

CHAPTER 9

CUMULATIVE IMPACTS

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 Hawai'i 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 Hawai'i 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 Hawai'i. 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 Hawai'i.

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 Hawai'i. 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**

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date
1. Whole Barracks Renewal Program	SBMR	US Army	Upgrade barracks facilities.	2010
2. Advanced Wastewater Treatment Upgrade	SBMR	US Army	Upgrade sewage treatment to an advanced treatment and effluent system.	2005
3. Fire Station-SBMR	SBMR	US Army	Build a new fire station. Old fire station is historic and will be preserved.	2005
4. Soldier and Family Readiness Center	SBMR	US Army	Build a new facility to house several services.	2007
5. Information Systems Facility	SBMR Main Post	US Army	Construct a 38,138-square-foot (11,624-square-meter) building. Special electromagnetic field shielding precautions are compulsory.	2005
6. Mission Support Training Facility	SBMR Main Post	US Army	Construct an 89,803-square-foot (27,372-square-meter) building to house war-fighting and digital classroom training.	2005
7. Installation Information Infrastructure Architecture	SBMR Main Post	US Army	Install fiber optics cabling from the cantonment area to the ranges, motor pool, and other facilities within the installation.	2004
8. Gate Alignments	SBMR/WAAF	US Army	Three gate alignments at SBMR and two at WAAF.	2007-2008
9. Army Facility Strategy Program	SBMR/WAAF	US Army	Projects include an aviation motor pool complex at WAAF, 2 physical fitness centers (SBMR, WAAF), a general instruction building, and upgrades to SBMR.	Unknown
10. Kamehameha Highway Bridge Replacements	Kawela, Kaukonahua Road (near SBMR/SBER)	State of Hawai‘i	Replace bridges. Kawela Stream bridge is near Kawela Camp Road, and Upper Poamoho Stream Bridge is in the Vicinity of Helemanō Plantation, near Kaukonahua Road.	Funded through 2004
11. Mākua Implementation Plan	MMR	US Army	Cooperative program with local landowners to stabilize endangered plants and animals with habitat at MMR.	2036
12. Live-Fire Training	MMR	US Army	Resume routine live fire military training at MMR.	2005
13. Controlled Burns at Army Installations in Hawai‘i	MMR, SBMR (McCarthy Flats), PTA, DMR	US Army	Controlled burn of dangerous vegetation to reduce fuel load at ranges. This also facilitates UXO clearance and surveys for cultural sites.	Ongoing, seasonal
14. Farrington Highway Improvements	Makaha (near MMR)	State of Hawai‘i	Construct safety and operation improvements for Farrington Highway, including sidewalks, signalized pedestrian crosswalk or bridges, and continuous left turn fences.	Funded through 2004
15. Farrington Highway, Replacement of Makaha Bridges 3 and 3A	Makaha (near MMR)	State of Hawai‘i	Replace two timber bridges in the vicinity of Mākaha Beach Park.	Funded through 2004
16. Kahuku Windmill and Hook Parcels Land Acquisition	KTA	US Army	Purchase 71.5 acres at KTA.	Completed
17. Turtle Bay Resort Improvements	KTA	Turtle Bay Resort	Expand and renovate hotel.	2004
18. Lā‘ie Wastewater Collection System Expansion Phase II – Lā‘ie	Lā‘ie (adjacent to KTA)	Town of Lā‘ie	Upgrade the existing sewage collection system.	2004

Table 9-1
Cumulative Projects on O‘ahu *(continued)*

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date
19. Drum Road Upgrade	Helemanō to Kahuku (near KTA)	US Army	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 <u>current force</u> training.	<u>2005/2006</u>
20. Kamehameha Highway Traffic Improvements	Kahaluu to Waimea Bay (near KTA)	State of Hawai‘i	Construct passing lanes, construct turning lanes at intersections, modify existing traffic signals, and install signs, flashers, and other warning devices.	Funded through 2004
21. Hot Cargo Pad	HAFB	US Air Force	Construct facilities to simultaneously load 3 C-5/C-17 aircraft.	Unknown
22. Troop Rigger Facility	HAFB	US Air Force	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.	<u>Unknown</u>
23. Ship Operations Building	Bishop Point near Pearl Harbor (near HAFB)	US Army	Construct a one-story ship operations building.	2004
24. Dry-dock Waterfront Support Facility	Pearl Harbor (near HAFB)	US Navy	Construct two-story metal buildings, renovate an existing latrine, demolish several buildings.	2003
25. Residential Communities Initiative	Army Installations on O‘ahu	US Army	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.	Construction starts 2004. Lease/management period 2004-2053
26. 25 th ID(L) & USARHAW Revitalization Program	O‘ahu	US Army	Construct or renovate water tanks and central ID Lab.	2006-2008
27. Implementation of the Integrated Natural Resources Management Plan	O‘ahu	US Army	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.	Not all projects funded. Plan 2002-2006
28. Implementation of the Integrated Cultural Resource Management Plan	O‘ahu	US Army	This project outlines stabilization and preservation strategies for protecting cultural and historical resources on US Army installations on O‘ahu.	Ongoing
29. Implementation of Proposed Range and Training Land Program Development Plan actions	O‘ahu	US Army	A planning document for managing range facilities and training areas based on Army training doctrine and resource guidance.	Ongoing
30. Implementation of the Central O‘ahu Sustainable Communities Plan	O‘ahu	City and County of Honolulu	A guideline for developing central O‘ahu.	Ongoing
31. Basing of eight C-17 aircraft at HAFB and the departure of four C-130 aircraft from HAFB.	HAFB	USAF	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.	Unknown
32. Land Transfer at DMR	O‘ahu	US Army	The Army will be returning the portion of the beach land in front of DMR to the State.	<u>2004 - 2005</u>

Figure 9-1
Cumulative Projects on O'ahu

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:

- 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.

