. Five of the six stream sites received direct sunlight and were without riparian vegetation. Two of the proposed vehicle crossing sites in the Waikoloa Gulch have high erosion potential due to large areas of exposed-loose soil upland of the gulches. Portions of the gulches are deep (20 to 50 feet) and are surrounded by large flat plateaus covered by Panicum maximum (guinea grass) and other grasses. To accommodate military activities, the grasses and shrubs growing on the plateaus are consistently cleared by burning and bulldozing. The proposed stream crossing sites in the Mohiakea Gulch were not surveyed due to military training activities on that day, however the topography and proximity of the two sites strongly indicate that conditions are similar.

The proposed BAX gulch crossings are located on tributaries to Kaukonahua stream, which flows from the crest of the Koolaus in an east-to-west direction to Waialua Bay on the north shore of Oahu. Streams throughout Hawaii, including streams of the north shore of Oahu such as Kaukonahua Stream and its tributaries, have been altered for over a century by agricultural diversions. These human-caused modifications to surface and ground water systems have profoundly altered natural hydrologic regimes. These dams usually divert all flowing water out of the stream channel, leaving the reach below the dam completely dry for extended periods of time. For example, Kaukonahua Stream is one of the most significant freshwater features in the entire state. It is the longest watershed in Hawaii, extending over thirty miles from its headwaters to its confluence with the sea. Kaukonahua Stream is dammed and now forms the largest impoundment in the state, Wahiawa Reservoir. This impoundment was created to store water for sugar cane cultivation. Several miles of stream channel below the dam are now dry
most of the time, and the aquatic habitats that once existed in the lower stream channel are now almost entirely eliminated. No structural modifications were incorporated into the design of dams built in the early days of the plantation era to facilitate passage of aquatic organisms within natural stream channels, nor have current environmental considerations led to water resource management for the maintenance of stream flows in the reaches below the dams. To the contrary, these diversion structures were specifically designed to be highly efficient in capturing and diverting as much of the stream flow as possible, particularly during periods of moderate and low flow, when agricultural demand for water resources is high, and coincidentally when the need for water to support aquatic life is most acute.

The dewatering of streams in the project areas is significant because the native freshwater fish and larger freshwater invertebrates of Hawaii’s streams (Table 1) are migratory and are, therefore, dependent upon adequate instream flows to complete their life cycle. These species exhibit a diadromous life cycle known as amphidromy in which adults live and spawn in the stream environment, newly hatched larvae are dispersed downstream to the ocean where the larvae persist in the marine environment until they undertake a remarkable upstream migration. Several species are capable of ascending vertical or overhanging waterfalls, and some species are found in high elevation perennial sections of intermittent or interrupted (diverted) streams, above reaches that do not contain perennially flowing water. Moderate numbers of most, if not all, of these species have been reported from lower and mid elevation areas of Kaukonahua Stream upstream of the proposed BAX gulch crossings (refer to the Hawaii Stream Assessment, the Hawaii Natural Heritage Program database, and the Oahu Training Areas Integrated Natural Resources Management Plan). However, no larger aquatic species are expected to be found in either Mohiakea Gulch or Waikoloa Gulch because they are dry most of the time.

Recommendations
The Service recommends that planning for the Schofield Barracks BAX incorporate stream protection measures both for the permanent installation and maintenance of the larger, more heavily used roadways, as well as for temporary construction related impacts. These goals should be accomplished by considering the following objectives in the design, engineering, and construction phases of the project:

1. Minimize concentration of runoff water volume and velocity, and reduce soil and sediment movement to maintain adequate water quality.
   - This objective should be accomplished by appropriate placement of surface cross drains to avoid discharges of runoff and roadway contaminants directly into stream channels or onto erodible slopes, and by providing buffers, grass swales, or sediment basins between cross drain outlets and stream channels.

2. Prevent stream crossings from being a direct source of sediment to streams.
Table 1. Migratory native freshwater organisms of Hawaii.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Hawaiian name</th>
<th>Biogeographic status</th>
<th>Type of organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awaous guamensis</td>
<td>O'opu nakea</td>
<td>indigenous</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Lentipes concolor</td>
<td>O'opu alamo'o</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Stenogobius hawaiiensis</td>
<td>O'opu naniha</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Sicyopterus stimpsoni</td>
<td>O'opu nopili</td>
<td>endemic</td>
<td>Freshwater fish (family Gobiidae)</td>
</tr>
<tr>
<td>Eleotris sandwicensis</td>
<td>O'opu akupa</td>
<td>endemic</td>
<td>Freshwater fish (family Eleotridae)</td>
</tr>
<tr>
<td>Atyoida bisulcata</td>
<td>Opa e kala'ole</td>
<td>endemic</td>
<td>Freshwater shrimp Crustacean</td>
</tr>
<tr>
<td>Macrobrachium grandimanus</td>
<td>Opa e 'oeh'a</td>
<td>endemic</td>
<td>Freshwater prawn Crustacean</td>
</tr>
<tr>
<td>Neritina granosa</td>
<td>Hihiwai</td>
<td>endemic</td>
<td>Freshwater snail Mollusk</td>
</tr>
</tbody>
</table>
This objective can be accomplished by using bridges, culverts, Texas swales (concrete swale), or gabion swales which span the stream channel and allow for vehicles to cross without directly coming into contact with stream substratum.

3. Stringent implementation of effective best management practices (BMPs) throughout project construction. These BMPs should be tailored to specifically recognize the challenges posed by the location and climatic conditions found along the proposed BAX gulch crossings. A variety of sources should be consulted regarding BMP development and standard operating procedures for the construction phase of these projects, particularly the Corps Regulatory Branch and the Hawaii Department of Health, Clean Water Branch. BMPs should incorporate specific guidance on the following:

- in-stream construction should be scheduled to occur during no-flow time periods;
- at the onset of periods of persistent or torrential rain in any season, construction should be halted, and exposed erodible areas should be secured;
- project-related materials (fill, revetment rock, pipe etc.) should not be stockpiled in a stream channel or adjacent riparian zone;
- all project-related materials and equipment (backhoes, trucks, etc) placed in the water should be free of pollutants;
- contamination (including alien species introductions or disposal of trash or debris) in stream channels, riparian areas, or adjacent marine environments should not result from project-related activities;
- fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project should be developed. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of petroleum spills; and
- turbidity and siltation from project-related work should be minimized and contained to within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse weather conditions.

As stated above, aquatic resources of concern are found in low numbers upstream of the proposed project area. If the Army follows the above recommendations to avoid and minimize potential impacts to these resources, overall project impacts to fish and wildlife are not anticipated to be significant as defined by the FWCA. The Service will continue to track the development of these projects, and in particular the implementation of the conservation efforts suggested above, throughout the environmental review process. This will include reviews of Environmental Assessments and Environmental Impact Statements under NEPA, and reviews of
Lt. Colonel David C. Press

permit actions under section 404 of the CWA. Unless the nature of the project changes or the Service is made aware of new information regarding fish and wildlife resources that may be potentially effected by the road projects, no field investigation and report under section 2(b) of the FWCA will be necessary.

The Service appreciates the opportunity to provide this Planning Aid Letter for the Schofield Barracks BAX projects. If you have questions regarding this letter, please contact Fish and Wildlife Biologist, Ray Hoy or Gordon Smith at 808/792-9431.

Sincerely,

Gina Shultz,
Acting Field Supervisor

cc:
EPA Region IX, Honolulu
ACOE, Engineering and Construction, Honolulu
NMFS – PIAO, Honolulu
DAR – Hawaii
DOFAW – Hawaii
CZM – Hawaii
CWB – Hawaii
CEPOH-EC-R

MEMORANDUM FOR: Chief, CEPOH-EC-T 9/11/02

DATE: 4 September 2002

SUBJECT: Certification of Wetland, Dillingham Military Reservation, Oahu Island

1. This is in response to your MFR dated 23 August 2002 regarding the subject project. Farley Watanabe of my staff has reviewed the drawings, database, and report for this project. The documentation complies with the procedures of the 1987 Corps Wetlands Delineation Manual and is adequate for certification purposes.

2. Based on the information provided, the map (Figure 6) included in the report entitled "Wetland Survey of Dillingham Military Reservation" which identified a perched wetland is hereby certified. The previously identified wetland identified in the agency ITAM (Figure 1) is not considered a jurisdictional wetland due to the absence of the hydrology indicator as required by the 1987 Corps Wetlands Delineation Manual.

3. Since wetlands are affected over time by both natural and man-made activities, we can expect local changes to occur in wetland boundaries. For the referenced maps, the wetland jurisdictional delineation is considered valid for a period of five years from the date of this memorandum (i.e., 4 September 2007). New information of local changes will require evaluation and may be used to revise delineations before the expiration date.

4. If you have any questions, please contact Mr. Watanabe at 438-7701 and refer to File Number 200200518.

George P. Young, P.E.
Chief, Regulatory Branch
Figure 1 - Areas of Interest
Wetland Survey of Dillingham Military Reservation

Notes:
1. Orthograph provided by ITAM.
2. GIS wetland polygons provided by ITAM and are not Corps of Engineers certified wetlands.
3. Grid is UTM Zone 4, NAD83, meters.
Central Federal Lands Highway Division
555 Zang Street
Mail Room 259
Lakewood, CO 80228

December 23, 2003

Refer To: HFPM-16

Mr. Michael Buck
Administrator
State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, HI 96813

Subject: Amendment to Saddle Road Palila MOU; Transfer of Implementation Responsibilities

Dear Mr. Buck:

The Federal Highway Administration (FHWA) - Central Federal Lands Highway Division (CFLHD), in cooperation with the State of Hawaii Department of Transportation (HDOT) and the U.S. Department of the Army (DOA), is proposing to improve State Route 200, Saddle Road, in the County of Hawaii.

The initial segment of construction will realign the portion of existing Saddle Road that passes through the DOA’s Pohakuloa Training Area to a location north of the base. This realignment will pass through critical habitat of an endangered bird, the Palila. To compensate for the impact to this habitat, a mitigation plan was developed and agreed to by seven federal and state agencies in 1999. The plan is outlined in the Memorandum of Understanding Regarding Implementation of the Saddle Road Palila Critical Habitat Impact Mitigation (Palila MOU). Table A of the Palila MOU summarizes the critical elements of the mitigation plan, their anticipated cost, the proposed funding sources, and the agency responsible for the implementation of each item of work. Under the terms of the original Palila MOU, the Department of Land and Natural Resources (DLNR) was identified as the agency responsible for carrying out the following elements of the mitigation plan: (1) predator and alien species control for ten years; (2) ungulate fencing at Pu’u Mali; (3) cattle fencing at Pu’u Mali and Ka’ohe lease lands; and, (4) mowing of the Ka’ohe mitigation site for a period of five years.

CFLHD representatives discussed the performance and scheduling of the DLNR mitigation elements with you and Mr. Roger Imoto via several telephone calls in October. Based on these conversations, it was our understanding that DLNR did not have sufficient staff at this time to undertake the first three of these elements and complete them within the needed timeframe.
Subsequent to these conversations, a meeting was held in Hilo on November 13 with Mr. Imoto and members of his staff, USGS-BRD, U.S. Fish & Wildlife Service, and FHWA to reach an understanding on how best to accomplish the predator and alien species control and fencing of the mitigation sites. As a result of this meeting, it was agreed that USGS-BRD would conduct the predator and alien species control work over the 10-year mitigation period and that CFLHD would install the fencing at Pu‘u Mali and Ka‘ohe. DLNR would continue to be responsible for the mowing of the Ka‘ohe lease land area. Therefore it is proposed that the Palila MOU be amended to:

- Reassign responsibility for predator and alien species control from DLNR to USGS-BRD.
- Reassign responsibility for the installation of the fencing at the Pu‘u Mali and Ka‘ohe sites from DLNR to FHWA.

We are forwarding three originals of Amendment #1 to the Palila MOU stipulating the above changes. If you agree, please sign and return all three originals of the amendment to this office in the enclosed franked and self-addressed envelope. The three originals of amendment #1 will then be forwarded to USGS-BRD for their signature. Upon obtaining signatures from both agencies, we will return one original signed amendment to you for your records. A copy of the signed amendment will also be provided to the other original Palila MOU signatory agencies that are not directly impacted by these changes.

We also propose to improve communications and coordination among the Palila MOU signatory agencies. We have recommended to USGS-BRD that they provide regular status updates to your Big Island staff of their ‘on-the-ground’ efforts that are undertaken as part of the Predator and Alien Species Control and Palila Relocation and Monitoring work. In addition, Ms. Jodi Chew, FHWA Hawaii Division, will oversee the implementation of the mitigation during the 10-year life of the plan. Ms. Chew will conduct annual meetings with the key implementing agencies at which the prior year’s efforts will be reviewed and upcoming year’s plan coordinated and agreed upon. Additional meetings will be scheduled on an as needed basis, and may include field inspections as appropriate. Your staff will be invited to all such meetings.

We wish to thank you and Mr. Imoto for your assistance and cooperation in resolving this matter in a highly professional manner. If you have any questions regarding this issue or any other matters related to the Saddle Road project, please contact Ms. Chew at (808) 541-2700, extension 328, or Mr. Dave Gideon, CFLHD Saddle Road Project Manager, at (303) 716-2131.

Sincerely,

Larry C. Smith, P.E.
Division Engineer

Enclosures
cc (w/ enclosure):

Mr. Roger Imoto, DLNR
Ms. Marilet Zablen, USFWS
Dr. William Steiner, USGS-BRD
Dr. Paul Banko, USGS-BRD
Mr. Glenn Yasui, HDOT
Mr. Pete Cline, MTMC
LTC David Anderson, USAG-HI
Mr. Ed Uchida, USGS-HI
Mr. Alvin Char, USAG-HI
MEMORANDUM OF UNDERSTANDING
REGARDING IMPLEMENTATION OF THE SADDLE ROAD PALILA CRITICAL
HABITAT IMPACT MITIGATION
(PALILA MOU)

AMENDMENT NUMBER 1

The 1999 Palila MOU formed the basis for the interagency implementation of the Palila mitigation related to the Saddle Road improvement project. Signatory agencies to the Palila MOU include: the Federal Highway Administration (FHWA) - Central Federal Lands Highway Division (CFLHD), the Hawaii Department of Transportation (HDOT), the Department of the Army - Military Traffic Management Command (MTMC), the U.S. Army Garrison – Hawaii (USAG-HI), U.S. Fish & Wildlife Service (USFWS), Department of Land and Natural Resources (DLNR), and the U.S. Geological Services – Biological Research Division (USGS-BRD).

The Final EIS and Record of Decision for Saddle Road were signed in late 1999. Palila mitigation related to the Saddle Road project was initiated in fiscal year 2000 using USAG-HI Ecosystem Management Funds in support of USGS-BRD’s Palila relocation and monitoring and related mitigation efforts. An easement setting aside the Pu’u Mali and Ka’ohe mitigation sites was executed on November 27, 2002 and extends through November 26, 2012.

The USFWS and USGS-BRD have releases of Palila scheduled for the fall and winter of 2003/2004 that require the prior or simultaneous implementation of predator and alien species control at or near the easement lands. DLNR was identified in the Palila MOU as the agency responsible for carrying-out predator and alien species control, as well as ungulate fencing of the Pu’u Mali and cattle fencing of the Ka’ohe sites. DLNR does not have sufficient staff at present to perform these efforts within the timeline required.

Therefore, it is mutually agreed that the Palila MOU shall be amended as follows:

A. USGS-BRD will conduct the predator and alien species control work over the 10-year mitigation period.

B. FHWA – CFLHD will install the ungulate fencing at Pu’u Mali and cattle fencing at Ka’ohe.

C. DLNR will remain responsible for the mowing of the Ka’ohe lease land area for a period of 5 years.

D. The implementation cost of each of these mitigation elements remains the same as shown in Table A of the Palila MOU.

Larry C. Smith, FHWA-CFLHD

Date

William Steiner, USGS-BRD

Date

Peter Young, DLNR

Date
Office of the Garrison Commander

Mr. David W. Blanc
Director
Hawai'i Coastal Zone Management Program
Office of Planning
Dept. of Business, Economic Development and Tourism
P.O. Box 2359
Honolulu, Hawai'i 96804

Dear Mr. Blanc:

Pursuant to Section 307 of the Coastal Zone Management Act of 1972 (16 U.S.C. § 1456), the US Army has determined that implementing the Stryker Brigade Combat Team project in the State of Hawai'i is consistent with the Hawai'i Coastal Zone Management Program (CMP). This letter, the attached Coastal Zone Management (CZM) Assessment Form and the Stryker Brigade Combat Team Draft Environmental Impact Statement (DEIS) serve as a Coastal Consistency Determination, as required by the National Oceanic and Atmospheric Administration regulations for federal consistency with approved coastal management programs (15 C.F.R. 930).

**Background.** The attached EIS is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and addresses in detail the specific impacts to resources, including consistency of the proposed action with the CMP. The US Army Hawai'i (USARHAW) is the lead agency on this proposed project. The project would occur on land that is or will be wholly owned or leased by the US Army on the islands of O'ahu and Hawai'i, at six installations: Pōhakuloa Training Area (PTA) on the Island of Hawai'i and Schofield Barracks Military Reservation (SBMR) including East Range, Wheeler Army Airfield (WAAF), Kahuku Training Area (KTA), Kawialoa Training Area, and Dillingham Military Reservation (DMR) on O'ahu. Public scoping meetings were held in Wahiawa, Honolulu, Hale'iwa, Kahuku, Wai'anae, and Hilo, and the Army published early notice of the meeting times and locations. Public hearings for comment on the DEIS were also held at most of the same locations.