Gate Alignments—Schofield Barracks/Wheeler Army Airfield (Project 8)

Foote 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.

WAAF 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 Kaukaonahua Road. The projects are funded through 2004 (OMPO 2002).

Mākua Implementation Plan—Mākua Military Reservation (Project 11)

The US Army's Mākua 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 O'ahu and sites on Kaua'i, 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 Mākua 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." (Mākua 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—Mākua 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 Mākua 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 Hawai'i (Project 13)

Prescribed burns have been conducted at Army installations in Hawai'i 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 live 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 FONSI 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**

Project	Location	Sponsor	Description	Projected Completion Date
1. Kawaihae Deep Draft Harbor	Kawaihae Harbor	The US Army Corps of Engineers and the State of Hawai‘i	Deepening and expanding the Kawaihae Harbor. The project consists of an entrance channel, the harbor basin, and a breakwater.	2008
2. TSV Pier Use	Kawaihae Harbor	The US Army Corps of Engineers	Using existing piers at Kawaihae Harbor for TSV landings.	Unknown
3. PTA 1010 Land Acquisition	PTA	US Army	The US Army is negotiating with a private landowner to acquire an area to be used for ongoing training.	Unknown
4. Consolidated command and range control building	PTA	US Army	Constructing a consolidated command center at PTA for ongoing training.	2004
5. Saddle Road realignment	Across island of Hawai‘i, near PTA	Federal Highways Administration (FHWA), State of Hawai‘i	Long-term highway construction project that includes improving and modifying Saddle Road between Hilo side and Kona side of the island of Hawai‘i.	Unknown
6. Kawaihae/Waimea Road	Waimea Park to Merriman’s (near Kawaihae Harbor)	State of Hawai‘i	State right-of-way and possible construction to replace road for the Kawaihae/Waimea Road.	Unknown
7. Waimea to Kawaihae Highway	South Kohala	FHWA	A 14-mile (23-kilometer) improved highway between Waimea town and Kawaihae Harbor in central and west Hawai‘i.	Unknown
8. Former Waikoloa Maneuver Area and Nansay Sites UXO Cleanup	Hawai‘i	The US Army Corps of Engineers	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.	2015
9. Theater Support Vessel (TSV)	O‘ahu to the island of Hawai‘i (Pearl Harbor to Kawaihae and waters in between)	US Army	High-speed transport vessel may be used between O‘ahu and Hawai‘i. Design specifics and operating characteristics are not known at this time.	Unknown
10. Relocation of Kilauea Fire Station to PTA	Hawai‘i/PTA	US Army	The Army proposes to move the fire station on the grounds of Hawai‘i Volcanoes National Park to Pōhakuloa Training Area, 70 miles (113 kilometers) away by road.	January 2005
11. RTLP Range Development Plan	Hawai‘i/PTA	US Army	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	2004-2005
12. Outrigger Telescopes Project	Mauna Kea	NASA	NASA proposes to fund the construction and operation of six outrigger telescopes in the W. M. Keck Observatory site at the Mauna Kea Summit.	2004-2007

Source: Tetra Tech 2002

Figure 9-2
Cumulative Projects on Hawai'i

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—Pōhakuloa 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—Pōhakuloa 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, Waiki'i Ranch, Kilohana 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.

RTL 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 RTL Range Development Plan project. Upcoming proposed projects identified so far to meet current force needs include converting the multi-purpose machine

Figure 9-3

Waikoloa Maneuver Area and Nansay Sites

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**

Resource Area	Proposed Action	Reduced Land Acquisition	No Action
Land Use/Recreation	⊗	⊗	○
Visual Resources	⊙	⊙	○
Airspace	⊙	⊙	○
Air quality	⊙	⊙	○
Noise	⊙	⊙	○
Traffic	⊙	⊙	○
Water Resources	⊗	⊗	○
Geologic, Soils, and Seismicity	⊙	⊙	○
Biological Resources	⊗	⊗	⊗
Cultural Resources	⊗	⊗	⊗+
Human Health and Safety Hazards	⊗	⊗	⊗
Socioeconomic and Environmental Justice	⊗	⊗	○
Public Service and Utilities	⊙	⊙	○

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 Helemanō 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 be 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 Helemanō Trail, which is expected to occur between August 2005 and August 2006, could occur simultaneously with the Kamehameha Highway bridge replacement near the Helemanō 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 Helemanō 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 Kawaihae/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 a 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 PM₁₀ 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 PM₁₀. 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.

PM₁₀ emissions. Fugitive dust sources and wildfires are the major contributors to PM₁₀ 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 PM₁₀ 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 PM₁₀ concentrations, such events in the past have not violated federal PM₁₀ standards. As discussed in Chapters 4 through 8, there may be localized, direct significant impacts from PM₁₀ 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 PM₁₀, 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 overdrawing 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 not to 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 be 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 ground water 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.

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 IWFMP 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 Mākuā 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 INRMPs 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, mongoose, 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 not 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 islands 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 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, 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 sties, 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 its 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.