**Project Description.** As described in the DEIS, the Army proposes to transform the 2nd Brigade to a Stryker Brigade Combat Team (SBCT), including enhancing training capabilities in Hawai'i to support the nationwide transformed forces. The purpose of the proposed action is to assist in bringing the Army's Interim Force to operational capability and to provide realistic field training in Hawai'i. Twenty-eight projects are proposed for USARHAW that would improve on the existing support structure and training facilities to provide the necessary training required for an SBCT. Reconfiguring maneuver areas, establishing combat training facilities more appropriate to the types of threats the Army expects to encounter, and strengthening
infrastructure are planned to ensure that SBCT’s leaders and its soldiers would be prepared for the full spectrum of military operations.

**Documentation and Analysis.** The Army has prepared extensive documentation and analysis to comply with requirements of NEPA, the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), and other federal and state laws. The SBCT Draft EIS is enclosed. Other documentation, such as the final draft Programmatic Agreement, dated December 5, 2003, in compliance with Section 106 of the NHPA and a letter of concurrence from NOAA Fisheries for compliance with Section 7 of the ESA are included with this submittal. The enclosed DEIS addresses the specific CMP policies under the specific environmental consequences section for each installation. The CMP policy areas are addressed in the following relevant DEIS sections:

<table>
<thead>
<tr>
<th>CMP</th>
<th>DEIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational Resources</td>
<td>Land Use/Recreation</td>
</tr>
<tr>
<td>Historic Resources</td>
<td>Cultural Resources</td>
</tr>
<tr>
<td>Open Space and Scenic Resources</td>
<td>Land Use/Recreation &amp; Visual Resources</td>
</tr>
<tr>
<td>Coastal Ecosystems</td>
<td>Biology and Water Resources</td>
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<tr>
<td>Economic Uses</td>
<td>Socioeconomics and Environmental Justice</td>
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<td>Coastal Hazards</td>
<td>Geological Resources</td>
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<tr>
<td>Managing Development</td>
<td>Land Use</td>
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<tr>
<td>Public Participation</td>
<td>Public Involvement (Section 1.8)</td>
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<tr>
<td>Beach Protection</td>
<td>Geological Resources/Water Resources</td>
</tr>
<tr>
<td>Marine Resources</td>
<td>Biological Resources/Water Resources</td>
</tr>
</tbody>
</table>

**Conclusion.** USARHAW has determined that implementing the proposed SBCT project on the islands of O'ahu and Hawai‘i, in the State of Hawai‘i, would be consistent with the Hawai‘i Coastal Zone Management Program. Please review the enclosures and forward a letter of concurrence. Pursuant to 15 C.F.R. § 930.41, the Hawai‘i Coastal Zone Management Program has 60 days from receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension, in writing under 15 C.F.R. § 930.41(b). Hawai‘i’s concurrence will be presumed if its response is not received by USARHAW on the 60th day from receipt of this determination. The state’s response should be sent to:

Cindy Barger  
U.S. Army Engineer District, Honolulu District  
Programs and Project Management Division  
SBCT EIS Project Manager  
Building 230, Room 306  
CEPOH-PP-E  
Fort Shafter, HI 96858-5440
If additional information is required, please contact Ms. Cindy Barger at 808-438-4812 or SBCT_EIS@poh01.usace.army.mil.

Sincerely,

David L. Anderson
Colonel, US Army
Commanding

Enclosures
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ENCLOSURE 1: SBCT Coastal Consistency Determination

HAWE'I CZM PROGRAM
FEDERAL CONSISTENCY ASSESSMENT FORM

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:
1) Improve coordination and funding of coastal recreation planning and management.
2) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
   a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
   b) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
   c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
   d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
   e) Encouraging expanded public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value;
   f) Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;
   g) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and
   h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, County planning commissions; and crediting such dedication against the requirements of section 46-6.

Check either “Yes” or “No” for each of the following questions:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Will the proposed action involve or be near a dedicated public right-of-way?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2. Does the project site abut the shoreline?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3. Is the project site near a State or County park?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4. Is the project site near a perennial stream?</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
ENCLOSURE 1: SBCT Coastal Consistency Determination

5. Will the proposed action occur in or affect a surf site? X ___

6. Will the proposed action occur in or affect a popular fishing area? X ___

7. Will the proposed action occur in or affect a recreational or boating area? X ___

8. Is the project site near a sandy beach? X ___

9. Are there swimming or other recreational uses in the area? X ___

Discussion:

1. The proposed action is near numerous public highways and trails. Public access on these rights-of-way would not be impeded.

2. The project site abuts the shoreline at Kawaihae Harbor, however, no changes to the Harbor are planned. While Dillingham Military Reservation (DMR) property includes shoreline areas, no project measures take place on or near the shoreline.

3. The following public parks are near one or more of the project sites. None of these parks would be adversely affected by the proposed action.
   a. On O‘ahu: Mokuleia Beach Park, Wahiawa State Freshwater Park (Lake Wilson), Sacred Falls State Park, and Kahana Valley State Park, which are on the east side of the Koolau Mountain ridge.

4. The military vehicle trails on O‘ahu (Dillingham Trail, Helemano Trail, and Drum Road) will cross numerous perennial streams, and the PTA Trail will cross the perennial Waikoloa Stream. Additional information regarding streams is discussed below under question 6 of Coastal Ecosystems.

5. Mokuleia Beach Park, across Farrington Highway from the Dillingham Military Reservation, has some surf sites. Although a surf site is located at Kawaihae on the reef between the south small boat harbor and the entrance channel, it would not be affected by the proposed action. Theater Support Vessels may be introduced as part of future operations. Impacts from those vessels would be considered under a separate NEPA document and Coastal Consistency Determination if they were to be introduced.

6. Mokuleia Beach Park attracts fishermen (shorecasting and diving); it is located across the highway from Dillingham Military Reservation and would not be affected by the proposed activities.

7. Kawaihae has two small boat harbors, one at the north end and one at the south end. The proposed activities would occur in the commercial port area and, therefore, would not affect recreational boating. There is some hunting allowed on Army lands (especially at PTA but also in State lands within the Kahuku Training Area and Kawailoa Training Area). New training requirements would change access to these hunting areas but access would not be closed. These hunting areas are not in or near shoreline areas.

8. Dillingham Military Reservation is located across the highway from Mokuleia Beach Park, which features a sandy beach. However, the activities at DMR would have no impact on the beach. Likewise, the activities at the Kawaihae Harbor commercial port would not affect the small sandy beach at the north end of the harbor.

9. Swimming, diving, shorecasting, and picnicking at Mokuleia Beach Park would not be affected by activities at DMR. The recreational areas of Kawaihae Harbor are used by local residents for shoreline recreational activities, including fishing, canoe paddling, sailing, windsurfing, swimming, scuba diving, snorkeling, and
ENCLOSURE 1: SBCT Coastal Consistency Determination

picnicking. None of these activities would be affected by the proposed action, which would occur in the commercial portion of the harbor.

HISTORIC RESOURCES

Objective: Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:
1) Identify and analyze significant archaeological resources;
2) Maximize information retention through preservation of remains and artifacts or salvage operations; and
3) Support State goals for protection, restoration, interpretation, and display of historic resources.

Check either “Yes” or “No” for each of the following questions:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>1. Is the project site within a historic/cultural district?</td>
<td>X</td>
<td></td>
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<tr>
<td>2. Is the project site listed on or nominated to the Hawaii or National register of historic places?</td>
<td>X</td>
<td></td>
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<tr>
<td>3. Does the project site include undeveloped land which has not been surveyed by an archaeologist?</td>
<td>X</td>
<td></td>
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<tr>
<td>4. Has a site survey revealed any information on historic or archaeological resources?</td>
<td>X</td>
<td></td>
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<tr>
<td>5. Is the project site within or near a Hawaiian fishpond or historic settlement area?</td>
<td>X</td>
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</table>

Discussion:

1. The construction of some project facilities would require demolishing some buildings that are over 50 years old and may be eligible for the National Register of Historic Places (NRHP). Constructing proposed action facilities could have significant impacts on historic buildings at Kahuku Training Area (KTA) and Pōhakuloa Training Area (PTA). The greatest number and intensity of impacts from the proposed action would occur at SBMR and PTA. These two areas are the sites of the greatest amount of project-related ground-disturbing activities, and therefore the greatest risk to archeological resources.

2. Prehistoric and historic resources found on SBCT project areas include historic and prehistoric archaeological sites, Areas of traditional importance (ATIs), traditional cultural properties (TCPs), historic buildings, structures, and districts, Cold War properties, historic landscapes, and monuments and memorials.

3. Draft TCP surveys have been completed at PTA and SBMR, and others are underway at KTA and Kawailoa Training Area (KLOA).

4. So far, more than 500 archaeological sites have been identified within the region of influence (ROI) for SBCT project activities in Hawaiʻi. Of these, two sites are listed on the NRHP, while the others have not yet been assessed for eligibility.
ENCLOSURE 1: SBCT Coastal Consistency Determination

5. Archeological sites exist on all project installations. Possible historical settlements can be found at all main project areas. Possible fishpond sites are located at SBMR.

Mitigation Summary:
Cultural resources impacts related to the proposed action vary depending on the location and the nature of the project. The five significant impacts to cultural resources primarily relate to the construction phase of SBCT-related projects and to training range activities at PTA, DMR and SBMR. A Programmatic Agreement (PA) is currently being developed that provides a mechanism for the Army to comply with Section 106 of the NHPA for proposed SBCT activities. The Army is consulting with the SHPO, the Advisory Council on Historic Preservation (ACHP), Native Hawaiian organizations, and other interested parties in accordance with Section 106 procedures regarding all historic properties affected by SBCT project activities. Proposed mitigation measures for archaeological resources would include surveys to identify sites, evaluation of NRHP eligibility, avoidance or data recovery of eligible sites, and archeological monitoring plans. Proposed mitigation measures for architectural resources would include evaluation of NRHP eligibility and avoidance or documentation of eligible buildings subject to demolition. Proposed mitigation measures for impacts on ATIs would include avoidance, limiting visual impacts by site location or design, and consultation with the Native Hawaiian community.

SCENIC AND OPEN SPACE RESOURCES

Objective: Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:
1) Identify valued scenic resources in the coastal zone management area;
2) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
3) Preserve, maintain and where desirable, improve and restore shoreline open space and scenic resources; and
4) Encourage those developments that are not coastal dependent to locate in inland areas.

Check either “Yes” or “No” for each of the following questions:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the project site abut a scenic landmark?</td>
<td>___</td>
<td>X</td>
</tr>
<tr>
<td>2. Does the proposed action involve the construction of a multi-story structure or structures?</td>
<td>X</td>
<td>___</td>
</tr>
<tr>
<td>3. Is the project site adjacent to undeveloped parcels?</td>
<td>X</td>
<td>___</td>
</tr>
<tr>
<td>4. Does the proposed action involve the construction of structures visible between the nearest coastal roadway and the shoreline?</td>
<td>___</td>
<td>X</td>
</tr>
<tr>
<td>5. Will the proposed action involve construction in or on waters seaward of the shoreline? On or near a beach?</td>
<td>___</td>
<td>X</td>
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</tbody>
</table>

Discussion:
1. No structures or developed areas abut scenic landmarks. Antenna support structures would be built in training areas. Although 25 single pole antennas would be constructed as part of the project only six have the potential to impact on the visual resources. Three antennas would be constructed at SBMR, two on DMR and one
approximately 1.5 miles (2.4 kilometers) south of DMR on the ridge. The DMR antennas would be visible from designated scenic areas along Farrington Highway and the coastline. These views would be partially screened by existing vegetation. Although this area has experienced a high degree of alteration from development and agriculture, a significant but mitigable impact would result because the proposed 100-foot (30.5-meter) structure would introduce a distinct vertical element that would be out of character with the existing views.

2. SBCT project sites at SBMR, KTA, DMR and PTA are adjacent to undeveloped parcels. None of these parcels are in a shoreline area, although DMR can be seen from the shoreline. SBCT-related construction and antenna support structures on KTA would be only partially visible along most of the north coastal area due to a bluff just inland of the Kamehameha Highway that obstructs views.

3. None of the installations are located between the shoreline and the nearest highway.

4. None of the installations are located seaward of the shoreline nor will any work be done there.

Mitigation Summary:
Proposed mitigation measures include enhancing existing site conditions to help screen the proposed antenna support structures and support shed from the surrounding area. Where practicable, permanent screening could be achieved with native tree and shrub plantings that complement natural and ornamental plantings, earthen berms that mimic the color and texture of the surrounding area, and fencing designed to fit in with the surrounding area. The antenna support structure site would be developed to conserve existing natural features, including terrain and vegetative cover, to the extent feasible.

SBCT project measures include constructing roads and military vehicle trails between training areas. These roads and trails would reduce military traffic on public roadways, including those in coastal areas. All proposed roads and trails are inland and not visible from coastal areas.

COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:
1) Improve the technical basis for natural resources management;
2) Preserve valuable coastal ecosystems of significant biological or economic importance;
3) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land water uses, recognizing competing water needs; and
4) Promote water quantity and quality planning and management practices, which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses, which violate State, water quality standards.

Check either “Yes” or “No” for each of the following questions:

1. Does the proposed action involve dredge or fill activities? _____ X
2. Is the project site within the Shoreline Setback Area (20 to 40 feet inland of the shoreline)? X _____
3. Will the proposed action require some form of effluent discharge into a body of water? _____ X
Discussion:
1. No dredge of fill activities will take place.
2. The project will take place in shoreline areas that are already developed for project purposes. No new development will take place in these areas and there will be no changed conditions regarding coastal ecosystems.
3, 5. There will be no effluent discharges to a body of water nor are there any new waste treatment facilities proposed.
4. The project includes construction of a two-lane 43 kilometer gravel road with a right of way from Kawaihae Harbor to PTA. However, no significant impacts from potential runoff are expected for marine wildlife resources or coral ecosystems. The expected increase in erosion to the ocean would be within the natural range that exists due to rainfall and runoff variation. Impacts on marine wildlife and coral ecosystems in the ROI waters are not considered to be significant
6. SBCT activities include using Kawaihae Harbor, though SBCT does not include any project measures regarding constructing or deepening harbors.

I. SBMR.
   a. Main Post. Figure 5-24 of the enclosed DEIS shows the watersheds and principal drainage features and water bodies within the SBMR Main Post. SBMR lies near the drainage divide between the Kaukonahua watershed and the Waikele watershed. These watersheds stretch across the Schofield plateau, from the ridgeline of the Ko‘olau Range to the ridgeline of the Wai‘anae Range. The Kaukonahua watershed is bordered on the north by the Poamoho watershed. The main drainages at SBMR are the Waikoloa Gulch and the Waikele Stream. Two other streams that drain the north part of SBMR are tributaries to the Kaukonahua Stream—Mohi‘kea Gulch and Haleauau Gulch. Kaukonahua Stream drains northward, through the area underlain by the Waialua aquifer system, joining the Poamoho Stream to form the Kī‘iki Stream, which discharges to Kaiakea Bay, just east of Waialua.
   b. SRAA. The South Range Acquisition Area is a 1,400-acre (567-hectare) area that borders the southern boundary of the Main Post west of WAAF. It is drained by Waikele Stream and its tributaries and lies entirely within the portion of the watershed of Waikele Stream that is upstream of WAAF.
   c. SBER. Schofield Barracks East Range occupies a portion of the Waipahu/Waiawa watershed in the Pearl Harbor hydrologic sector, just south of the hydrologic divide that separates it from the Central
ENCLOSURE 1: SBCT Coastal Consistency Determination

hydrologic sector. Figure 5-25 shows the principal drainage and surface water features in SBER. Most of SBER is drained by the South Fork of Kaukonahua Stream, which discharges to the Wahiawā Reservoir. The Kaukonahua Stream, downstream of Wahiawā Reservoir, ultimately discharges to Kaiaka Bay at Hale'iwa.

II. DMR. DMR is in the Kawaihāpai watershed (see Figure 3-6 and Figure 6-10 of the DEIS). There are several unnamed intermittent streams and no perennial streams on DMR, although potential wetland areas have been identified and are undergoing investigation to determine if they qualify as jurisdictional wetlands. The State of Hawai'i Department of Health classified the waters as Class 2 waters.

III. KTA. Figure 7-12 of the enclosed DEIS shows surface water features and watershed boundaries on KTA, which straddles the northern Koʻolau Mountain Range and contains portions of four watersheds. On the west side of KTA is the Paumalū watershed. The Paumalū watershed includes drainages from Paumalū Stream on the west to Waiale'e Gulch on the east. The headwaters of the Paumalū Stream are in the Pūpūkea Paumalū Forest Reserve, most of which is within the boundaries of KTA. KTA does not include the downstream portion of the Paumalū Stream, but most of the watershed east of the Paumalū drainage, almost to the Kamehameha Highway, is on KTA. To the east of Paumalū watershed and wedged between it and the ‘Ō‘io watershed farther to the east is the Kawela watershed, which includes the streams that drain to Kawela Bay—Pahipahi‘ilua Stream and Kawela Stream. East of Paumalū and Kawela watersheds is the ‘Ō‘io watershed, which includes the upper portions of drainages from ‘Ō‘io Gulch east to Kea‘au’ulu Gulch, which discharges at the town of Kahuku. KLOA does not have any coastal riparian resources.

IV. PTA. Figure 8-21 of the DEIS shows the watersheds and principal drainage features in the PTA. On the Island of Hawai‘i, PTA lies within the Northwest Mauna Loa and the West Mauna Kea watersheds, which drain to the northern Hualālai and southern Kohala coasts, respectively. The PTA Trail is mainly within the West Mauna Kea watershed. The two watersheds are underlain by aquifer “sectors” of the same name. There are no surface streams, lakes, or other bodies of water within PTA boundaries due to low rainfall, porous soils, and lava substrates. There are no perennial streams near the PTA installation. However, the proposed PTA-Kawaihae Tank Trail would cross the Waikoloa Stream, which is a perennial stream, about six miles east of Kawaihae Harbor. According to the US EPA 305(b) list, Waikoloa Stream water quality is impaired, although not threatened, due to the presence of nutrients (nitrogen- and phosphorous-containing compounds), pathogens (coliiform bacteria), and turbidity.

7, 8. The proposed action would affect biological resources identified within the SBCT ROI, which include general plants, animals, and vegetation communities as well as sensitive species and sensitive habitats. Sensitive habitats refer to Biologically Sensitive Areas as identified in the O‘ahu and PTA INRMPs, wetlands, and federally designated critical habitat. Conservation measures described in US Fish and Wildlife Service (USFWS) Recovery Plans for federally listed species have been implemented to the greatest degree feasible to avoid, minimize, or compensate for impacts to listed species. These impacts are summarized below and discussed in detail in the enclosed DEIS in the appropriate chapter.

Fire is expected to have significant adverse and not mitigable impacts on sensitive species and sensitive habitats. The proposed live-fire training would increase the probability that there would be a wildland fire in the project ROI. Wildland Fire Management Plans are being developed to minimize the probability of fire and shorten the time and distance that the fire would extend. However, it is not within the Army’s ability to prevent and contain all fires. The combined impacts of fire at each of the proposed training areas where live fire would occur (PTA, SBMR, and KTA) would cause long-term loss or impairment of a substantial portion of natural habitat and the loss of individual plant or animals that in total would constitute a population level decline. The extensive damage that is caused both directly and indirectly by fire would significantly impact federally listed and sensitive species and cannot be mitigated to the less than significant level. The Army is currently undergoing Section 7 consultation with the USFWS to ensure the proposed action will not jeopardize the continued existence of federally listed species or adversely modify critical habitat.
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Project activities would cause both short-term and long-term impacts on sensitive plants and wildlife and include impacts as a result of training and construction activities. Impacts will include those to certain endemic bird species (such as the O'ahu 'elepaio and its federally designated critical habitat, and the palila and its federally designated critical habitat), as well as impacts to migratory birds. There would be impacts to sensitive plant and animal species from the spread of nonnative (alien) species, from fire, from loss of habitat (both general and sensitive), and from habitat degradation. Many native and endangered plants (e.g., Ureia kaalae, Platypedia cornuta, Sanicula purpurea) are particularly susceptible to habitat disturbance by non-native species.

9. A wetland delineation of DMR was conducted in the spring and summer of 2002 following the US Army Corps of Engineers (ACOE) 1987 wetland delineation manual; results were published in a report dated August 2002. In a memorandum for the record, dated 4 September 2002, the Corps determined that the one wetland identified on DMR was not jurisdictional due to the absence of the hydrology indicator as required by the ACOE 1987 wetland delineation manual. The project would not affect this non-jurisdictional wetland.

10. Ka‘ala Natural Area Reserve (NAR) is the highest point on O‘ahu (4,020 feet) and dominates the northern section of the Wai‘anae Mountain Range behind and to the west of SBMR. Pahole NAR encompasses a complex valley system in the northern Wai‘anae Mountains and is located south/southeast of DMR. These NARs are not in shoreline areas and do not contain coastal ecosystems.

11-12. The project does not abut a Marine Conservation District or an estuary.

Mitigation Summary:
Proposed mitigation measures for reducing sediment loading to streams for each installation are described in the environmental consequences sections in the DEIS. Under the proposed action, USARHAW would continue to implement land restoration measures in accordance with the installation watershed management plans and the Integrated Natural Resource Management Plan (INRMP). Proposed mitigation measures would include, but would not be limited to, implementing the Integrated Training Area Management program to identify and inventory land condition using a GIS database; coordinating between training planners and natural resource managers; implementing land rehabilitation measures in accordance with the INRMP; monitoring the effectiveness of the land rehabilitation measures; evaluating erosion modeling data to identify areas in need of improved management; and implementing education and outreach programs to increase user awareness of the value of good land stewardship. While the proposed action does not currently include proposals for dredge and fill of waters of the U.S., all construction in or alteration of streams would be reviewed by the Corps of Engineers prior to construction to determine if the activity is regulated under Section 404 of the Clean Water Act (Section 404). In accordance with Section 404, any dredge or fill activities in these streams associated with the crossings may require a Department of the Army permit. If a Department of the Army permit is required, then a Clean Water Act (CWA) Section 401 Water Quality Certification issued by the State of Hawai‘i may also be required. The Army would design the stream crossings to avoid and minimize any dredge or fill impacts to the stream to the fullest extent practicable in compliance with Section 404. If the Corps determines that a Department of the Army permit is required, the Army would abide by all appropriate CWA regulations and permit processes administered by the Corps and Hawai‘i.

Proposed mitigation for chemicals from training ranges could include controlling soil erosion as described above. In addition, surface water quality and soils would be monitored as a means of measuring potential future impacts. If impacts on surface water or soils were identified through monitoring, further mitigation could include characterizing and remediating contaminant source areas.

Proposed mitigation for impacts on federally listed species would include compliance with ESA. The effects of SBCT actions on listed species in the SBCT ROI are being evaluated as part of ESA Section 7 consultation with USFWS. The ESA incidental take statements (including all terms and conditions) as defined in the Biological Opinion and required by USFWS for this action would be implemented as part of this proposed action. These measures would help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the proposed action. The Army would use the following proposed mitigation measures to lessen the level of impact to a less than significant level. The Army would educate soldiers and others...
ENCLOSURE 1: SBCT Coastal Consistency Determination

using the facilities and roads in the importance of cleaning vehicles and field gear. The Army would prevent weeds brought in by SBCT activities from becoming established by rigorously monitoring and eradicating new weeds. Vehicles would be confined to Helemano Trail, and personnel would be confined to their vehicles while on the trail, unless an emergency occurs.

Native plants would be used in any new landscaping or planting efforts where possible. Where possible, the Army would fence off any sensitive plants from activity that takes place within the ROI. Implementing an environmental management system would improve the identification and reduction of environmental risks inherent in mission activities. The Army would consult with the Invasive Species Council in compliance with Executive Order 13112, which determines federal agency duties in regard to preventing and compensating for invasive species impacts. Tactical Vehicle wash facilities are proposed at Schofield Barracks, KTA, and PTA. At these locations, the Army would inspect all vehicles and wash vehicles before allowing them to travel to other training ranges to minimize the spread of weeds and animal (invertebrate) relocations.

ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State’s economy in suitable locations.

Policies:
1) Concentrate in appropriate areas the location of coastal dependent development necessary to the State’s economy;

2) Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

3) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
   a) Utilization of presently designated locations is not feasible;
   b) Adverse environmental effects are minimized; and
   c) Important to the State’s economy.

Check either “Yes” or “No” for each of the following questions:

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<thead>
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<th>Yes</th>
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<tbody>
<tr>
<td>1. Does the project involve a harbor or port?</td>
<td>X</td>
<td></td>
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<tr>
<td>2. Is the project site within a designated tourist destination area?</td>
<td>X</td>
<td></td>
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<tr>
<td>3. Does the project site include agricultural lands or lands designated for such use?</td>
<td>X</td>
<td></td>
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<tr>
<td>4. Does the proposed activity relate to commercial fishing or seafood production?</td>
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<tr>
<td>5. Does the proposed activity related to energy production?</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6. Does the proposed activity relate to seabed mining?</td>
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<td>X</td>
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Discussion:
1. SBCT activities include using Kawaihae Harbor. However, SBCT does not include any project measures regarding constructing or deepening harbors.
ENCLOSURE 1: SBCT Coastal Consistency Determination

2. While some installations are adjacent to conservation areas, no project sites abut designated tourist destination areas.

3. Agricultural land would be changed to training land at the South Range Acquisition Area, West PTA Acquisition Area, Dillingham Trail, Helemano Trail, and PTA Trail.

4. Land use within the South Range and West PTA Acquisition Areas would be converted from agriculture to general training land. The South Range Acquisition Area would not be available for pineapple cultivation, and the West PTA Acquisition Area would not be available for cattle grazing. However, general military training within these areas is not expected to affect off-post land use. Land uses along Dillingham Trail and Helemano Trail would be converted from agriculture (both Prime and Unique) to general training land. The PTA Trail alignment is generally along property boundaries and is not expected to adversely affect land use.

5. The Army’s acquisition and use of the agricultural lands are exempted under 7 CFR 658 (Farmland Protection Policy Act), Section 658.3 (b). Acquisition or use of farmland by a Federal agency for national defense purposes is exempted by section 1547(b) of the Act, 7 U.S.C. 4208(b).

COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies:
1) Develop and communicate adequate information on storm wave, tsunami, flood erosion, and subsidence hazard;
2) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;
3) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
4) Prevent coastal flooding from inland projects.

Check either “Yes” or “No” for each of the following questions:

1. Is the project site on or abutting a sandy beach? [X]

2. Is the project site within a potential tsunami inundation area as depicted on the National Flood Insurance Program flood hazard map? [X]

3. Is the project site within a potential flood inundation area according to a flood hazard map? [X]

4. Is the project site within a potential subsidence hazard areas according to a subsidence hazard map? [X]

5. Has the project site or nearby shoreline areas experienced shoreline erosion? [X]

Discussion:
1. While DMR property includes shoreline areas and a small beach, no project measures take place on or near the shoreline.

2. None of the project areas is within a tsunami runup zone, although some may be marginally affected by flooding in the event of a tsunami, including areas near the shore at DMR and Kawaihae Harbor (terminus of the PTA Trail). The project is not expected to increase exposure to or hazards resulting from flooding.
3. The only area in which existing flood zones have been identified is on the Waikele Stream west of Wheeler Army Air Field. Flooding there occurs within the gulch of Waikele Stream but can inundate facilities located within the gulch. The project is not expected to increase exposure to or hazards resulting from flooding.

4. The proposed action is not expected to result in any significant new hazards associated with earthquakes or liquefaction relative to existing conditions. The risk of strong ground shaking at the site of SBCT installation structures is relatively low due to low likelihood of earthquake on Oahu. Because of their distances from the south coast of the Island of Hawai'i, where most earthquakes are centered, impacts to SBCT structures at PTA will also be low.

MANAGING DEVELOPMENT

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:
1) Effectively utilize and implement existing law to the maximum extent possible in managing present and future coastal zone development;
2) Facilitate timely processing of application for development permits and resolve overlapping or conflicting permit requirements; and
3) Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the general public to facilitate public participation in the planning and review process.

Check either “Yes” or “No” for each of the following questions:

1. Will the proposed activity require more than two (2) permits or approval? (Provide the status of each.) X ___
2. Does the proposed activity conform with the State and County land use designations for the site? See discussion
3. Has or will the public be notified of the proposed activity? X ___
4. Has a draft or final environmental impact statement or an environmental assessment been prepared? X ___

Discussion:
1. The proposed action requires consultation with the SHPO and USFWS/National Marine Fisheries Service (NMFS) in accordance with Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act. Permits required by federal law, such as NPDES permits for construction would be applied for when site-specific construction details are determined. The Section 106 and Section 7 consultations are ongoing concurrently with the NEPA process, and federal permits required for construction and operation will be obtained when more detailed plans become available.

2. In general, the proposed activities conform to state and county land use designations on properties currently in military use. Land use designations in the proposed acquisition areas and trail easements are, mainly agricultural and conservation uses. Following is a listing of the state and county land use designations for the affected parcels and military vehicle trail easements.
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a. Schofield Barracks Main Post/Schofield Barracks East Range/Wheeler Army Airfield:
   ii. City and County of Honolulu Central O'ahu Sustainable Community Plan: in the Urban District—Residential, Golf Course, Military, Public Facilities; in the Agriculture and Conservation Districts—Military, Agriculture, Preservation.
   iii. City and County Land Use Ordinance (zoning): urban and lower training areas—F-1 Military; mountainous areas—P-1 Restricted.

b. South Range Acquisition Area:
   i. State Land Use District: mostly Agriculture with a small portion in Conservation.
   ii. City and County of Honolulu Central O'ahu Sustainable Community Plan: Agriculture, Preservation.
   iii. City and County Land Use Ordinance: mostly Agriculture, Military, P-1 Restricted.

c. Dillingham Military Reservation:
   i. State Land Use Districts: mainly Agriculture with a small portion in Conservation.
   ii. City and County of Honolulu North Shore Sustainable Communities Plan: Military.
   iii. City and County Land Use Ordinance: Agriculture District—Ag-2 General; Conservation District—F-1 Military.

d. Dillingham Trail:
   i. State Land Use District: Agriculture.
   ii. City and County of Honolulu North Shore Sustainable Communities Plan: Agriculture.
   iii. City and County Land Use Ordinance: Ag-1 Restricted, Ag-2 General.

e. Kahuku Training Area:
   i. State Land Use Districts: Agriculture and Conservation.
   ii. City and County of Honolulu Ko'olau Loa Sustainable Communities Plan: Military.
   iii. City and County Land Use Ordinance: Ag-2 General, P-1 Restricted.

f. Kawailoa Training Area:
   i. State Land Use Districts: Conservation.
   ii. City and County of Honolulu North Shore Sustainable Communities Plan: Agriculture.
   iii. City and County Land Use Ordinance: Ag-1 Restricted, P-1 Restricted.

g. Helemano Trail:
   i. State Land Use Districts: Agriculture and Conservation.
   ii. City and County of Honolulu North Shore Sustainable Communities Plan: Agriculture.
   iii. City and County Land Use Ordinance: Ag-1 Restricted.

h. Drum Road:
   i. State Land Use Districts: Agriculture, Urban, Conservation.
   ii. City and County of Honolulu North Shore Sustainable Communities Plan: Agriculture.
   iii. City and County Land Use Ordinance: Ag-1 Restricted, P-1 Restricted.

i. Pohakuloa Training Area:
   i. State Land Use Districts: mostly Conservation with a small portion in Agriculture.
   ii. County of Hawai'i General Plan: Conservation (existing plan and proposed revision).
   iii. County of Hawai'i Zoning: Forest Reserve and Open.

j. West PTA Acquisition Area:
   i. State Land Use District: Agriculture.
   ii. County of Hawai'i General Plan: Conservation: Intensive Agriculture, Extensive Agriculture (existing plan); Proposed Important Agricultural Lands, Extensive Agriculture (proposed revision).
   iii. County of Hawai'i Zoning: A-40a Agriculture.

k. PTA Trail:
   i. State Land Use Districts: mostly Agriculture with small portion in Urban.
   ii. County of Hawai'i General Plan: Extensive and Intensive Agriculture, Urban Expansion, Medium Density Urban, Industrial (existing plan); Proposed Important Agricultural Lands, Open Area, Extensive Agriculture, Proposed Industrial, Medium Low Density, Industrial (proposed revision).
   iii. County of Hawai'i Zoning: A-5a and A-40a Agriculture, Open.
3. The public was notified of the proposed action during the scoping phase of the EIS process, including public notices (newspapers, website), mailings, press releases, and public scoping meetings. The same communication methods have been used to inform the public of the DEIS. See discussion under Public Participation that follows this section.

4. A DEIS has been prepared and is being circulated for public comment.

PUBLIC PARTICIPATION

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:
1) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

2) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

3) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: Regarding Policy No. 3, Council on Environmental Quality regulations for Implementing NEPA and Army Regulation (AR) 200-2 guide public participation opportunities in the NEPA process. These include issuing in the Federal Register a notice of intent (NOI) to prepare an EIS, a public scoping process, a 45-day public review period for the draft EIS, and publication of the final EIS, accompanied by a 30-day mandatory waiting period before the Record of Decision (ROD) is issued. Following publication of the NOI, public notices were published in the major newspapers on the Island of Hawai‘i and O‘ahu announcing the time and location of seven public scoping meetings to solicit input and to obtain comments on the scope of the EIS. In addition, the scoping meetings were announced in the April 8, 2000, issue of The Environmental Notice, published by the State of Hawai‘i, Department of Health, Office of Environmental Quality Control. The scoping period was extended to 70 days, during which the public, organizations, and agencies were encouraged to provide comments.

At the public scoping meetings, approximately 100 individuals or persons representing organizations provided oral comments for the Army’s consideration. The Army also received written comments from approximately 200 individuals and organizations in the form of e-mails, written letters, and form letters. The Army also received 21 comments to its World Wide Web site, 7 comments by telephone, and 77 comments at separate information meetings requested by groups and organizations. The Army compiled a scoping report, identifying and assessing the issues brought forth through the scoping process. The scoping meetings were held between April 16 and 30, 2002.

The Draft EIS was completed on October 3rd and is being circulated for public comment. Six public meetings were held between October 28th and November 6th. The 45-day public comment period was extended an additional 45 days; the close of public comment is now on January 3rd, 2004.

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

Policies:
1) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;
ENCLOSURE 1: SBCT Coastal Consistency Determination

2) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

3) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed action does not include project measures in which structures would be built seaward of the shoreline.

MARINE RESOURCES

Objective: Implement the State’s ocean resources management plan.

Policies:
1) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

2) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

3) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

4) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

5) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

6) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion:
The Army has prepared Integrated Natural Resource Management Plans that prescribe conservation measures for the habitat areas on installations that would be used under the proposed action. These include measures to protect aquatic health and water quality, watersheds and wetlands on training land. The effects of SBCT actions on listed species in the SBCT ROI are being evaluated as part of ESA Section 7 Consultation with the USFWS. The ESA incidental take statements (including all terms and conditions) as defined in the Biological Opinion and required by USFWS for this action would be implemented as part of this proposed action.
### U.S. Department of Agriculture

**FARMLAND CONVERSION IMPACT RATING**

**PART I** (To be completed by Federal Agency)

<table>
<thead>
<tr>
<th>Name Of Project</th>
<th>South Range Land Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Land Use</td>
<td>Military Training</td>
</tr>
</tbody>
</table>

**PART II** (To be completed by NRCS)

<table>
<thead>
<tr>
<th>Does the site contain prime, unique, statewide or local important farmland?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>(If no, the FPFA does not apply – do not complete additional parts of this form).</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Farmable Land In Govt. Jurisdiction Acres:</th>
<th>151,860</th>
<th>% 39</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>State Of Hawaii:</th>
<th>LESA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Of Land Evaluation System Used:</td>
<td>None</td>
</tr>
<tr>
<td>Name Of Local Site Assessment System:</td>
<td></td>
</tr>
</tbody>
</table>

**PART III** (To be completed by Federal Agency)

<table>
<thead>
<tr>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1402</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**PART IV** (To be completed by NRCS) Land Evaluation Information

<table>
<thead>
<tr>
<th>A. Total Acres Prime And Unique Farmland</th>
<th>535</th>
<th>84</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Total Acres Statewide And Local Important Farmland</td>
<td>252</td>
<td>3</td>
</tr>
<tr>
<td>C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted</td>
<td>0.83</td>
<td>0.09</td>
</tr>
<tr>
<td>D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value</td>
<td>33</td>
<td>15</td>
</tr>
</tbody>
</table>

**PART V** (To be completed by NRCS) Land Evaluation Criterion

<table>
<thead>
<tr>
<th>Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)</th>
<th>0</th>
<th>54</th>
<th>87</th>
<th>0</th>
</tr>
</thead>
</table>

**PART VI** (To be completed by Federal Agency)

<table>
<thead>
<tr>
<th>Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Area In Nonurban Use</td>
<td>15</td>
</tr>
<tr>
<td>2. Perimeter In Nonurban Use</td>
<td>10</td>
</tr>
<tr>
<td>3. Percent Of Site Being Farmed</td>
<td>20</td>
</tr>
<tr>
<td>4. Protection Provided By State And Local Government</td>
<td>20</td>
</tr>
<tr>
<td>5. Distance From Urban Builtup Area</td>
<td>15</td>
</tr>
<tr>
<td>6. Distance To Urban Support Services</td>
<td>15</td>
</tr>
<tr>
<td>7. Size Of Present Farm Unit Compared To Average</td>
<td>10</td>
</tr>
<tr>
<td>8. Creation Of Nonfarmable Farmland</td>
<td>10</td>
</tr>
<tr>
<td>9. Availability Of Farm Support Services</td>
<td>5</td>
</tr>
<tr>
<td>10. On-Farm Investments</td>
<td>20</td>
</tr>
<tr>
<td>11. Effects Of Conversion On Farm Support Services</td>
<td>10</td>
</tr>
<tr>
<td>12. Compatibility With Existing Agricultural Use</td>
<td>10</td>
</tr>
</tbody>
</table>

**PART VII** (To be completed by Federal Agency)

<table>
<thead>
<tr>
<th>Relative Value Of Farmland (From Part V)</th>
<th>100</th>
<th>54</th>
<th>0</th>
<th>87</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Site Assessment (From Part VI above or a local site assessment)</td>
<td>150</td>
<td>61</td>
<td>0</td>
<td>76</td>
<td>0</td>
</tr>
</tbody>
</table>

**TOTAL POINTS (Total of above 2 lines)**

<table>
<thead>
<tr>
<th>Site Selected:</th>
<th>Date Of Selection</th>
<th>Was A Local Site Assessment Used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason For Selection:</td>
<td></td>
<td>Yes ☐ No ☐</td>
</tr>
</tbody>
</table>

**NOTE:** This section will be completed at the time of "Record of Decision". After the final decision on this project has been made, this form will be filled with Natural Resource Conservation Service (NRCS) in compliance with the Farmland Protection Policy Act (FPPA).
# FARMLAND CONVERSION IMPACT RATING

**PART I (To be completed by Federal Agency)**

<table>
<thead>
<tr>
<th>Name Of Project</th>
<th>Date Of Land Evaluation Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>West PTA Land Acquisition Area</td>
<td>22 September 2003</td>
</tr>
</tbody>
</table>

**Name Of Project**

Proposed Land Use

| Military Training |

**County And State**

**Hawaii, Hawaii**

**Federal Agency Involved**

| U.S. Army Garrison - Hawaii |

**PART II (To be completed by NRCS)**

<table>
<thead>
<tr>
<th>Date Request/Received By NRCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/22/2003</td>
</tr>
</tbody>
</table>

**Does the site contain prime, unique, statewide or local important farmland?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acres Irigated</th>
<th>Average Farm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>74.28</td>
<td>2.62 ac</td>
</tr>
</tbody>
</table>

**Major Crop(s):**

Vegetable Crops, MacNuts, Coffee

Formable Land in Govt. Jurisdiction

<table>
<thead>
<tr>
<th>Acres</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>72.72</td>
<td>28</td>
</tr>
</tbody>
</table>

**Name Of Land Evaluation System Used:**

None

**Name Of Local Site Assessment System:**

**State of Hawaii LEISA**

**Date Land Evaluation Returned By NRCS:**

10/21/2003

---

**PART III (To be completed by Federal Agency)**

<table>
<thead>
<tr>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>23,000</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Total Acres To Be Converted Directly**

**Total Acres To Be Converted Indirectly**

| 0.0 | n/a | n/a | n/a |

**Total Acres In Site**

0.0

---

**PART IV (To be completed by NRCS)**

**Land Evaluation Information**

<table>
<thead>
<tr>
<th>Total Acres Prime And Unique Farmland</th>
<th>Total Acres Statewide And Local Important Farmland</th>
<th>Percentage Of Farmland In County Or Local Gov't Unit To Be Converted</th>
<th>Percentage Of Farmland In Gov't Jurisdiction With Some Or Higher Relative Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>16.7%</td>
<td>6.0%</td>
</tr>
</tbody>
</table>

**PART V (To be completed by NRCS)**

**Land Evaluation Criteria**

Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)

| 0 | 48 |

---

**PART VI (To be completed by Federal Agency)**

**Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))**

<table>
<thead>
<tr>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

| 1. Area In Nonurban Use | 15 |
| 2. Perimeter In Nonurban Use | 10 |
| 3. Percent Of Site Being Farmed | 20 |
| 4. Protection Provided By State And Local Government | 20 |
| 5. Distance From Urban Builtup Area | 15 |
| 6. Distance To Urban Support Services | 15 |
| 7. Size Of Present Farm Unit Compared To Average | 10 |
| 8. Creation Of Nonfarmable Farmland | 10 |
| 9. Availability Of Farm Support Services | 5 |
| 10. On-Farm Investments | 20 |
| 11. Effects Of Conversion On Farm Support Services | 10 |
| 12. Compatibility With Existing Agricultural Use | 10 |

| TOTAL SITE ASSESSMENT POINTS | 160 | 108 |

---

**PART VII (To be completed by Federal Agency)**

**Relative Value Of Farmland (From Part V)**

| 100 | | 48 | |

**Total Site Assessment (From Part VI above or a local site assessment)**

| 160 | 108 |

**TOTAL POINTS (Total of above 2 lines)**

| 260 | 156 |

---

**Site Selected:**

<table>
<thead>
<tr>
<th>Date Of Selection</th>
<th>Was A Local Site Assessment Used?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes ☒ No</td>
</tr>
</tbody>
</table>

**Reason For Selection:**

**NOTE:** This section will be completed at the time of "Record of Decision". After the final decision on this project has been made, this form will be filed with Natural Resource Conservation Service (NRCS) in compliance with the Farmland Protection Policy Act (FPPA).
APPENDIX L

ECONOMIC IMPACT FORECAST SYSTEM (EIFS) MODEL AND OUTPUT
Appendix L: Economic Impact Forecast System Model and Output

Socioeconomic Impact Assessment
Socioeconomic impacts are linked through cause-and-effect relationships. Military payrolls and local procurement contribute to the economic base for the region of influence (ROI). In this regard, construction of military training ranges and supporting facilities necessary for transformation at the Schofield Barracks, Kahuku Training Area, and Dillingham Military Range in Honolulu County, and the Pōhakuloa Training Area in Hawai‘i County, will have a multiplier effect on the local and regional economy. With the preferred alternative, direct jobs will be created, generating new income and increasing personal spending. This spending generally creates secondary jobs, increases business volume, and increases revenues for schools and other social services.

The Economic Impact Forecast System
The U.S. Army, with the assistance of many academic and professional economists and regional scientists, developed the Economic Impact Forecast System (EIFS) to address the economic impacts of NEPA-requiring actions and to measure their significance. As a result of its designed applicability, and in the interest of uniformity, EIFS should be used in NEPA assessments for RCI. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand, but still have firm, defensible bases in regional economic theory.

EIFS is implemented as an on-line system supported by the U.S. Army Environmental Policy Institute through the Computer Information Science Department of Clark Atlanta University, Georgia. The system is available to anyone with an approved user-id and password. University staff and the staff of the Army Environmental Policy Institute are available to assist with the use of EIFS.

The databases in EIFS are national in scope and cover the approximately 3,700 counties, parishes, and independent cities that are recognized as reporting units by federal agencies. EIFS allows the user to define an economic ROI by identifying the counties, parishes, or cities to be analyzed. Once the ROI is defined, the system aggregates the data, calculates multipliers and other variables used in the various models in EIFS, and prompts the user for forecast input data.

The EIFS Model
The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Army-related changes in local expenditures or employment. In calculating the multipliers, EIFS uses the economic base model approach, which relies on the ratio of total economic activity to basic economic activity. Basic, in this context, is defined as the production or employment engaged to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating aggregate impacts and makes the economic base model ideal for the EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its base sector; for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a location quotient approach based on the concentration of industries within the region relative to the industrial concentrations for the nation.

The user inputs into the model the data elements which describe the Army action: the change in expenditures, or dollar volume of the construction project(s); change in civilian or military employment; average annual income of affected civilian or military employees; the percent of civilians expected to relocate due to the Army’s action; and the percent of military living on-post. Once these are entered into the EIFS model, a projection of changes in the local economy is provided. These are projected changes in sales.
volume, income, employment, and population. These four indicator variables are used to measure and evaluate socioeconomic impacts. Sales volume is the direct and indirect change in local business activity and sales (total retail and wholesale trade sales, total selected service receipts, and value-added by manufacturing). Employment is the total change in local employment due to the proposed action, including not only the direct and secondary changes in local employment, but also those personnel who are initially affected by the military action. Income is the total change in local wages and salaries due to the proposed action, which includes the sum of the direct and indirect wages and salaries, plus the income of the civilian and military personnel affected by the proposed action. Population is, of course, the increase or decrease in the local population as a result of the proposed action.

Because the counties in this study (Hawai‘i County and Honolulu County) are two separate islands, two separate ROI’s were defined and analyzed using EIFS. For Hawai‘i County, the cost of construction of the new training ranges and supporting facilities was entered as the change in total expenditures. The total expenditure is the money that would be spent in the ROI study area, as well as outside the study area for goods that would need to be imported into the ROI (e.g., lumber). The expenditures associated with these projects were spread out over a 4-year period since the construction is currently scheduled to take place between 2004 and 2007. There would be no change in troop strength at any of the installations in Hawai‘i County as a result of the proposed action.

For Honolulu County, just as for Hawai‘i County, the cost of construction of the new training ranges and supporting facilities was entered as the change in total expenditures. The expenditures associated with these projects were spread out over a 5-year period since the construction is currently scheduled to take place between 2004 and 2008. Schofield Barracks in Honolulu County is expected to gain 480 troops. This increase in troop strength was entered as the change in military personnel. The average income of affected military personnel was calculated from the military basic pay scale, effective January 1, 2002.

The Significance of Socioeconomic Impacts

Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the user to evaluate the significance of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, income, employment, and population. These evaluations identify the positive and negative changes within which a project can affect the local economy without creating a significant impact. The greatest historical changes define the boundaries that provide a basis for comparing an action’s impact on the historical fluctuation in a particular area. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of the following variables:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Increase</th>
<th>Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Volume</td>
<td>X 100%</td>
<td>75%</td>
</tr>
<tr>
<td>Income</td>
<td>X 100%</td>
<td>67%</td>
</tr>
<tr>
<td>Employment</td>
<td>X 100%</td>
<td>67%</td>
</tr>
<tr>
<td>Population</td>
<td>X 100%</td>
<td>50%</td>
</tr>
</tbody>
</table>

These boundaries determine the amount of change that will affect an area. The percentage allowances are arbitrary, but sensible. The maximum positive historical fluctuation is allowed with expansion because economic growth is beneficial. While cases of damaging economic growth have been cited, and although the zero-growth concept is being accepted by many local planning groups, military base reductions and closures generally are more injurious to local economics than are expansion.

The major strengths of the RTV are its specificity to the region under analysis and its basis on actual historical data for the region. The EIFS impact model, in combination with the RTV, has proven successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring the intensity of impacts have been reviewed by economic experts and have been deemed theoretically sound.
The following are the EIFS inputs and output data for construction and the RTV values for the ROI. These data form the basis for the socioeconomic impact analysis presented in Section 4.13.
EIFS REPORT: HAWAI’I COUNTY

PROJECT NAME
Hawai‘i SBCT Hawai‘i County

STUDY AREA
15001 Hawai‘i, HI

FORECAST INPUT
Change In Local Expenditures $70,766,660
Change In Civilian Employment 0
Average Income of Affected Civilian $0
Percent Expected to Relocate 0
Change In Military Employment 0
Average Income of Affected Military $0
Percent of Military Living On-post 0

FORECAST OUTPUT
Employment Multiplier 2.54
Income Multiplier 2.54
Sales Volume – Direct $42,905,760
Sales Volume – Induced $66,074,880
Sales Volume – Total $108,980,600 7.38%
Income – Direct $6,989,448
Income - Induced $10,763,750
Income - Total(place of work) $17,753,200 0.73%
Employment – Direct 364
Employment – Induced 560
Employment – Total 924 1.31%
Local Population 0
Local Off-base Population 0 0%

RTV SUMMARY

<table>
<thead>
<tr>
<th></th>
<th>Sales Volume</th>
<th>Income</th>
<th>Employment</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive RTV</td>
<td>7.18</td>
<td>16.43</td>
<td>5.82</td>
<td>9.72</td>
</tr>
<tr>
<td>Negative RTV</td>
<td>-5.21</td>
<td>-10.91</td>
<td>-3.14</td>
<td>-4.57</td>
</tr>
</tbody>
</table>
## RTV DETAILED

### SALES VOLUME

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>Adj_Value</th>
<th>Change</th>
<th>Deviation</th>
<th>%Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>185647</td>
<td>349515</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>1970</td>
<td>220594</td>
<td>615457</td>
<td>65942</td>
<td>16620</td>
<td>2.7</td>
</tr>
<tr>
<td>1971</td>
<td>252094</td>
<td>675612</td>
<td>60155</td>
<td>10833</td>
<td>1.6</td>
</tr>
<tr>
<td>1972</td>
<td>281813</td>
<td>729896</td>
<td>54284</td>
<td>4962</td>
<td>0.68</td>
</tr>
<tr>
<td>1973</td>
<td>310283</td>
<td>753988</td>
<td>24092</td>
<td>-25230</td>
<td>-3.35</td>
</tr>
<tr>
<td>1974</td>
<td>348069</td>
<td>762271</td>
<td>8283</td>
<td>-41039</td>
<td>-5.38</td>
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<tr>
<td>1975</td>
<td>408890</td>
<td>821869</td>
<td>59598</td>
<td>10276</td>
<td>1.25</td>
</tr>
<tr>
<td>1976</td>
<td>458566</td>
<td>880447</td>
<td>58578</td>
<td>9256</td>
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</tr>
<tr>
<td>1977</td>
<td>506281</td>
<td>901180</td>
<td>20733</td>
<td>-28589</td>
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<tr>
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***** End of Report *****
EIFS REPORT HONOLULU COUNTY

PROJECT NAME
Hawai'i SBCT Honolulu County Total Region

STUDY AREA
15003 Honolulu, HI

FORECAST INPUT

| Change In Local Expenditures | $133,258,300 |
| Change In Civilian Employment | 0 |
| Average Income of Affected Civilian | $0 |
| Percent Expected to Relocate | 0 |
| Change In Military Employment | 810 |
| Average Income of Affected Military | $31,794 |
| Percent of Military Living On-post | 0 |

FORECAST OUTPUT

| Employment Multiplier | 2.7 |
| Income Multiplier | 2.7 |
| Sales Volume – Direct | $96,496,660 |
| Sales Volume – Induced | $164,044,300 |
| Sales Volume – Total | $260,541,000 1.87% |
| Income – Direct | $39,197,690 |
| Income - Induced | $26,286,210 |
| Income - Total(place of work) | $65,483,900 0.29% |
| Employment – Direct | 1,506 |
| Employment – Induced | 1,183 |
| Employment – Total | 2,690 0.47% |
| Local Population | 2,017 |
| Local Off-base Population | 2,017 0.23% |

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